



# **Exoplanet Characterisation Observatory (EChO)**

## **Assessment Phase Payload Study**

### **Generation of a target list of observable exoplanets for EChO**

**ECHO-TN-0001-UCL**

**Issue 03**

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#### DOCUMENT CHANGE DETAILS

Issue	Date	Page	Description Of Change	Comment
3	11-12-13	most	<p>Updated all figures and tables with latest simulation run, this factors in some minor echoism changes but mainly adds new targets.</p> <p>Targets that are missing a distance (earth to star) have their distance estimated from the magnitude and spectral type.</p> <p>Spectral plots are updated with better sampling and more cases.</p>	
2	30-09-13	Lots	<p>Updated all figures and tables with latest simulation run. The major change being the temperatures shown in the table are the ones used in the simulation, this was not always true in issue 1.</p> <p>Added simulation run for Rosetta Stone mode</p> <p>In addition there are several text changes, mostly language based.</p>	



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## **1 PREAMBLE**

### **1.1 SCOPE**

This document covers the generation and results of simulations using EChOSim on the currently confirmed Exoplanets. The results show the viability of the mission and allow other researchers to study EChO's performance and capabilities on a range of targets.

### **1.2 PURPOSE**

The reason for this document to exist is to explain how the target list is generated and to provide results of the simulations.

### **1.3 APPLICABLE DOCUMENTS**

AD #	APPLICABLE DOCUMENT TITLE	DOCUMENT ID	ISSUE / DATE
1			
2			
3			

### **1.4 REFERENCE DOCUMENTS**

RD #	REFERENCE DOCUMENT TITLE	DOCUMENT ID	ISSUE / DATE
1	ESA-MRD	3.0	
2	ESA-SciRD		
3	EChOSim URD	3.0	
4	EChOSim SRD	3.0	
5	EChOSim-TN-0001-UCL (EChOSim – ESA-RM comparison)	1.0	
6	EChO Photometric Stability TN	1.0	



## 2 INTRODUCTION

Survey missions like EChO require the generation of a target list of observable objects. The choices made in the selection are important to maximise the mission efficiency and breadth of science. By running the current population of targets through the EChO end-to-end simulator, EChOSim (see EChOSim URD/SRD, Waldmann et al 2013, Pascale et al., in prep), we can estimate if a given target observation will reach the required signal to noise, how many orbits it will take and how much observing time it will require. In addition we can compare simulations with different instrument designs to investigate the impact on the mission.

### 3 ETLOS (GENERATING THE LIST)

A first target list has been generated and will be updated using the EChO Target List Observation Simulator (ETLOS) utilising the Open Exoplanet Catalogue (Rein et al, 2012) for the exoplanet database which generally cites original papers as sources. We have further verified most targets using SIMBAD, the 2MASS catalogue and exoplanet.eu where appropriate. The Open Exoplanet Catalogue was chosen as it was open access and easy to modify allowing us to be more confident over its accuracy than other catalogues. During the duration of this exercise, the exoplanet community provided constant feedback with a variety of contributions and star/planetary parameter updates.

To facilitate the EChO Target List Simulator we developed the Open Exoplanet Catalogue Python Interface (OECPy<sup>1</sup>) to load the latest exoplanet databases into ETLOS. OECPy was written by us as a general package for exoplanet research and is where most of our assumptions (such as planet classification) are handled along with the calculations of orbital parameters and estimations for any missing values. OECPy is still in development but is available today<sup>1</sup>.

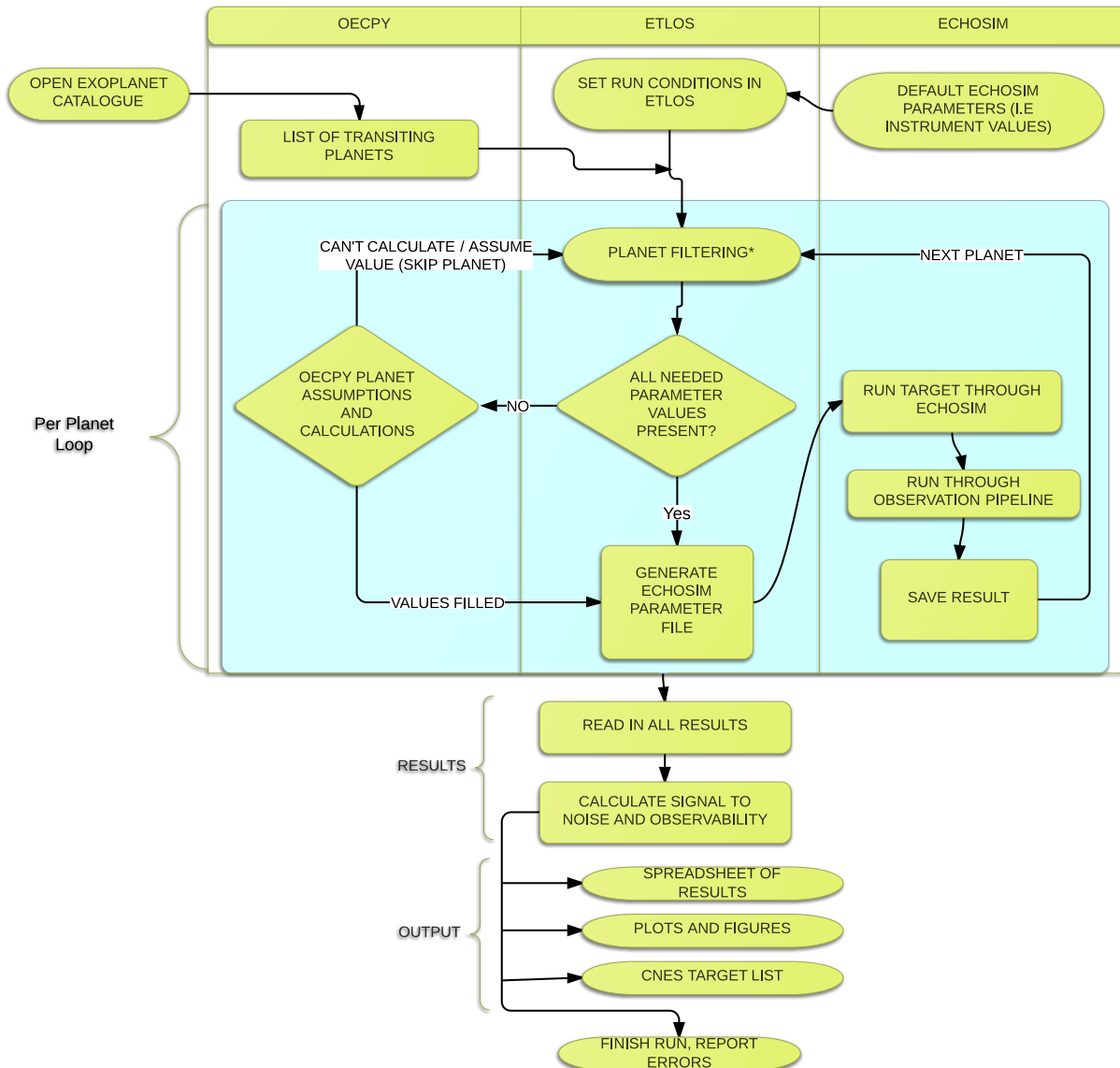
ETLOS works by generating EChOSim parameter files for each target and running them through EChOSim (version 3.0) and the associated observation pipeline (which analyses the EChOSim generated data to obtain transmission/emission spectra). ETLOS outputs spectra as ascii files which are used to calculate the signal to noise of the exoplanetary observation. The full flow chart of how ETLOS works and fits into the source planet catalogue (OEC) and EChOSim is shown in Figure 1.

ETLOS is designed for the long term needs of the mission, it is dynamic, newly discovered planets are typically added to the catalogue within hours and can immediately be ran by ETLOS and added to the results. Parameters can be changed to gauge the impact of instrument changes, or optimized observation strategies. Changes can be made both globally, to targets meeting certain conditions and on a target by target basis making it a powerful informative tool.

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<sup>1</sup> Available as free download: <https://github.com/ryanvarley/open-exoplanet-catalogue-python>

<sup>2</sup> <http://www.uni.edu/morgans/astro/course/Notes/section2/spectraltemps.html>



**Figure 1** Flowchart of the ETLOS code and how it links in to the Open Exoplanet Catalogue (OEC), Open Exoplanet Catalogue Python Interface (OECPY) and ECHOSim (the end-to-end ECHO mission Simulator). \*Planet filtering refers to the exclusion of certain faint targets or the checking of any changes in planet parameters (incremental run).

## 4 RUN CONDITIONS AND ASSUMPTIONS

We made very conservative assumptions for the simulations to account for contingency.

- Current instrument design is assumed
- maximum zodiacal noise
- No optimal de-trending algorithm is used to optimize the SNR (e.g. a potential increase of SNR by a factor Square root 2 could obtainable)
- Jitter for reaction wheel option 1 (PRE noise = 20 mas-rms, RPE noise = 50 mas-rms, see pointing stability tech note)
- Circular orbits are assumed for all targets

We performed three runs all with the same run conditions but with differing resolution and SNR requirements:

1. **Chemical Census** - R=50 for  $\lambda < 5 \mu\text{m}$  and R=30 or  $\lambda > 5 \mu\text{m}$  where the results for SNR 5 correspond to the level required for this mode
2. **Origin Mode** - R=100 for  $\lambda < 5 \mu\text{m}$  and R=30 or  $\lambda > 5 \mu\text{m}$  where the results for SNR 10 correspond to level required for this mode
3. **Rosetta Stones** – R=300 for  $\lambda < 5 \mu\text{m}$  and R=30 or  $\lambda > 5 \mu\text{m}$  where the results for SNR 20 correspond to level required for this mode

We classify a planet as being observable when an appropriate SNR can be reached within the 5 year lifetime of the EChO Mission. No overheads or observation clashes are taken into account. This is done separately by the scheduling team.

### 4.1 MISSING VALUES

Whilst a wealth of targets have been discovered, many are poorly constrained or are missing inferred parameters such as mass. To assess the observability of these targets we estimate some of the missing values, this is done within OECPy. The calculation (or assumptions) we use are listed.

- Inclination =  $90^\circ$
- For stellar parameters we use the assumptions listed in the SCiRD-3.0 (The mapping between spectral type and effective temperature for all stars up to late Ms has been taken from Table A5 of Kenyon & Hartmann (1995, ApJ, 101, 117), connecting smoothly with Golimowski et al. (2004, AJ, 127, 3516) for the late-Ms, and using Baraffe et al. (1998, A&A, 337, 403) 1-Gyr isochrone for the radii.)
- We estimate the planetary effective temperature ( $T_{pl}$ ) using Tessenyi et al. (2012)

$$T_{pl} = T_{\star} \left( \sqrt{\frac{(1-A) R_{\star}}{\epsilon 2a}} \right)^{\frac{1}{2}} \quad \text{where the planetary albedo is } A = 0.3, \text{ and a small greenhouse effect contribution of } \epsilon = 0.7 \text{ is assumed.}$$

- $M_p$  estimated using density of planet type in Table 1 (Grasset et al. 2009, ApJ, 693, 722).

Many systems are missing distances to them. This is a required part of EChOSim in order to accurately simulate the star. In order to include as many targets as possible we estimate the distance when missing by using an absolute magnitude lookup table based on spectral type<sup>2</sup>. Stars without a constrained spectral type are omitted.

<sup>2</sup> <http://www.uni.edu/morgans/astro/course/Notes/section2/spectraltemps.html>

We then use the following distance-magnitude relationship to calculate the distance.

$$m - M = 5 \log_{10}(d) - 5$$

Where  $m$  is the apparent magnitude,  $M$  the absolute magnitude and  $d$  the distance to the star, We omit the  $A_V$  term as we only require a conservative estimate.

Where we do not have the apparent magnitude (in V band) we convert the K band magnitude using table A5 of Kenyon et al. (1995).

## 4.2 PLANET CLASSIFICATION

All planets are classified based on their mass and temperature, when a planet has no mass measured the radius assumptions are used instead (Grasset et al. 2009, ApJ, 693, 722). These classifications are then used to choose other values for the simulation. Temperature is used to choose the albedo while mass is used to choose the mean molecular weight (and is also used in EChOSim to calculate the scale height of the atmosphere for primary transits).

Type	Mass (Earth Mass)	Radius (Earth Radius)	Density (g/cm <sup>3</sup> )	Mean Molecular Weight (u)	Type	T (K)	Bond Albedo
Jupiter	> 50	> 6	1.326	2	Hot	> 700	0.1
Neptune	> 10	> 3	1.638	2	Warm	> 350	0.3
Super-Earth	< 10	< 3	4	18	Temperate	< 350	0.3

**Table 1** Assumed parameters of planets used in our simulations. These can be changed within ETLOS to suit different requirements.

## 4.3 THE TARGET SAMPLE

Of the 391 targets available we were able to simulate 363. We later removed 226 leaving us with 166. Of this new sample 130 did not require any parameters to be calculated, the remaining 36 required one or more. Targets that were excluded include those missing fundamental parameters (i.e. stellar radius in the announced but unpublished target wasp-20b), planets around binary star systems (which are not currently supported by EChOSim's Keplerian orbit solver), and the eccentric planets HD 80606 b and TRES-4 b which cannot be considered with circular orbits. With further assumptions most of these targets could be simulated in a *Phase II* study.

The 226 removed planets were rejected from the working sample as they are outside the range of current instrument design considerations, these were excluded from future iterations to increase the speed of simulations runs and are not included in our results.

## 4.4 SNR JUSTIFICATION

To justify our SNR choices for the different observing modes we ran three planets (GJ 1214b, GJ 436b, HD 189733b) in transmission for CO, CO<sub>2</sub>, H<sub>2</sub>O, CH<sub>4</sub> at abundances of 10<sup>-3</sup>, 10<sup>-5</sup>, 10<sup>-7</sup> and three planets (55 Cnc e, GJ 436b, HD 189733b) in emission for CO<sub>2</sub> at an abundance of 10<sup>-5</sup>. The spectral files were generated using TAU (Hollis et al. 2013)<sup>3</sup> for transmission and as described by Tessenyi et al. (2013)<sup>4</sup> for emission.

Figure 2 shows EChOSim simulations for a CO<sub>2</sub> atmosphere of GJ 436b ran for the number of transits specified to reach SNR 5 for the Chemical Census mode found by our original run without molecules and SNR 10 for Origin mode. All our simulated cases are shown in Figure 7 for Chemical Census and Figure 8 for Origin.

Plots are labelled in the format

<sup>3</sup> M.D.J. Hollis et al., *Comp. Phys. Comm.* **184**, pp. 2351-2361 (2013)

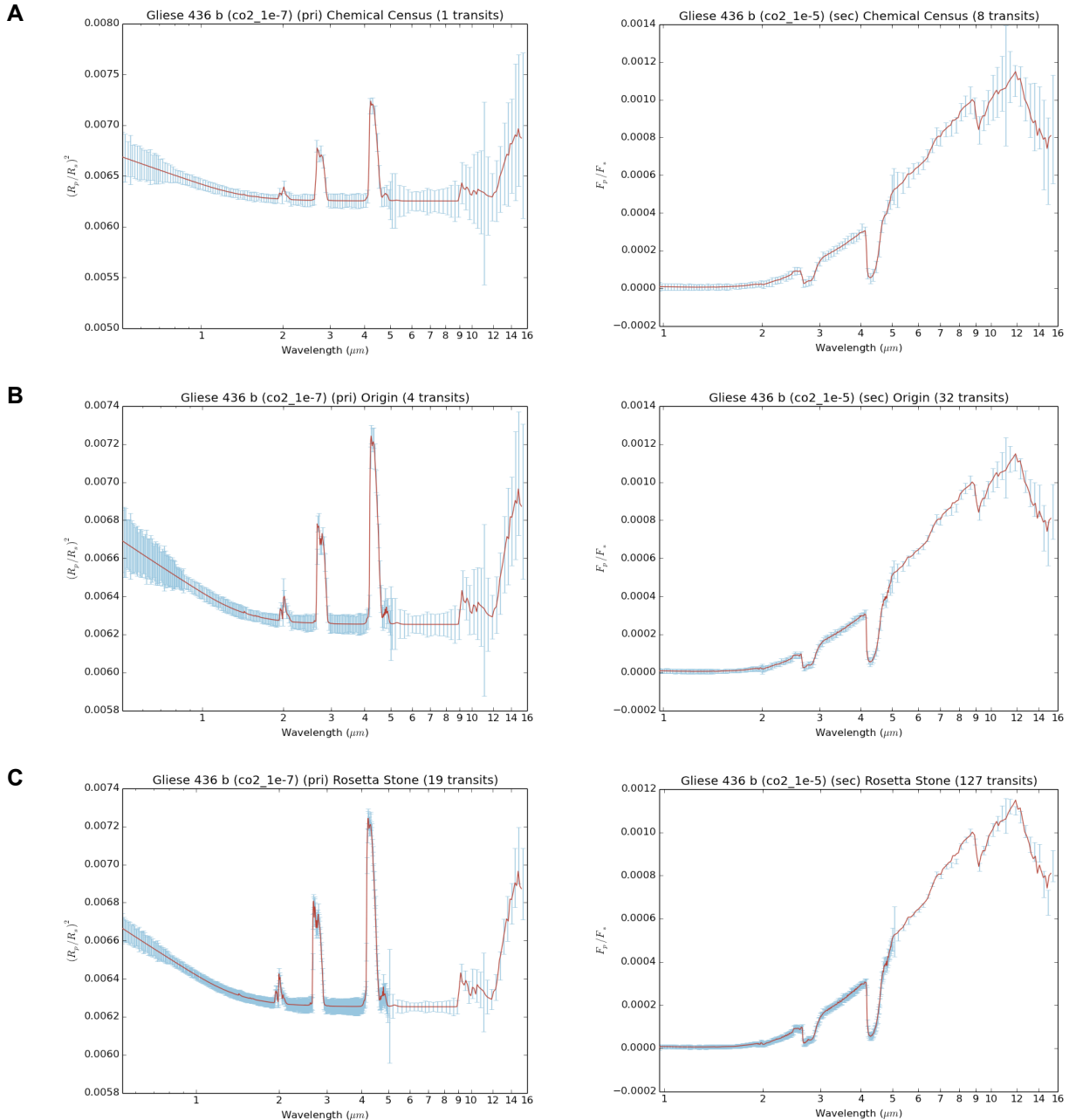
<sup>4</sup> Tessenyi et al. (2013). Molecular Detectability in Exoplanetary Emission Spectra, *Icarus*, in press. astro-ph



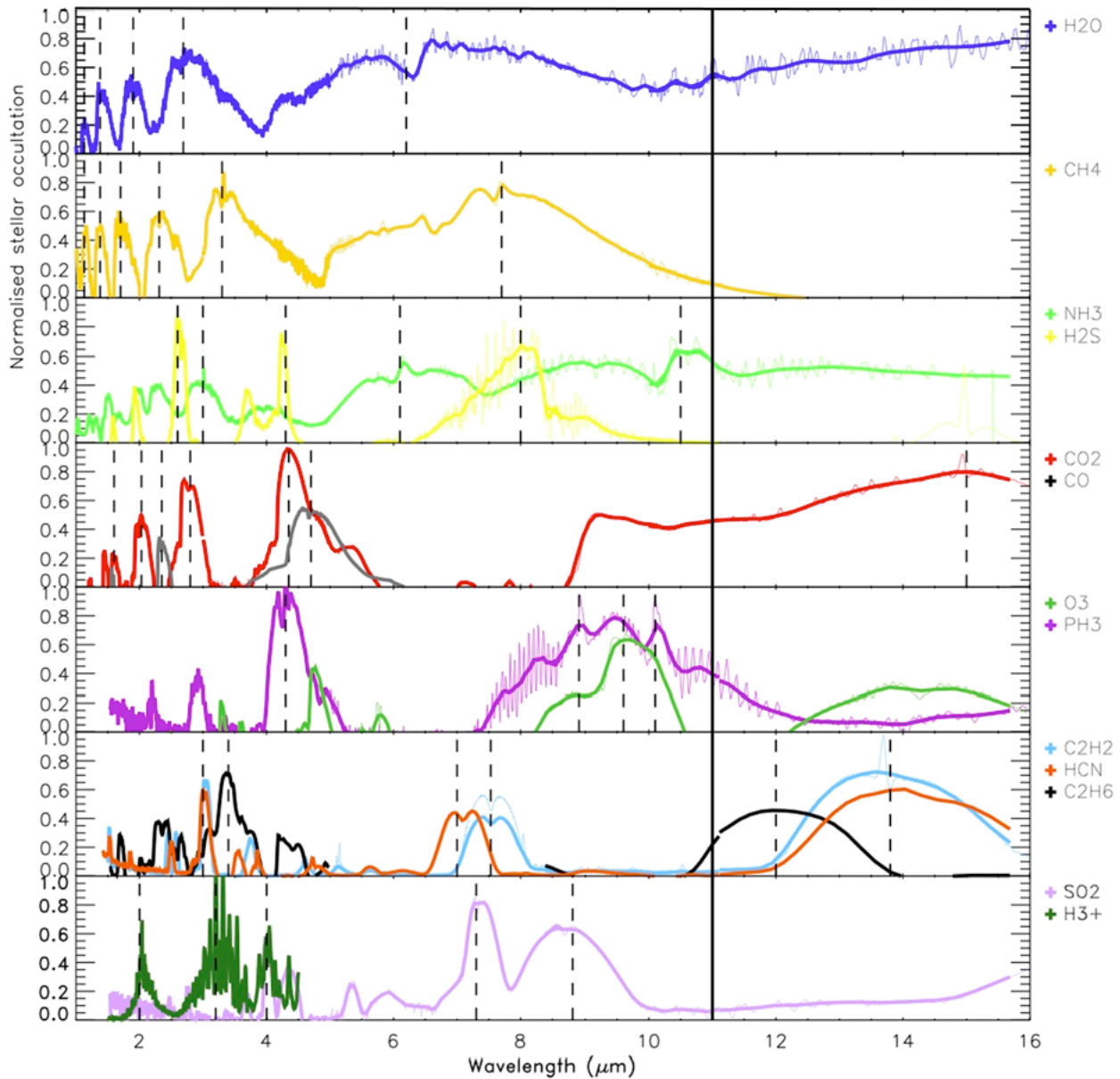
[Planet name] ([molecule]\_[abundance]) ([transit type]) Planet Signal – [Survey Type] – [Number of transits]

Where the transit type is either primary (pri) or secondary (sec) and the number of transits/eclipses is how many transits/eclipses have been combined to produce the signal.

We find that even for low abundances (e.g. mixing ratios  $\sim 10^{-7}$ )  $\text{SNR} = 5$  is sufficient to detect most of trace gases (see also Tesseney et al., 2013, Icarus in press, <http://arxiv.org/abs/1308.4986>). This also validates our choice of using the mean of the best bin in the mid three channels for our SNR calculation.



**Figure 2** Simulated spectra for GJ 436 b with a composition of CO<sub>2</sub> with an abundance of  $10^{-7}$  in transmission (left) and for CO<sub>2</sub> with an abundance of  $10^{-5}$  in emission (right) (A) Chemical Census and (B) Origin modes and (C) Rosetta Stone modes. The blue error bars represent the simulated observation in EChOSim with the red lines showing the original model (at a higher resolution than the simulation).



**Figure 3** extracted from Tinetti, Encrenaz and Coustenis, *The Astronomy and Astrophysics Review* (63), 2013, in press. Absorptions contributions from different molecules in the transmission spectrum of a hot, gaseous exoplanet. Two values of the spectral resolving power are used: 300 (thin line) and 30 (thick line). The dashed vertical lines indicate the positions of maximum absorption for the different molecules. We used high temperature line lists BT2 (Barber et al. 2006) for water, BYTe (Yurchenko et al. 2011) for ammonia, Neale et al. (1996) coefficients for H+3 and HITEMP (Rothman et al. 2010) for CO and CO2. The other molecules were simulated using HITRAN 2008 (Rothman et al. 2009) line list.

## 5 RESULTS

The following results show the diversity of planets and systems known today observable by EChO. These results are obtained for the three observing modes, Chemical Census, Origin and Rosetta Stones.

The observability of a target is assessed by taking the mean SNR of the SWIR and two MWIR channels and selecting the best channel from these. This is justified in section §4.4 which shows simulated spectra using this criteria.

We find 166 planets are observable with a reasonable number of transits or eclipses with 2/3 observable in both primary and secondary. Observing all targets in chemical census would require ~ 3 years of continuous observations with 2/3 of the targets in just 1.5 years, without overheads of scheduling, calibration, slewing etc. of the 166 targets only 8 are unobservable in either primary or secondary.

Figure 4 shows the parameter space echo could explore if launched today. Whilst currently the majority of observable targets are Hot Jupiter's these systems cover a very broad parameter space in terms of stellar types, eccentricity, temperature, density etc.

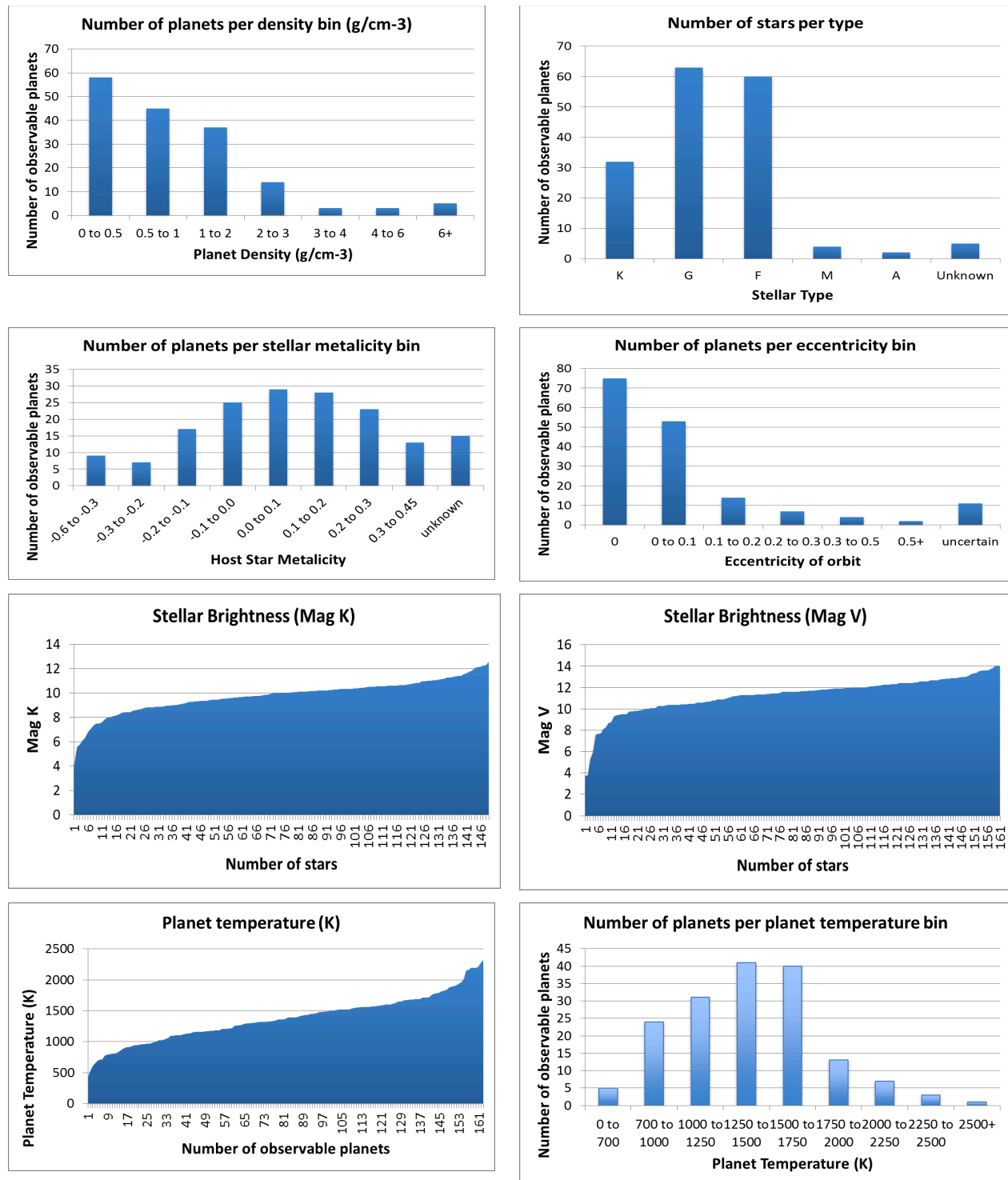
Figure 5 shows how the number of observable planets changes with mission length. With perfect scheduling and no overheads the majority of the chemical census targets could be observed in just half a year. For the Rosetta Stone survey the target sample is much more constrained by the length of the mission with only half capable of being observed with a year and 2/3 within 2 years.

We generate two types of plot for each observable target.

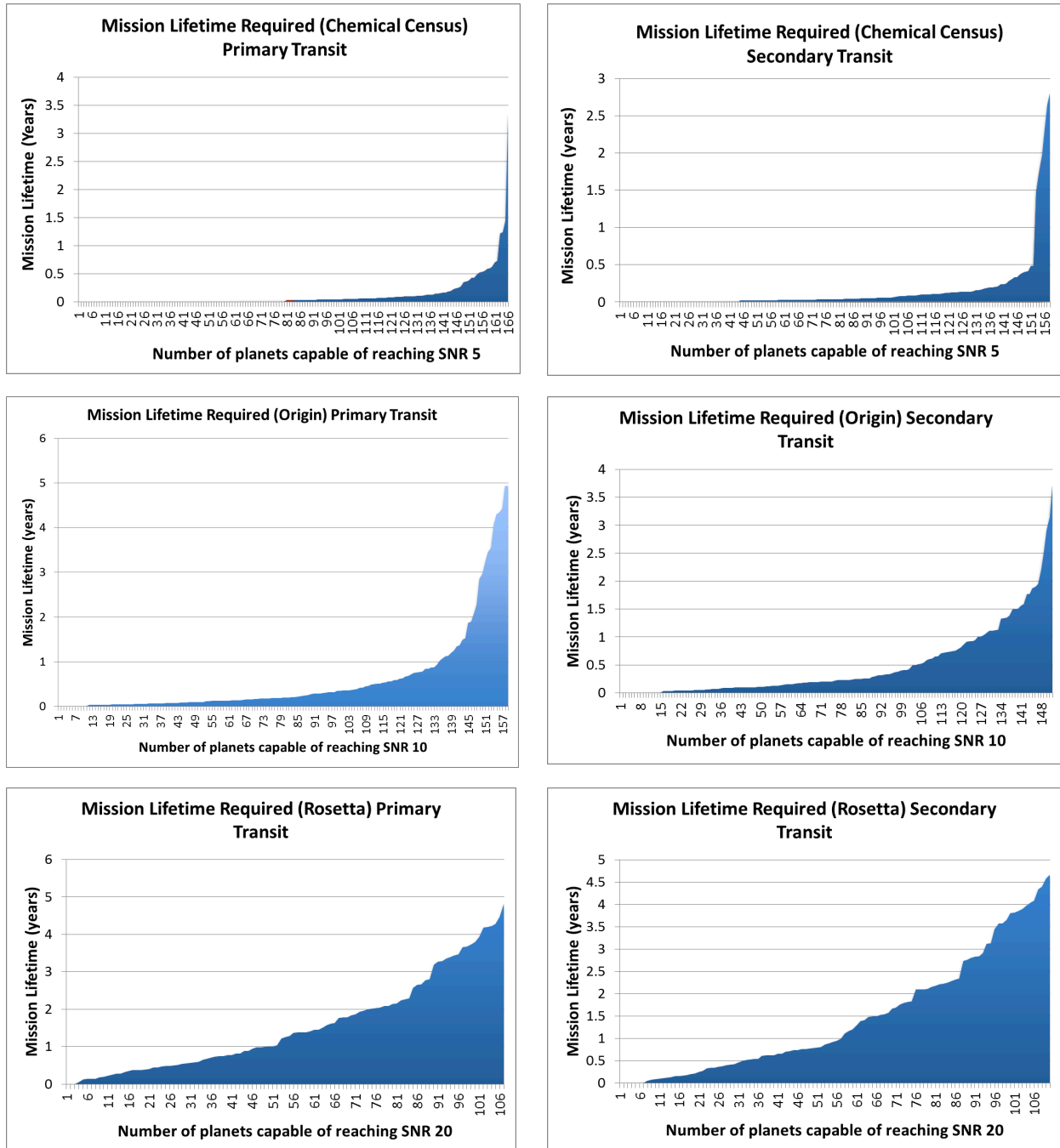
- Signal to noise scaled to 5, 10 and 20 (note that we calculate the number required transits in integers so the actual signal to noise may be higher)
- The signal to noise per photometric bin (each channel summed together in one bin). Useful for studies of the albedo, thermal emission and orbital phase curves.

An example of these plots is shown in Figure 6 with all plots available in §9 (Figure 10 to Figure 11).

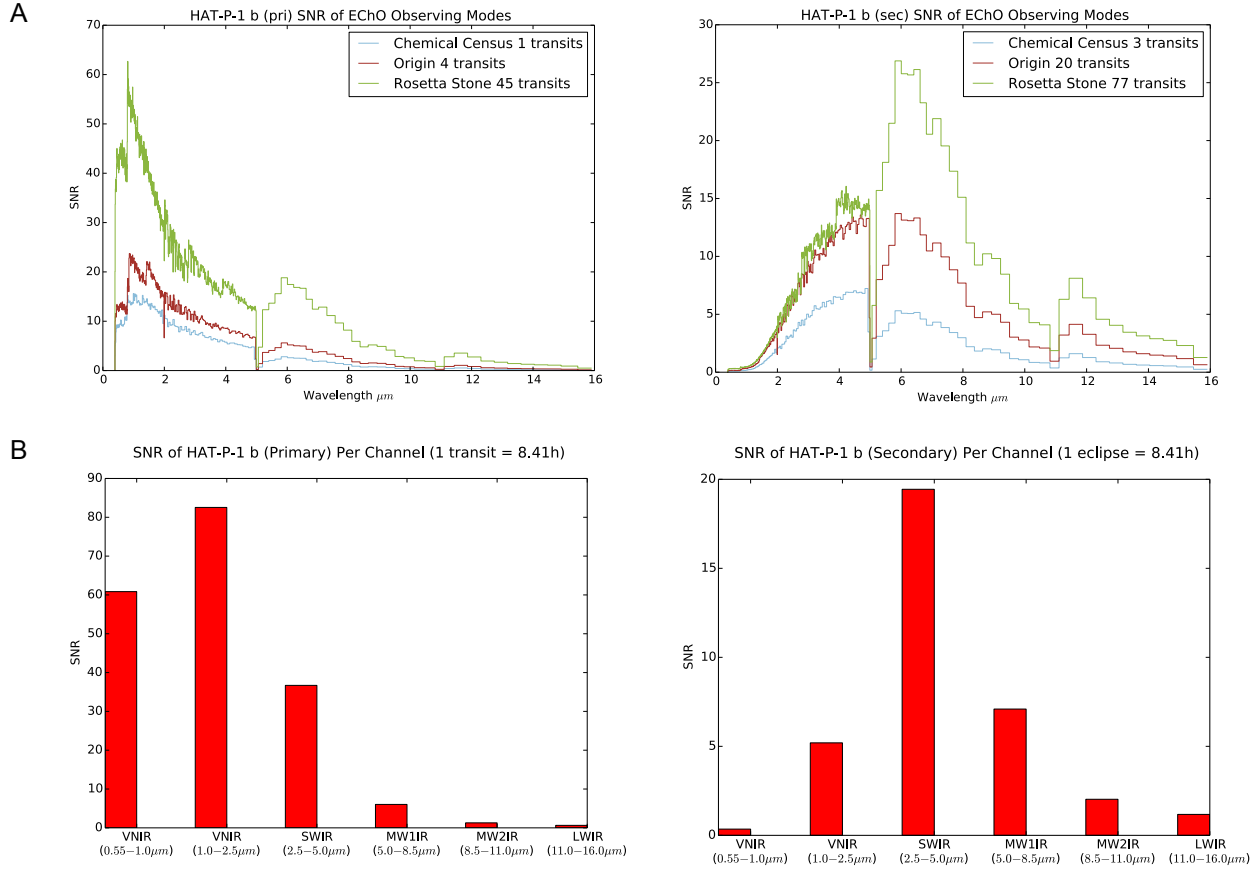
**Figure 4** Parameter space probed through the currently observable targets by EChO in Chemical Census mode (see text for details).



**Figure 5** Plots showing how many planets can be observed with the length of the mission. The time for the planet to be counted as observable is the number of transits required for the observing mode multiplied by the period.



**Figure 6** Example of the plots generated by ETLOS for HAT-P-1 b in transmission (left) and emission (right). **A** shows the SNR per bin at the number of transits required for each survey and **B** the SNR per channel as a single bin for a single transit.





## 6 CONCLUSION

The plots, tables and data shown and described in this tech note are available as a data packet at <https://www.dropbox.com/s/ug9m83kt9ue5m62/echo-target-list-tn-data-packet-v3.zip> to be downloaded and used by consortium members for further study. The format of the results are explained in §7.1

Out of the 166 targets simulated we find all 166 are observable in Chemical Census in primary and/or secondary transit with 158 observable in both types of transit. ~160 are observable in either primary and/or secondary in Origin mode and ~135 in either primary and/or secondary in Rosetta Stone mode without any overheads or scheduling issues (see DRM and other scheduling tech notes). This shows that even today we can fulfill all the science requirements and tackle the goals reported in the SciRD with a sizable target list to choose the core sample from for each mode.

The programs developed for this exercise are ongoing developments. Whilst we have simulated some targets with molecules, future iterations will be linked directly to models of exoplanet atmospheres for all targets allowing even better quantification of molecular detectability.



## 7 APPENDIX

### 7.1 FORMAT OF THE RESULTS

The data packet available at <https://www.dropbox.com/s/ug9m83kt9ue5m62/echo-target-list-tn-data-packet-v3.zip> a variety of folders and files, the format of which is explained below.

name	description
bulk_snr_plots	Plots for each planet in primary and secondary showing the total SNR of each channel as a single bin.
origin (100-30)	Folder containing plots and data for origin mode
origin (100-30) - mol	Folder containing plots and data for simulations ran using different atmospheric compositions for a selection of targets in origin mode
chemical census (50-30)	Folder containing plots and data for chemical census mode
chemical census (50-30) - mol	Folder containing plots and data for simulations ran using different atmospheric compositions for a selection of targets in chemical census mode
rosetta stone (300-30)	Folder containing plots and data for Rosetta Stone mode
rosetta stone (300-30) - mol	Folder containing plots and data for simulations ran using different atmospheric compositions for a selection of targets in Rosetta Stone mode
system_parameters.xls	Spreadsheet of system values used in our simulations
results-chemicalcensus.xls	Table of the number of transits required to reach SNR 5 in primary and secondary for each planet in the chemical census survey
results-origin.xls	Table of the number of transits required to reach SNR 10 in primary and secondary for each planet in the origin survey
results-rosettastone.xls	Table of the number of transits required to reach SNR 20 in primary and secondary for each planet in the Rosetta Stone survey
snr plots	Plots of the snr for each target of all 3 modes combined for both primary and secondary

Inside the highlighted folders are some or all of the following.

name	description
planet_signal_plots	Plots of the signal from each planet with error bars (a plotted version of the output in the pri / sec folders).
pri	Contains the EChOSim observation pipeline output for each planet in primary transit (.txt) and the parameter files used (.yaml).
sec	Same as pri but for secondary transit

The format of the .txt files in the pri and sec folders is

Wavelength (microns) | Signal | Errorbar

For primary transits we subtract the transit depth from the signal to get the planetary rather than the stellar signal. You can find the mass and radius used in the parameter file (.yaml) or in system\_parameters.xls.





## 7.2 PLANET PARAMETERS USED

Copy of the table 'system\_parameters.xls' available in the data packet showing the system parameters we used in our simulations.

**Table 2 – System parameters used in our simulations.** The values given are those from the Open Exoplanet Catalogue along with any assumed values and results of our calculations for missing values. Some values have been rounded to fit in this document, raw values are available in the spreadsheet of this table available in the data packet. Also included in the spreadsheet is the flags column which indicated which values have been calculated by us.

Planet Name	Planet Type	Distance (pc)	Mass (Mj)	Radius (Rj)	density	Temp (K)	i (deg)	a (pc)	P (days)	mu (u)	Albedo	Star Type	Mass (Ms)	Radius (Rs)	Temp (K)	Metallicity	magK	magV	Observing Duration (hours)	Transits in 5.0 yr
55 Cnc e	Hot Super-Earth	12	0.03	0.18	6.01	1781	nan	0.0155	0.74	18	0.10	K0V	0.905	0.943	5196	0.31	4.015	5.95	4.982	2479
BD+30 1138 b	Hot Jupiter	178	1.46	1.36	0.77	1668	84.1	0.0413	2.70	2	0.10	F2	1.282	1.482	1482	0.05	8.662	9.82	9.521	675
CoRoT-1 b	Hot Jupiter	460	1.03	1.49	0.41	1898	85.1	0.0254	1.51	2	0.10	G0V	0.95	1.11	6298	-0.30	12.149	13.6	7.537	1210
CoRoT-11 b	Hot Jupiter	560	2.49	1.39	1.23	1593	81.4	0.0435	2.99	2	0.10	F6V	1.27	1.37	6440	-0.03	11.248	12.8	4.385	609
CoRoT-19 b	Hot Jupiter	800	1.11	1.45	0.48	1515	87.6	0.0518	3.90	2	0.10	F9V	1.21	1.65	6090	-0.02	11.837	14.007	14.054	468
CoRoT-2 b	Hot Jupiter	300	3.31	1.47	1.40	1393	87.8	0.0281	1.74	2	0.10	G7V	0.97	0.902	5575	nan	10.31	12.568	6.843	1047
CoRoT-4 b	Hot Jupiter	724	0.72	1.19	0.57	976	90.0	0.0900	9.20	2	0.10	F8V	1.1	1.15	6190	0.05	12.29	13.7	13.914	198
CoRoT-5 b	Hot Jupiter	400	0.47	1.39	0.23	1316	85.8	0.0495	4.04	2	0.10	F9V	1	1.186	6100	-0.25	12.546	14	9.475	452
Gliese 1214 b	Warm Super-Earth	13	0.02	0.25	1.59	520	88.2	0.0141	1.58	18	0.30	M4.5	0.15	0.216	3026	0.39	8.782	14.71	2.660	1155
Gliese 3470 b	Warm Neptune	31	0.04	0.44	0.68	604	88.1	0.0356	3.34	2	0.30	M1.5	0.539	0.568	3600	0.20	7.989	12.3	5.625	547
Gliese 436 b	Warm Neptune	10	0.07	0.37	2.01	650	85.8	0.0289	2.64	2	0.30	M3.5V	0.452	0.464	3684	-0.32	6.073	10.59	2.111	690
HAT-P-1 b	Hot Jupiter	139	0.52	1.22	0.39	1182	86.3	0.0554	4.47	2	0.10	G0V	1.133	1.115	5975	0.13	8.858	10.4	8.406	408
HAT-P-11 b	Hot Neptune	38	0.08	0.45	1.16	791	88.5	0.0530	4.89	2	0.10	K4	0.81	0.75	4780	0.31	7.009	9.47	7.299	373
HAT-P-12 b	Hot Jupiter	143	0.21	0.96	0.32	875	nan	0.0384	3.21	2	0.10	K5	0.73	0.7	4650	-0.29	10.108	12.84	7.147	568
HAT-P-13 b	Hot Jupiter	214	0.85	1.28	0.54	1504	83.3	0.0426	2.92	2	0.10	G4	1.22	1.56	5638	0.43	8.975	10.42	9.719	626
HAT-P-14 b	Hot Jupiter	205	2.20	1.20	1.69	1446	83.2	0.0594	4.63	2	0.10	F	1.386	1.468	6600	0.11	8.851	9.99	4.281	394
HAT-P-15 b	Hot Jupiter	190	1.95	1.07	2.10	820	89.1	0.0964	10.86	2	0.10	G5	1.013	1.08	5568	0.22	9.641	12.41	13.801	168
HAT-P-16 b	Hot Jupiter	235	4.19	1.29	2.60	1486	86.6	0.0413	2.78	2	0.10	F8	1.218	1.237	6158	0.17	9.553	10.91	9.133	657
HAT-P-17 b	Hot Jupiter	90	0.53	1.01	0.69	707	89.2	0.0882	10.34	2	0.10	K	0.857	0.837	5246	nan	8.544	10.38	11.313	176
HAT-P-18 b	Hot Jupiter	166	0.20	1.00	0.27	775	88.8	0.0559	5.51	2	0.10	K	0.77	0.749	4803	0.10	10.234	12.76	8.568	331
HAT-P-19 b	Hot Jupiter	215	0.29	1.13	0.27	923	88.2	0.0466	4.01	2	0.10	K	0.842	0.82	4990	0.23	10.546	12.9	8.118	455
HAT-P-2 b	Hot Jupiter	118	8.74	0.95	13.48	1344	90.0	0.0674	5.63	2	0.10	F8	1.36	1.64	6290	0.14	7.603	8.69	15.579	324
HAT-P-20 b	Hot Jupiter	70	7.25	0.87	14.75	888	86.8	0.0361	2.88	2	0.10	K7	0.756	0.694	4595	0.35	8.601	11.34	5.571	635
HAT-P-21 b	Hot Jupiter	254	4.06	1.02	5.02	1162	87.2	0.0494	4.12	2	0.10	G3	0.947	1.105	5588	0.01	10.111	11.46	9.795	442
HAT-P-22 b	Hot Jupiter	82	2.15	1.08	2.26	1172	86.9	0.0414	3.21	2	0.10	G5	0.916	1.04	5302	0.24	7.837	9.76	8.708	568
HAT-P-23 b	Hot Jupiter	393	2.09	1.37	1.08	1874	85.1	0.0232	1.21	2	0.10	G5	1.13	1.203	5905	0.15	10.791	11.94	7.228	1505
HAT-P-24 b	Hot Jupiter	306	0.69	1.24	0.47	1495	88.6	0.0465	3.36	2	0.10	F8	1.191	1.317	6373	-0.16	10.543	11.76	11.025	544
HAT-P-25 b	Hot Jupiter	297	0.57	1.19	0.45	1100	87.6	0.0466	3.65	2	0.10	G5	1.01	0.959	5500	0.31	10.815	13.15	8.370	499
HAT-P-26 b	Hot Neptune	134	0.06	0.57	0.43	907	88.6	0.0479	4.23	2	0.10	K1	0.816	0.788	5079	-0.04	9.581	11.76	7.651	431
HAT-P-27 b	Hot Jupiter	204	0.62	1.02	0.77	1103	85.0	0.0400	3.04	2	0.10	G8	0.92	0.87	5300	0.14	10.109	12.19	5.101	600
HAT-P-28 b	Hot Jupiter	395	0.63	1.21	0.47	1262	88.0	0.0434	3.26	2	0.10	G3	1.025	1.103	5680	0.12	11.104	13.03	9.526	560
HAT-P-29 b	Hot Jupiter	322	0.78	1.11	0.76	1149	87.1	0.0667	5.72	2	0.10	F8	1.207	1.224	6087	0.21	10.297	11.83	10.347	319
HAT-P-3 b	Hot Jupiter	130	0.59	0.83	1.39	1047	87.1	0.0387	2.90	2	0.10	K	0.917	0.799	5224	0.27	9.448	11.86	6.237	629
HAT-P-30 b	Hot Jupiter	193	0.71	1.34	0.39	1553	83.6	0.0419	2.81	2	0.10	F	1.242	1.215	6304	0.13	9.151	10.35	6.569	649
HAT-P-31 b	Hot Jupiter	354	2.17	1.07	2.35	1325	87.1	0.0550	5.01	2	0.10	F	1.218	1.36	6065	0.15	10.083	11.67	13.122	364
HAT-P-32 b	Hot Jupiter	320	0.94	2.04	0.15	1677	88.7	0.0344	2.15	2	0.10	F/G	1.176	1.387	6001	-0.16	9.99	11.44	10.681	849
HAT-P-33 b	Hot Jupiter	419	0.76	1.83	0.17	1675	86.7	0.0503	3.47	2	0.10	F	1.403	1.777	6401	0.05	10.004	11.03	13.855	525
HAT-P-34 b	Hot Jupiter	257	3.33	1.20	2.57	1335	87.1	0.0677	5.45	2	0.10	F8	1.392	1.535	6442	0.22	9.247	10.4	12.845	334
HAT-P-35 b	Hot Jupiter	535	1.05	1.33	0.59	1443	87.3	0.0498	3.65	2	0.10	F	1.236	1.435	6096	0.11	11.03	11.59	11.710	500
HAT-P-36 b	Hot Jupiter	317	1.83	1.26	1.20	1669	86.0	0.0238	1.33	2	0.10	G	1.022	1.096	5580	0.26	10.603	12.262	7.069	1376
HAT-P-38 b	Hot Jupiter	249	0.27	0.83	0.63	987	88.3	0.0523	4.64	2	0.10	G	0.886	0.923	5330	0.06	10.501	12.557	9.039	393
HAT-P-39 b	Hot Jupiter	642	0.60	1.57	0.20	1602	87.0	0.0509	3.54	2	0.10	F	1.404	1.625	6430	0.19	11.157	12.422	12.667	515
HAT-P-4 b	Hot Jupiter	310	0.68	1.27	0.44	1551	89.7	0.0446	3.06	2	0.10	F	1.26	1.59	5890	0.24	9.77	11.12	12.672	597
HAT-P-40 b	Hot Jupiter	501	0.62	1.73	0.16	1615	88.3	0.0608	4.46	2	0.10	F	1.512	2.206	6080	0.22	10.009	11.34	18.552	409
HAT-P-41 b	Hot Jupiter	344	0.80	1.69	0.22	1690	87.7	0.0426	2.69	2	0.10	F	1.418	1.683	6390	0.21	9.728	11.36	12.393	677
HAT-P-42 b	Hot Jupiter	447	0.98	1.28	0.62	1427	85.9	0.0575	4.64	2	0.10	G	1.179	1.528	6455	0.27	10.626	12.17	12.194	393
HAT-P-43 b	Hot Jupiter	543	0.66	1.28	0.41	1361	88.7	0.0443	3.33	2	0.10	F	1.048	1.104	5979	0.23	11.764	13.36	9.811	547
HAT-P-44 b	Hot Jupiter	374	0.39	1.28	0.25	1126	89.0	0.0507	4.30	2	0.10	nan	0.939	0.979	5295	0.33	11.275	5.34	9.934	424
HAT-P-45 b	Hot Jupiter	305	0.89	1.43	0.41	1652	87.8	0.0452	3.13	2	0.10	nan	1.259	1.319	6330	0.07	nan	3.75	10.532	583
HAT-P-46 b	Hot Jupiter	296	0.49	1.28	0.31	1458	85.5	0.0577	4.47	2	0.10	nan	1.284	1.396	6120	0.30	9.924	3.79	9.811	408
HAT-P-5 b	Hot Jupiter	340	1.06	1.25	0.72	1387	86.8	0.0408	2.79	2	0.10	G	1.163	1.137	5960	0.24	10.481	11.95	8.546	654
HAT-P-6 b	Hot Jupiter	200	1.06	1.33	0.60	1530	85.5	0.0524	3.85	2	0.10	F	1.29	1.46	6570	-0.13	9.313	10.47	10.548	473
HAT-P-7 b	Hot Jupiter	320	1.71	1.46	0.73	2733	83.1	0.0379	2.20	2	0.10	F6	1.415	1.9276	6350	0.26	9.334	10.48	11.601	828

HAT-P-8 b	Hot Jupiter	230	1.28	1.32	0.73	1713	87.8	0.0439	3.08	2	0.10	F	1.192	1.475	6200	0.01	8.953	10.36	11.825	593
HAT-P-9 b	Hot Jupiter	480	0.67	1.40	0.32	1397	86.5	0.0530	3.92	2	0.10	F	1.28	1.32	6350	0.12	11.015	12.34	10.237	465
HATS-1 b	Hot Jupiter	303	1.86	1.30	1.11	1250	85.6	0.0444	3.45	2	0.10	G2V	0.986	1.038	5870	-0.06	10.58	12.053	7.630	529
HATS-2 b	Hot Jupiter	360	1.35	1.17	1.12	1577	87.2	0.0230	1.35	2	0.10	K	0.88	0.89	5227	0.15	11.386	13.62	6.217	1348
HATS-3 b	Hot Jupiter	556	1.14	1.70	0.31	1816	84.3	0.0497	3.55	2	0.10	F	1.3	1.725	6351	-0.16	10.694	12.44	12.140	514
HD 149026 b	Hot Jupiter	79	0.36	0.72	1.28	1602	85.3	0.0429	2.88	2	0.10	G0V	1.3	1.497	6147	0.36	6.819	8.14	9.969	635
HD 189733 A b	Hot Jupiter	19	1.14	1.14	1.02	1100	85.5	0.0314	2.22	2	0.10	K2V	0.8	0.788	4980	-0.03	5.54	7.68	5.570	823
HD 209458 b	Hot Jupiter	47	0.71	1.38	0.36	1316	86.6	0.0475	3.52	2	0.10	G0V	1.148	1.146	6075	0.02	6.308	7.63	9.051	518
HD 97658 b	Warm Super-Earth	21	0.02	0.21	0.38	689	89.5	0.0796	9.49	18	0.30	K1V	0.748	0.703	5119	-0.30	5.734	7.714	9.019	192
KELT-2A b	Hot Jupiter	129	1.49	1.31	0.88	1566	89	0.0550	4.11	2	0.10	F7V	1.31	1.842	6148	-0.02	7.346	8.77	15.891	443
KOI-13 b	Hot Jupiter	604	8.30	1.40	4.01	3648	85.9	0.0367	1.76	2	0.10	A5-7V	2.05	2.55	8500	nan	8.425	9.95	13.852	1035
KOI-254 b	Hot Jupiter	333	0.51	0.96	0.76	956	87.0	0.0270	2.46	2	0.10	M	0.59	0.55	4116	0.13	12.89	16.88	5.580	743
KOI-2672 b	Warm Neptune	263	0.05	0.48	0.63	413	nan	0.3690	88.52	2	0.30	nan	0.95	1.04	5565	nan	nan	nan	27.977	20
KOI-94 d	Hot Jupiter	426	0.33	1.03	0.41	806	89.9	0.1684	22.34	2	0.10	F	1.277	1.52	6182	0.02	10.926	11.626	23.050	81
Kepler-12 b	Hot Jupiter	600	0.43	1.70	0.12	1354	88.8	0.0556	4.44	2	0.10	G0	1.166	1.483	5947	0.07	12.066	13.4	14.009	411
Kepler-15 b	Hot Jupiter	661	0.66	0.96	0.99	1028	87.4	0.0571	4.94	2	0.10	G	1.018	0.992	5595	0.36	12.216	13.8	8.741	369
Kepler-17 b	Hot Jupiter	800	2.45	1.31	1.44	1623	87.2	0.0259	1.49	2	0.10	G2V	1.16	1.05	5781	0.26	12.585	14	7.125	1229
Kepler-25 c	Hot Neptune	191	nan	0.41	nan	960	nan	0.1100	12.72	2	0.10	F	1.22	1.36	6190	nan	9.493	10.77	17.371	143
Kepler-63 b	Hot Jupiter	200	0.38	0.56	2.90	963	87.8	0.0800	9.43	2	0.10	nan	0.984	0.901	5576	0.05	9.997	12.02	8.820	193
Kepler-7 b	Hot Jupiter	446	0.43	1.61	0.14	1487	85.2	0.0625	4.89	2	0.10	G0	1.36	2.02	5933	0.11	11.535	12.945	15.786	373
Kepler-76 b	Hot Jupiter	513	2.00	1.25	1.36	2274	78.0	0.0278	1.54	2	0.10	G2V	1.2	1.32	6409	-0.10	12.092	13.552	4.568	1182
OGLE2-TR-L9 b	Hot Jupiter	900	4.34	1.61	1.37	2155	79.8	0.0308	2.49	2	0.10	F3	1.52	1.53	6933	-0.05	13.12	14.03	10.826	734
Qatar-1 b	Hot Jupiter	233	1.33	1.16	1.12	1389	83.8	0.0234	1.42	2	0.10	K	0.85	0.8	4910	0.20	10.409	12.84	4.857	1286
Qatar-2 b	Hot Jupiter	288	2.49	1.14	2.20	1180	88.3	0.0215	1.34	2	0.10	K	0.74	0.713	4645	nan	10.619	13.3	5.472	1365
TrES-1 b	Hot Jupiter	157	0.76	1.10	0.76	1257	88.4	0.0393	3.03	2	0.10	K0V	0.88	0.85	5250	0.00	9.819	11.42	7.709	602
TrES-2 A b	Hot Jupiter	213	1.25	1.17	1.04	1600	83.9	0.0356	2.47	2	0.10	G0	0.983	1.003	5850	0.00	9.846	11.25	5.788	739
TrES-3 b	Hot Jupiter	400	1.91	1.31	1.14	1685	82.2	0.0226	1.31	2	0.10	K0V	0.88	0.85	5338	0.00	10.608	12.402	4.550	1398
TrES-5 b	Hot Jupiter	360	1.78	1.21	1.33	1569	84.5	0.0245	1.48	2	0.10	K0V	0.88	0.85	5171	0.20	11.591	13.58	5.457	1232
WASP-1 b	Hot Jupiter	408	0.86	1.48	0.35	1644	88.7	0.0382	2.52	2	0.10	F7V	1.24	1.382	6200	nan	10.276	11.79	10.798	724
WASP-10 b	Hot Jupiter	90	3.06	1.08	3.22	947	86.8	0.0371	3.09	2	0.10	K5	0.71	0.783	4675	0.03	9.983	12.7	6.928	590
WASP-100 b	Hot Jupiter	316	2.03	1.69	0.56	2190	82.6	0.0457	2.85	2	0.10	F2	1.57	2	6900	-0.03	nan	10.8	11.967	640
WASP-101 b	Hot Jupiter	182	0.50	1.41	0.24	1560	85.0	0.0506	3.59	2	0.10	F6	1.34	1.29	6400	0.20	nan	10.3	8.217	509
WASP-11 b	Hot Jupiter	125	0.46	1.05	0.53	943	88.5	0.0439	3.72	2	0.10	K3V	0.82	0.81	4980	0.13	9.421	11.89	8.018	490
WASP-12 b	Hot Jupiter	250	1.40	1.74	0.36	2320	86.0	0.0229	1.09	2	0.10	G0	1.35	1.599	6300	0.30	10.188	11.69	9.092	1673
WASP-13 b	Hot Jupiter	155	0.48	1.39	0.24	1203	85.6	0.0538	4.35	2	0.10	G1V	1.09	1.559	5826	0.00	9.119	10.42	12.691	419
WASP-14 b	Hot Jupiter	160	7.34	1.28	4.63	1719	84.8	0.0360	2.24	2	0.10	F5V	1.211	1.306	6475	nan	8.621	9.75	8.435	813
WASP-15 b	Hot Jupiter	308	0.54	1.43	0.25	1511	85.5	0.0499	3.75	2	0.10	F7	1.18	1.477	6300	-0.17	9.693	10.9	11.239	486
WASP-16 b	Hot Jupiter	176	0.86	1.01	1.11	1160	85.2	0.0421	3.12	2	0.10	G3V	1.022	0.946	5550	0.01	9.589	11.3	5.821	585
WASP-17 b	Hot Jupiter	400	0.49	1.99	0.08	1518	86.8	0.0515	3.74	2	0.10	F4	1.306	1.572	6650	-0.19	10.224	11.6	12.996	488
WASP-18 b	Hot Jupiter	100	10.43	1.17	8.75	2188	86.0	0.0205	0.94	2	0.10	F6	1.24	1.23	6400	nan	8.131	9.3	6.580	1939
WASP-19 b	Hot Jupiter	250	1.17	1.39	0.58	1912	79.4	0.0166	0.79	2	0.10	G8V	0.97	0.99	5500	0.02	10.481	12.3	4.848	2315
WASP-2 A b	Hot Jupiter	166	0.91	1.12	0.87	1171	84.7	0.0314	2.15	2	0.10	K1V	0.89	0.84	5150	-0.08	9.632	11.98	5.362	848
WASP-21 b	Hot Jupiter	230	0.30	1.21	0.22	1155	87.3	0.0520	4.32	2	0.10	G3V	1.01	1.06	5800	-0.40	9.982	11.6	9.444	422
WASP-22 b	Hot Jupiter	300	0.59	1.16	0.50	1298	88.3	0.0470	3.53	2	0.10	G	1.1	1.13	6000	-0.05	10.318	12	9.761	516
WASP-23 b	Hot Jupiter	200	0.88	0.96	1.32	1024	88.4	0.0376	2.94	2	0.10	K1V	0.78	0.765	5150	nan	10.53	12.7	6.989	620
WASP-24 b	Hot Jupiter	330	1.03	1.10	1.02	1514	83.6	0.0359	2.34	2	0.10	F8-9	1.129	1.147	6075	0.07	10.148	11.3	6.528	780
WASP-25 b	Hot Jupiter	169	0.58	1.26	0.38	1135	87.7	0.0474	3.76	2	0.10	G4	1	0.95	5750	-0.05	10.174	11.9	8.499	485
WASP-26 b	Hot Jupiter	250	1.03	1.28	0.65	1521	82.9	0.0399	2.76	2	0.10	G0	1.12	1.34	5950	-0.02	9.69	11.3	7.668	662
WASP-28 b	Hot Jupiter	334	0.91	1.12	0.86	1292	89.1	0.0455	3.41	2	0.10	F8-G0	1.08	1.05	6100	-0.29	10.732	12	9.271	535
WASP-29 b	Hot Jupiter	80	0.24	0.79	0.65	911	88.8	0.0457	3.92	2	0.10	K4V	0.825	0.846	4800	0.11	8.783	11.3	8.313	465
WASP-3 b	Hot Jupiter	223	2.06	1.45	0.89	1826	85.1	0.0313	1.85	2	0.10	F7V	1.24	1.31	6400	nan	9.361	10.64	8.539	988
WASP-31 b	Hot Jupiter	400	0.48	1.54	0.17	1411	84.5	0.0466	3.41	2	0.10	F	1.16	1.24	6200	-0.19	10.65	11.7	8.059	536
WASP-32 b	Hot Jupiter	209	3.46	1.10	3.45	1428	85.1	0.0390	2.72	2	0.10	G	1.07	1.09	6100	-0.13	10.161	11.3	7.256	671
WASP-33 b	Hot Jupiter	116	4.59	1.44	2.05	2452	87.7	0.0256	1.22	2	0.10	A5	1.495	1.444	7400	0.10	7.468	8.3	8.156	1497

WASP-34 b	Hot Jupiter	120	0.59	1.22	0.43	1059	85.2	0.0524	4.32	2	0.10	G5	1.01	0.93	5700	-0.02	8.792	10.4	4.225	422
WASP-35 b	Hot Jupiter	177	0.72	1.32	0.42	1455	88.0	0.0432	3.16	2	0.10	G0	1.07	1.09	5990	-0.15	9.525	10.94	9.268	577
WASP-36 b	Hot Jupiter	450	2.28	1.27	1.48	1555	83.7	0.0262	1.54	2	0.10	G2	1.02	0.943	5881	-0.31	11.294	12.7	5.527	1187
WASP-37 b	Hot Jupiter	338	1.70	1.14	1.53	1214	88.8	0.0434	3.58	2	0.10	G2	0.849	0.977	5800	-0.40	11.093	12.7	9.499	510
WASP-38 b	Hot Jupiter	110	2.71	1.09	2.78	1153	89.5	0.0758	6.87	2	0.10	F8	1.23	1.35	6150	-0.12	7.998	9.42	14.127	265
WASP-39 b	Hot Jupiter	230	0.28	1.27	0.18	1022	87.8	0.0486	4.06	2	0.10	G8	0.93	0.895	5400	-0.12	10.202	12.11	8.451	450
WASP-4 b	Hot Jupiter	300	1.12	1.36	0.59	1710	88.8	0.0231	1.34	2	0.10	G8	0.93	1.15	5500	-0.03	10.746	12.6	8.046	1364
WASP-41 b	Hot Jupiter	180	0.92	1.21	0.69	1208	87.3	0.0400	3.05	2	0.10	G8V	0.95	1.01	5450	-0.08	9.677	11.6	8.673	598
WASP-42 b	Hot Jupiter	160	0.50	1.08	0.53	995	88.3	0.0548	4.98	2	0.10	K1	0.884	0.863	5200	0.05	10.033	12.57	8.805	366
WASP-43 b	Hot Jupiter	80	2.03	1.04	2.43	1318	82.3	0.0153	0.81	2	0.10	K7V	0.717	0.667	4520	-0.01	9.267	12.4	3.688	2244
WASP-44 b	Hot Jupiter	288	0.87	1.00	1.15	1304	86.0	0.0345	2.42	2	0.10	G8V	0.917	0.865	5410	0.06	11.341	12.9	6.199	753
WASP-45 b	Hot Jupiter	132	1.01	1.16	0.86	1094	84.5	0.0405	3.13	2	0.10	K2V	0.909	0.945	5140	0.36	10.294	12	5.434	584
WASP-46 b	Hot Jupiter	326	2.10	1.31	1.24	1517	82.6	0.0245	1.43	2	0.10	G6V	0.956	0.917	5620	-0.37	11.401	12.9	5.100	1276
WASP-47 b	Hot Jupiter	200	1.14	1.15	0.99	1120	89.2	0.0520	4.16	2	0.10	G9V	1.084	1.15	5400	0.18	10.192	11.9	10.784	439
WASP-49 b	Hot Jupiter	170	0.38	1.12	0.36	1369	84.9	0.0379	2.78	2	0.10	G6	0.938	0.976	5600	-0.23	9.749	11.36	6.433	656
WASP-5 b	Hot Jupiter	297	1.64	1.17	1.35	1584	85.8	0.0273	1.63	2	0.10	G5	1	1.084	5700	0.09	10.598	12.26	7.242	1121
WASP-50 b	Hot Jupiter	230	1.47	1.15	1.28	1290	84.7	0.0295	1.96	2	0.10	G9	0.89	0.84	5400	-0.12	9.969	11.6	5.447	934
WASP-52 b	Hot Jupiter	140	0.46	1.27	0.30	1315	85.4	0.0271	1.75	2	0.10	K2V	0.87	0.79	5000	0.03 nan		12	5.473	1043
WASP-54 b	Hot Jupiter	200	0.64	1.65	0.19	1759	85.0	0.0499	3.69	2	0.10	F9	1.15	1.4	6100	-0.27	9.035	10.42	10.024	494
WASP-55 b	Hot Jupiter	330	0.57	1.30	0.34	1160	89.2	0.0533	4.47	2	0.10	G1	1.01	1.06	5900	-0.20	10.396	11.8	10.608	408
WASP-56 b	Hot Jupiter	255	0.57	1.09	0.58	1216	88.5	0.0546	4.62	2	0.10	G6	1.03	0.99	5600 nan		10.532	11.484	9.588	395
WASP-58 b	Hot Jupiter	300	0.89	1.37	0.46	1270	87.4	0.0561	5.02	2	0.10	G2V	0.94	1.17	5800	-0.45 nan		11.66	11.418	363
WASP-59 b	Hot Jupiter	125	0.86	0.78	2.46	710	89.3	0.0697	7.92	2	0.10	K5V	0.719	0.613	4650	-0.15	9.723	13	8.086	230
WASP-6 b	Hot Jupiter	307	0.50	1.22	0.36	1092	88.5	0.0421	3.36	2	0.10	G8	0.888	0.87	5450	-0.20	10.325	12.4	8.255	543
WASP-61 b	Hot Jupiter	480	2.06	1.24	1.43	1418	89.4	0.0514	3.86	2	0.10	F7	1.22	1.36	6250	-0.10	11.008	12.5	11.924	473
WASP-62 b	Hot Jupiter	160	0.57	1.39	0.28	1305	88.3	0.0567	4.41	2	0.10	F7	1.25	1.28	6230	0.04	8.944	10.3	11.475	413
WASP-63 b	Hot Jupiter	330	0.38	1.43	0.17	1540	87.8	0.0574	4.38	2	0.10	G8	1.32	1.88	5570	0.08	9.393	11.2	16.161	417
WASP-64 b	Hot Jupiter	350	1.27	1.27	0.82	1689	86.6	0.0265	1.57	2	0.10	G7	0.98	1.03	5400	-0.08	10.956	12.29	7.102	1160
WASP-65 b	Hot Jupiter	310	1.55	1.11	1.50	1480	88.8	0.0334	2.31	2	0.10	G6	0.93	1.01	5600	-0.31	10.452	11.6	8.276	790
WASP-66 b	Hot Jupiter	380	2.32	1.39	1.15	1648	85.9	0.0546	4.09	2	0.10	F4	1.3	1.75	6600	-0.07	10.35	11.9	13.672	446
WASP-67 b	Hot Jupiter	225	0.42	1.40	0.20	941	85.8	0.0517	4.61	2	0.10	K0V	0.87	0.87	5200	-0.07	10.129	12.5	5.791	395
WASP-68 b	Hot Jupiter	158	0.95	1.24	0.66	1490	88.1	0.0621	5.08	2	0.10	G0	1.24	1.69	5911	0.22	8.9	10.7	15.504	359
WASP-69 b	Hot Jupiter	50	0.26	1.06	0.29	963	86.7	0.0453	3.87	2	0.10	K5	0.826	0.813	4715	0.15	7.46	9.87	6.721	472
WASP-7 b	Hot Jupiter	140	0.96	1.33	0.54	1360	87.0	0.0617	4.95	2	0.10	F5V	1.276	1.432	6400 nan		8.396	9.51	12.153	368
WASP-70A b	Hot Jupiter	245	0.59	1.16	0.50	1387	87.1	0.0485	3.71	2	0.10	G4	1.106	1.215	6193	-0.01 nan	9.32	10.56	10.080	491
WASP-71 b	Hot Jupiter	200	2.26	1.50	0.89	1888	84.2	0.0463	2.90	2	0.10	F8	1.21	1.27	6050 nan			628	6.814	628
WASP-72 b	Hot Jupiter	340	1.41	1.01	1.82	2210	86.8	0.0366	2.22	2	0.10	F7	1.23	1.37	6250	-0.06	9.617	10.88	9.194	823
WASP-73 b	Hot Jupiter	166	1.88	1.16	1.60	1790	87.4	0.0551	4.09	2	0.10	F9	1.34	2.07	6036	0.14	9	10.5	16.952	446
WASP-75 b	Hot Jupiter	260	1.07	1.27	0.69	1710	82.0	0.0375	2.48	2	0.10	F9	1.14	1.26	6100	0.07	10.062	11.45	5.912	735
WASP-76 b	Hot Jupiter	120	0.92	1.83	0.20	2160	88.0	0.0330	1.81	2	0.10	F7	1.46	1.73	6250	0.23	8.243	9.52	11.295	1009
WASP-77 A b	Hot Jupiter	93	1.76	1.21	1.32	1934	89.4	0.0240	1.36	2	0.10	G8 V	1.002	1.12	5500	0.00	8.408	10.3	7.604	1342
WASP-78 b	Hot Jupiter	550	1.16	1.75	0.29	2007	89.0	0.0415	2.18	2	0.10	F8	2.02	2.31	6100	-0.35	11.008	12	14.120	839
WASP-79 b	Hot Jupiter	240	0.90	1.70	0.24	1959	85.4	0.0362	3.66	2	0.10	F3	1.56	1.64	6600	0.03	9.056	10.1	18.644	498
WASP-8 b	Hot Jupiter	87	2.24	1.04	2.66	847	88.6	0.0801	8.16	2	0.10	G6	1.033	0.953	5600	0.17	8.086	9.9	10.528	223
WASP-80 b	Hot Jupiter	60	0.55	0.95	0.85	800	89.9	0.0346	3.07	2	0.10	K7V	0.57	0.571	4145	-0.14	8.351	11.881	6.337	595
WASP-82 b	Hot Jupiter	200	1.24	1.67	0.35	2190	87.9	0.0447	2.71	2	0.10	F5	1.63	2.18	6490	0.12 nan		10.1	15.216	674
WASP-84 b	Hot Jupiter	125	0.69	0.94	1.10	797	88.4	0.0771	8.52	2	0.10	K0	0.842	0.748	5314	0.00	8.86	11.64	8.288	214
WASP-88 b	Hot Jupiter	302	0.56	1.70	0.15	1772	88.0	0.0643	4.95	2	0.10	F6	1.45	2.08	6431	-0.08	10.3		18.235	368
WASP-90 b	Hot Jupiter	340	0.63	1.63	0.19	1840	82.1	0.0562	3.92	2	0.10	F6	1.55	1.98	6430	0.11 nan		11.7	10.313	466
WASP-95 b	Hot Jupiter	105	1.13	1.21	0.85	1570	88.4	0.0342	2.18	2	0.10	G2	1.11	1.13	5630	0.14 nan		10.1	8.503	835
WASP-96 b	Hot Jupiter	209	0.48	1.20	0.37	1285	85.6	0.0453	3.43	2	0.10	G8	1.06	1.05	5540	0.14 nan		12.2	7.353	533
WASP-97 b	Hot Jupiter	120	1.32	1.13	1.21	1555	88.0	0.0330	2.07	2	0.10	G5	1.12	1.06	5640	0.23 nan		10.6	7.751	881
WASP-98 b	Hot Jupiter	321	0.83	1.10	0.83	1180	86.3	0.0360	2.96	2	0.10	G7	0.69	0.7	5525	-0.60 nan		13	5.659	616
WASP-99 b	Hot Jupiter	105	2.78	1.10	2.77	1480	88.8	0.0717	5.75	2	0.10	F8	1.48	1.76	6180	0.21 nan		9.5	15.880	317

XO-1 b	Hot Jupiter	200	0.90	1.18	0.72	1168	89.3	0.0488	3.94	2	0.10	G1V	1	0.928	5940	nan	9.527	11.3	9.006	463
XO-2 b	Hot Jupiter	149	0.62	0.97	0.89	1203	88.7	0.0369	2.62	2	0.10	K0V	0.98	0.964	5340	0.45	9.308	11.18	7.972	698
XO-3 b	Hot Jupiter	260	11.79	1.22	8.68	1555	84.2	0.0454	3.19	2	0.10	F5V	1.213	1.377	6429	-0.18	8.791	9.8	8.597	572
XO-4 b	Hot Jupiter	293	1.72	1.34	0.95	1328	88.7	0.0555	4.13	2	0.10	F5V	1.32	1.55	5700	-0.04	9.406	10.7	13.287	442
XO-5 b	Hot Jupiter	255	1.08	1.03	1.31	1134	86.8	0.0487	4.19	2	0.10	G8V	0.88	1.06	5510	0.18	10.345	12.13	9.310	436



### **7.3 SPREADSHEET OF RESULTS**

The following tables are copies of the results spreadsheets available in the datapacket. Dashes indicate an unobservable mode.

**Table 3 Results of our simulations for Chemical Census mode (number of transits required to reach SNR 5)**

Planet Name	Planet Type	Transits in 5 yr	no. pri transits for SNR 5	no. sec transits for SNR 5
55 Cnc e	Hot Super-Earth	2479	34	4
BD+30 1138 b	Hot Jupiter	675	2	1
CoRoT-1 b	Hot Jupiter	1210	3	2
CoRoT-11 b	Hot Jupiter	609	86	17
CoRoT-19 b	Hot Jupiter	468	21	18
CoRoT-2 b	Hot Jupiter	1047	9	2
CoRoT-5 b	Hot Jupiter	452	2	8
Gliese 1214 b	Warm Super-Earth	1155	6	77
Gliese 3470 b	Warm Neptune	547	1	43
Gliese 436 b	Warm Neptune	690	1	8
HAT-P-1 b	Hot Jupiter	408	1	3
HAT-P-11 b	Hot Neptune	373	1	18
HAT-P-12 b	Hot Jupiter	568	1	34
HAT-P-13 b	Hot Jupiter	626	3	2
HAT-P-14 b	Hot Jupiter	394	22	8
HAT-P-15 b	Hot Jupiter	168	12	89
HAT-P-16 b	Hot Jupiter	657	15	2
HAT-P-17 b	Hot Jupiter	176	1	17
HAT-P-18 b	Hot Jupiter	331	1	114
HAT-P-19 b	Hot Jupiter	455	1	37
HAT-P-2 b	Hot Jupiter	324	28	3
HAT-P-20 b	Hot Jupiter	635	13	7
HAT-P-21 b	Hot Jupiter	442	53	18
HAT-P-22 b	Hot Jupiter	568	3	2
HAT-P-23 b	Hot Jupiter	1505	13	2
HAT-P-24 b	Hot Jupiter	544	3	4
HAT-P-25 b	Hot Jupiter	499	3	19
HAT-P-26 b	Hot Neptune	431	1	242
HAT-P-27 b	Hot Jupiter	600	6	20
HAT-P-28 b	Hot Jupiter	560	5	14
HAT-P-29 b	Hot Jupiter	319	9	31
HAT-P-3 b	Hot Jupiter	629	5	17
HAT-P-30 b	Hot Jupiter	649	1	2
HAT-P-31 b	Hot Jupiter	364	43	15
HAT-P-32 b	Hot Jupiter	849	1	1
HAT-P-33 b	Hot Jupiter	525	1	2
HAT-P-34 b	Hot Jupiter	334	24	7
HAT-P-35 b	Hot Jupiter	500	13	12
HAT-P-36 b	Hot Jupiter	1376	12	2
HAT-P-38 b	Hot Jupiter	393	5	116
HAT-P-39 b	Hot Jupiter	515	3	7
HAT-P-4 b	Hot Jupiter	597	3	3
HAT-P-40 b	Hot Jupiter	409	2	3
HAT-P-41 b	Hot Jupiter	677	1	1
HAT-P-42 b	Hot Jupiter	393	10	10
HAT-P-43 b	Hot Jupiter	547	7	20
HAT-P-44 b	Hot Jupiter	424	2	35
HAT-P-45 b	Hot Jupiter	583	2	2

HAT-P-46 b	Hot Jupiter	408	2	7
HAT-P-5 b	Hot Jupiter	654	7	6
HAT-P-6 b	Hot Jupiter	473	2	2
HAT-P-7 b	Hot Jupiter	828	6	1
HAT-P-8 b	Hot Jupiter	593	3	2
HAT-P-9 b	Hot Jupiter	465	4	9
HATS-1 b	Hot Jupiter	529	11	8
HATS-2 b	Hot Jupiter	1348	16	6
HATS-3 b	Hot Jupiter	514	5	4
HD 149026 b	Hot Jupiter	635	2	2
HD 189733 A b	Hot Jupiter	823	1	1
HD 209458 b	Hot Jupiter	518	1	1
KELT-2A b	Hot Jupiter	443	2	1
Kepler-12 b	Hot Jupiter	411	1	8
Kepler-17 b	Hot Jupiter	1229	132	19
Kepler-7 b	Hot Jupiter	373	1	4
Kepler-76 b	Hot Jupiter	1182	60	7
KOI-13 b	Hot Jupiter	1035	109	2
KOI-254 b	Hot Jupiter	743	19	344
OGLE2-TR-L9 b	Hot Jupiter	734	71	4
Qatar-1 b	Hot Jupiter	1286	9	4
Qatar-2 b	Hot Jupiter	1365	29	9
TrES-1 b	Hot Jupiter	602	2	7
TrES-2 A b	Hot Jupiter	739	6	4
TrES-3 b	Hot Jupiter	1398	23	7
TrES-5 b	Hot Jupiter	1232	24	8
WASP-1 b	Hot Jupiter	724	3	2
WASP-10 b	Hot Jupiter	590	4	4
WASP-100 b	Hot Jupiter	640	3	1
WASP-101 b	Hot Jupiter	509	1	2
WASP-11 b	Hot Jupiter	490	1	13
WASP-12 b	Hot Jupiter	1673	1	1
WASP-13 b	Hot Jupiter	419	1	1
WASP-14 b	Hot Jupiter	813	12	1
WASP-15 b	Hot Jupiter	486	1	3
WASP-16 b	Hot Jupiter	585	7	11
WASP-17 b	Hot Jupiter	488	1	1
WASP-18 b	Hot Jupiter	1939	9	1
WASP-19 b	Hot Jupiter	2315	3	1
WASP-2 A b	Hot Jupiter	848	4	4
WASP-21 b	Hot Jupiter	422	1	9
WASP-22 b	Hot Jupiter	516	3	9
WASP-23 b	Hot Jupiter	620	8	24
WASP-24 b	Hot Jupiter	780	14	8
WASP-25 b	Hot Jupiter	485	1	4
WASP-26 b	Hot Jupiter	662	4	3
WASP-28 b	Hot Jupiter	535	9	12
WASP-29 b	Hot Jupiter	465	1	10
WASP-3 b	Hot Jupiter	988	3	1



WASP-31 b	Hot Jupiter	536	1	5
WASP-32 b	Hot Jupiter	671	22	4
WASP-33 b	Hot Jupiter	1497	2	1
WASP-34 b	Hot Jupiter	422	1	7
WASP-35 b	Hot Jupiter	577	1	2
WASP-36 b	Hot Jupiter	1187	36	7
WASP-37 b	Hot Jupiter	510	19	14
WASP-38 b	Hot Jupiter	265	5	3
WASP-39 b	Hot Jupiter	450	1	14
WASP-4 b	Hot Jupiter	1364	3	1
WASP-41 b	Hot Jupiter	598	2	4
WASP-42 b	Hot Jupiter	366	2	27
WASP-43 b	Hot Jupiter	2244	3	1
WASP-44 b	Hot Jupiter	753	14	19
WASP-45 b	Hot Jupiter	584	3	5
WASP-46 b	Hot Jupiter	1276	14	3
WASP-47 b	Hot Jupiter	439	5	9
WASP-49 b	Hot Jupiter	656	1	4
WASP-5 b	Hot Jupiter	1121	13	3
WASP-50 b	Hot Jupiter	934	10	5
WASP-52 b	Hot Jupiter	1043	1	2
WASP-54 b	Hot Jupiter	494	1	1
WASP-55 b	Hot Jupiter	408	2	12
WASP-56 b	Hot Jupiter	395	4	26
WASP-58 b	Hot Jupiter	363	3	8
WASP-6 b	Hot Jupiter	543	2	17
WASP-61 b	Hot Jupiter	473	36	12
WASP-62 b	Hot Jupiter	413	1	2
WASP-63 b	Hot Jupiter	417	1	4
WASP-64 b	Hot Jupiter	1160	9	4
WASP-65 b	Hot Jupiter	790	17	7
WASP-66 b	Hot Jupiter	446	15	3
WASP-67 b	Hot Jupiter	395	1	22
WASP-68 b	Hot Jupiter	359	2	2
WASP-69 b	Hot Jupiter	472	1	1
WASP-7 b	Hot Jupiter	368	1	2
WASP-70A b	Hot Jupiter	491	2	5
WASP-71 b	Hot Jupiter	628	4	2
WASP-72 b	Hot Jupiter	823	31	7
WASP-73 b	Hot Jupiter	446	7	2
WASP-75 b	Hot Jupiter	735	6	3
WASP-76 b	Hot Jupiter	1009	1	1
WASP-77 A b	Hot Jupiter	1342	2	1
WASP-78 b	Hot Jupiter	839	4	2
WASP-79 b	Hot Jupiter	498	1	1
WASP-8 b	Hot Jupiter	223	4	6
WASP-80 b	Hot Jupiter	595	1	5
WASP-82 b	Hot Jupiter	674	1	1
WASP-84 b	Hot Jupiter	214	3	84

WASP-88 b	Hot Jupiter	368	1	1
WASP-90 b	Hot Jupiter	466	1	2
WASP-95 b	Hot Jupiter	835	1	1
WASP-96 b	Hot Jupiter	533	2	7
WASP-97 b	Hot Jupiter	881	2	1
WASP-98 b	Hot Jupiter	616	9	30
WASP-99 b	Hot Jupiter	317	6	2
XO-1 b	Hot Jupiter	463	3	7
XO-2 b	Hot Jupiter	698	3	5
XO-3 b	Hot Jupiter	572	63	3
XO-4 b	Hot Jupiter	442	9	5
XO-5 b	Hot Jupiter	436	13	21
CoRoT-4 b	Hot Jupiter	198	29	-
HD 97658 b	Warm Super-Earth	192	47	-
Kepler-15 b	Hot Jupiter	369	92	-
Kepler-25 c	Hot Neptune	143	18	-
Kepler-63 b	Hot Jupiter	193	56	-
KOI-2672 b	Warm Neptune	20	14	-
KOI-94 d	Hot Jupiter	81	7	-
WASP-59 b	Hot Jupiter	230	11	-

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**Table 4 Results of our simulations for Origin mode (number of transits required to reach SNR 10)**

Planet Name	Planet Type	Transits in 5 yr	no. pri transits for SNR 10	no. sec transits for SNR 10
55 Cnc e	Hot Super-Earth	2479	277	13
BD+30 1138 b	Hot Jupiter	675	16	5
CoRoT-1 b	Hot Jupiter	1210	26	13
CoRoT-19 b	Hot Jupiter	468	178	141
CoRoT-2 b	Hot Jupiter	1047	78	14
CoRoT-5 b	Hot Jupiter	452	11	59
Gliese 1214 b	Warm Super-Earth	1155	48	307
Gliese 3470 b	Warm Neptune	547	3	171
Gliese 436 b	Warm Neptune	690	4	32
HAT-P-1 b	Hot Jupiter	408	4	20
HAT-P-11 b	Hot Neptune	373	5	69
HAT-P-12 b	Hot Jupiter	568	4	201
HAT-P-13 b	Hot Jupiter	626	19	14
HAT-P-14 b	Hot Jupiter	394	180	58
HAT-P-16 b	Hot Jupiter	657	122	14
HAT-P-17 b	Hot Jupiter	176	6	67
HAT-P-19 b	Hot Jupiter	455	6	265
HAT-P-2 b	Hot Jupiter	324	224	13
HAT-P-20 b	Hot Jupiter	635	98	25
HAT-P-21 b	Hot Jupiter	442	437	132
HAT-P-22 b	Hot Jupiter	568	20	5
HAT-P-23 b	Hot Jupiter	1505	110	12
HAT-P-24 b	Hot Jupiter	544	19	27
HAT-P-25 b	Hot Jupiter	499	23	138
HAT-P-27 b	Hot Jupiter	600	42	160
HAT-P-28 b	Hot Jupiter	560	40	102
HAT-P-29 b	Hot Jupiter	319	72	238
HAT-P-3 b	Hot Jupiter	629	36	135
HAT-P-30 b	Hot Jupiter	649	8	11
HAT-P-31 b	Hot Jupiter	364	360	116
HAT-P-32 b	Hot Jupiter	849	2	3
HAT-P-33 b	Hot Jupiter	525	6	9
HAT-P-34 b	Hot Jupiter	334	199	48
HAT-P-35 b	Hot Jupiter	500	112	92
HAT-P-36 b	Hot Jupiter	1376	95	14
HAT-P-39 b	Hot Jupiter	515	22	51
HAT-P-4 b	Hot Jupiter	597	22	23
HAT-P-40 b	Hot Jupiter	409	10	19
HAT-P-41 b	Hot Jupiter	677	6	6
HAT-P-42 b	Hot Jupiter	393	84	74
HAT-P-43 b	Hot Jupiter	547	58	147
HAT-P-44 b	Hot Jupiter	424	15	267
HAT-P-45 b	Hot Jupiter	583	14	15
HAT-P-46 b	Hot Jupiter	408	13	53
HAT-P-5 b	Hot Jupiter	654	54	44
HAT-P-6 b	Hot Jupiter	473	13	10
HAT-P-7 b	Hot Jupiter	828	48	7
HAT-P-8 b	Hot Jupiter	593	23	9
HAT-P-9 b	Hot Jupiter	465	29	73
HATS-1 b	Hot Jupiter	529	89	55

HATS-2 b	Hot Jupiter	1348	133	45
HATS-3 b	Hot Jupiter	514	37	26
HD 149026 b	Hot Jupiter	635	12	9
HD 189733 A b	Hot Jupiter	823	1	1
HD 209458 b	Hot Jupiter	518	1	1
KELT-2A b	Hot Jupiter	443	11	3
Kepler-12 b	Hot Jupiter	411	8	58
Kepler-17 b	Hot Jupiter	1229	1070	148
Kepler-7 b	Hot Jupiter	373	7	30
Kepler-76 b	Hot Jupiter	1182	491	53
KOI-13 b	Hot Jupiter	1035	890	10
OGLE2-TR-L9 b	Hot Jupiter	734	597	29
Qatar-1 b	Hot Jupiter	1286	70	32
Qatar-2 b	Hot Jupiter	1365	238	67
TrES-1 b	Hot Jupiter	602	15	46
TrES-2 A b	Hot Jupiter	739	46	27
TrES-3 b	Hot Jupiter	1398	187	47
TrES-5 b	Hot Jupiter	1232	193	58
WASP-1 b	Hot Jupiter	724	19	16
WASP-10 b	Hot Jupiter	590	33	16
WASP-100 b	Hot Jupiter	640	26	5
WASP-101 b	Hot Jupiter	509	3	10
WASP-11 b	Hot Jupiter	490	7	57
WASP-12 b	Hot Jupiter	1673	6	1
WASP-13 b	Hot Jupiter	419	2	8
WASP-14 b	Hot Jupiter	813	95	4
WASP-15 b	Hot Jupiter	486	7	18
WASP-16 b	Hot Jupiter	585	49	87
WASP-17 b	Hot Jupiter	488	2	6
WASP-18 b	Hot Jupiter	1939	73	1
WASP-19 b	Hot Jupiter	2315	18	4
WASP-2 A b	Hot Jupiter	848	26	33
WASP-21 b	Hot Jupiter	422	4	61
WASP-22 b	Hot Jupiter	516	23	63
WASP-23 b	Hot Jupiter	620	63	185
WASP-24 b	Hot Jupiter	780	112	57
WASP-25 b	Hot Jupiter	485	5	28
WASP-26 b	Hot Jupiter	662	33	19
WASP-28 b	Hot Jupiter	535	67	87
WASP-29 b	Hot Jupiter	465	5	40
WASP-3 b	Hot Jupiter	988	22	4
WASP-31 b	Hot Jupiter	536	7	34
WASP-32 b	Hot Jupiter	671	181	26
WASP-33 b	Hot Jupiter	1497	13	1
WASP-34 b	Hot Jupiter	422	7	34
WASP-35 b	Hot Jupiter	577	5	11
WASP-36 b	Hot Jupiter	1187	298	52
WASP-37 b	Hot Jupiter	510	153	106
WASP-38 b	Hot Jupiter	265	40	12
WASP-39 b	Hot Jupiter	450	3	100
WASP-4 b	Hot Jupiter	1364	25	8

WASP-41 b	Hot Jupiter	598	15	24
WASP-42 b	Hot Jupiter	366	10	137
WASP-43 b	Hot Jupiter	2244	23	4
WASP-44 b	Hot Jupiter	753	114	152
WASP-45 b	Hot Jupiter	584	21	38
WASP-46 b	Hot Jupiter	1276	113	23
WASP-47 b	Hot Jupiter	439	40	66
WASP-49 b	Hot Jupiter	656	6	30
WASP-5 b	Hot Jupiter	1121	108	21
WASP-50 b	Hot Jupiter	934	71	36
WASP-52 b	Hot Jupiter	1043	3	11
WASP-54 b	Hot Jupiter	494	2	6
WASP-55 b	Hot Jupiter	408	15	91
WASP-56 b	Hot Jupiter	395	27	200
WASP-58 b	Hot Jupiter	363	22	63
WASP-6 b	Hot Jupiter	543	16	123
WASP-61 b	Hot Jupiter	473	306	95
WASP-62 b	Hot Jupiter	413	3	10
WASP-63 b	Hot Jupiter	417	6	29
WASP-64 b	Hot Jupiter	1160	74	27
WASP-65 b	Hot Jupiter	790	137	50
WASP-66 b	Hot Jupiter	446	122	23
WASP-67 b	Hot Jupiter	395	6	175
WASP-68 b	Hot Jupiter	359	12	11
WASP-69 b	Hot Jupiter	472	1	4
WASP-7 b	Hot Jupiter	368	6	7
WASP-70A b	Hot Jupiter	491	15	33
WASP-71 b	Hot Jupiter	628	31	11
WASP-72 b	Hot Jupiter	823	252	48
WASP-73 b	Hot Jupiter	446	55	9
WASP-75 b	Hot Jupiter	735	42	22
WASP-76 b	Hot Jupiter	1009	1	1
WASP-77 A b	Hot Jupiter	1342	9	2
WASP-78 b	Hot Jupiter	839	32	11
WASP-79 b	Hot Jupiter	498	2	2
WASP-8 b	Hot Jupiter	223	25	24
WASP-80 b	Hot Jupiter	595	4	20
WASP-82 b	Hot Jupiter	674	5	2
WASP-88 b	Hot Jupiter	368	3	7
WASP-90 b	Hot Jupiter	466	8	14
WASP-95 b	Hot Jupiter	835	7	4
WASP-96 b	Hot Jupiter	533	10	52
WASP-97 b	Hot Jupiter	881	16	6
WASP-98 b	Hot Jupiter	616	72	240
WASP-99 b	Hot Jupiter	317	43	6
XO-1 b	Hot Jupiter	463	17	47
XO-2 b	Hot Jupiter	698	19	36
XO-3 b	Hot Jupiter	572	507	23
XO-4 b	Hot Jupiter	442	74	36
XO-5 b	Hot Jupiter	436	104	154
CoRoT-11 b	Hot Jupiter	609	-	137

HAT-P-15 b	Hot Jupiter	168	96	-
HAT-P-18 b	Hot Jupiter	331	4	-
HAT-P-26 b	Hot Neptune	431	6	-
HAT-P-38 b	Hot Jupiter	393	40	-
KOI-254 b	Hot Jupiter	743	152	-
KOI-94 d	Hot Jupiter	81	58	-
WASP-59 b	Hot Jupiter	230	86	-
WASP-84 b	Hot Jupiter	214	23	-

	<p><b>Exoplanet Characterisation Observatory</b></p>	<p>Doc Ref: ECHO-TN-0001-UCL Issue: 03 Date: 11-12-2013</p>
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**Table 5 Results of our simulations for Rosetta Stone mode (number of transits required to reach SNR 20)**



Planet Name	Planet Type	Transits in 5 yr	no. pri transits for SNR 20	no. sec transits for SNR 20
55 Cnc e	Hot Super-Earth	2479	1702	52
BD+30 1138 b	Hot Jupiter	675	186	34
CoRoT-1 b	Hot Jupiter	1210	294	150
CoRoT-2 b	Hot Jupiter	1047	896	167
Gliese 436 b	Warm Neptune	690	19	127
HAT-P-1 b	Hot Jupiter	408	45	77
HAT-P-11 b	Hot Neptune	373	51	273
HAT-P-13 b	Hot Jupiter	626	230	112
HAT-P-22 b	Hot Jupiter	568	231	18
HAT-P-23 b	Hot Jupiter	1505	1264	139
HAT-P-24 b	Hot Jupiter	544	218	310
HAT-P-3 b	Hot Jupiter	629	436	554
HAT-P-30 b	Hot Jupiter	649	85	100
HAT-P-32 b	Hot Jupiter	849	24	28
HAT-P-33 b	Hot Jupiter	525	60	105
HAT-P-36 b	Hot Jupiter	1376	1084	172
HAT-P-4 b	Hot Jupiter	597	245	266
HAT-P-40 b	Hot Jupiter	409	105	232
HAT-P-41 b	Hot Jupiter	677	65	74
HAT-P-45 b	Hot Jupiter	583	162	175
HAT-P-5 b	Hot Jupiter	654	631	535
HAT-P-6 b	Hot Jupiter	473	153	68
HAT-P-7 b	Hot Jupiter	828	542	85
HAT-P-8 b	Hot Jupiter	593	256	88
HATS-3 b	Hot Jupiter	514	391	322
HD 149026 b	Hot Jupiter	635	119	35
HD 189733 A b	Hot Jupiter	823	3	1
HD 209458 b	Hot Jupiter	518	3	1
KELT-2A b	Hot Jupiter	443	123	12
Kepler-7 b	Hot Jupiter	373	74	349
Qatar-1 b	Hot Jupiter	1286	822	385
TrES-1 b	Hot Jupiter	602	165	263
TrES-2 A b	Hot Jupiter	739	552	311
WASP-1 b	Hot Jupiter	724	210	201
WASP-10 b	Hot Jupiter	590	397	63
WASP-100 b	Hot Jupiter	640	287	54
WASP-101 b	Hot Jupiter	509	28	63
WASP-11 b	Hot Jupiter	490	72	227
WASP-12 b	Hot Jupiter	1673	61	11
WASP-13 b	Hot Jupiter	419	23	29
WASP-15 b	Hot Jupiter	486	79	204
WASP-17 b	Hot Jupiter	488	13	72
WASP-18 b	Hot Jupiter	1939	879	6
WASP-19 b	Hot Jupiter	2315	206	45
WASP-2 A b	Hot Jupiter	848	301	310
WASP-25 b	Hot Jupiter	485	53	149
WASP-26 b	Hot Jupiter	662	368	221
WASP-29 b	Hot Jupiter	465	56	158
WASP-3 b	Hot Jupiter	988	250	42
WASP-31 b	Hot Jupiter	536	80	413

WASP-33 b	Hot Jupiter	1497	142	2
WASP-34 b	Hot Jupiter	422	75	133
WASP-35 b	Hot Jupiter	577	57	76
WASP-4 b	Hot Jupiter	1364	276	94
WASP-41 b	Hot Jupiter	598	174	169
WASP-43 b	Hot Jupiter	2244	262	21
WASP-45 b	Hot Jupiter	584	243	151
WASP-49 b	Hot Jupiter	656	64	232
WASP-50 b	Hot Jupiter	934	835	421
WASP-52 b	Hot Jupiter	1043	28	84
WASP-54 b	Hot Jupiter	494	22	36
WASP-62 b	Hot Jupiter	413	26	41
WASP-63 b	Hot Jupiter	417	65	288
WASP-64 b	Hot Jupiter	1160	852	343
WASP-68 b	Hot Jupiter	359	139	44
WASP-69 b	Hot Jupiter	472	6	15
WASP-7 b	Hot Jupiter	368	65	28
WASP-70A b	Hot Jupiter	491	175	352
WASP-71 b	Hot Jupiter	628	353	89
WASP-75 b	Hot Jupiter	735	500	268
WASP-76 b	Hot Jupiter	1009	6	2
WASP-77 A b	Hot Jupiter	1342	102	7
WASP-78 b	Hot Jupiter	839	360	135
WASP-79 b	Hot Jupiter	498	19	12
WASP-80 b	Hot Jupiter	595	45	78
WASP-82 b	Hot Jupiter	674	53	10
WASP-88 b	Hot Jupiter	368	30	58
WASP-90 b	Hot Jupiter	466	92	167
WASP-95 b	Hot Jupiter	835	74	14
WASP-96 b	Hot Jupiter	533	110	424
WASP-97 b	Hot Jupiter	881	179	35
XO-1 b	Hot Jupiter	463	187	331
XO-2 b	Hot Jupiter	698	210	213
CoRoT-5 b	Hot Jupiter	452	128	-
Gliese 1214 b	Warm Super-Earth	1155	593	-
Gliese 3470 b	Warm Neptune	547	27	-
HAT-P-12 b	Hot Jupiter	568	42	-
HAT-P-14 b	Hot Jupiter	394	-	343
HAT-P-16 b	Hot Jupiter	657	-	158
HAT-P-17 b	Hot Jupiter	176	63	-
HAT-P-18 b	Hot Jupiter	331	47	-
HAT-P-19 b	Hot Jupiter	455	68	-
HAT-P-2 b	Hot Jupiter	324	-	49
HAT-P-20 b	Hot Jupiter	635	-	97
HAT-P-25 b	Hot Jupiter	499	267	-
HAT-P-26 b	Hot Neptune	431	70	-
HAT-P-27 b	Hot Jupiter	600	508	-
HAT-P-28 b	Hot Jupiter	560	469	-
HAT-P-39 b	Hot Jupiter	515	236	-
HAT-P-44 b	Hot Jupiter	424	166	-
HAT-P-46 b	Hot Jupiter	408	153	-

HAT-P-9 b	Hot Jupiter	465	341	-
HATS-2 b	Hot Jupiter	1348	-	568
Kepler-12 b	Hot Jupiter	411	81	-
Kepler-76 b	Hot Jupiter	1182	-	647
KOI-13 b	Hot Jupiter	1035	-	111
OGLE2-TR-L9 b	Hot Jupiter	734	-	335
Qatar-2 b	Hot Jupiter	1365	-	767
TrES-3 b	Hot Jupiter	1398	-	602
TrES-5 b	Hot Jupiter	1232	-	717
WASP-14 b	Hot Jupiter	813	-	29
WASP-21 b	Hot Jupiter	422	43	-
WASP-22 b	Hot Jupiter	516	274	-
WASP-24 b	Hot Jupiter	780	-	716
WASP-32 b	Hot Jupiter	671	-	298
WASP-36 b	Hot Jupiter	1187	-	655
WASP-38 b	Hot Jupiter	265	-	46
WASP-39 b	Hot Jupiter	450	31	-
WASP-42 b	Hot Jupiter	366	115	-
WASP-46 b	Hot Jupiter	1276	-	284
WASP-47 b	Hot Jupiter	439	-	343
WASP-5 b	Hot Jupiter	1121	-	261
WASP-55 b	Hot Jupiter	408	171	-
WASP-56 b	Hot Jupiter	395	311	-
WASP-58 b	Hot Jupiter	363	239	-
WASP-6 b	Hot Jupiter	543	177	-
WASP-65 b	Hot Jupiter	790	-	601
WASP-66 b	Hot Jupiter	446	-	279
WASP-67 b	Hot Jupiter	395	61	922
WASP-72 b	Hot Jupiter	823	-	629
WASP-73 b	Hot Jupiter	446	-	37
WASP-8 b	Hot Jupiter	223	-	94
WASP-99 b	Hot Jupiter	317	-	21
XO-3 b	Hot Jupiter	572	-	268
XO-4 b	Hot Jupiter	442	-	358



## 7.4 EXAMPLE PARAMETER FILES

This shows the content of a parameter file used in the simulations. This is generated by ETLOS from the catalogue data, run conditions and the default parameters contained in echoism. Some parameters aren't shown as they are not currently used in EChOSim despite being present in par files. The planet used in this example is GJ 1214b.

### 7.4.1 EChOSIM Parameter File

#### [Star]

star_dist	13	#distance to star in parsecs
star_radius	0.21	#Radius of star in Solar radii (Rsol)
star_temp	3026	#effective temperature of star in Kelvin
star_logg	4.97393	#stellar surface gravity (og)
star_mh	0.39	#stellar metallicity (Fe/H)
spectral_res	0.002	#wavelength resolution in microns
oversamplefact	10	# Spectral oversampling factor.

#### [Planet]

planet_radius	0.245	#Radius of planet in Jupiter radii (Rj)
planet_mass	0.02	#Mass of planet in Jupiter masses (Mj)
planet_albedo	0.03	#Planetary albedo (0-1)
planet_period	1.58040482	#Orbital period in days
Planet_temp	519.6	#Temperature of the planet
planet_A	0.014	#Semi-major axis of planet orbit in astronomical units (AU)
planet_INC	88.8	#Orbital inclination (deg.)
planet_ecc	0	#orbital eccentricity (keep 0 as default for circular orbit)
planet_omega	0	#argument of periastron
planet_nu	2.99E-26	# mean molecular weight of the atmosphere kg
planet_blackbody	T	#switch from planetary SED file to black-body: F/T
planet_prisec	sec	#Calculate primary or secondary transit (pri/sec)
planet_obsrat	2	#Total time observed as multiple of the transit time

#### [Foreground]

run_foreground	1	# 1 = run it, 0 = no foregrounds
fore_read_file	0	#run foreground emission from file 1 = yes, 0 = n
zodi_level	3	# 1=min, 2=average, 3=max (default) zodi levels

#### [Instrument]

calc_emission	1	# 1 = calculate telescope, dichroic emission. # 0 = no telescope, dichroic emission.
Report	1	# 1 = Compile report of calculations in instrument module.
Report_Wave	0.599, 3.0, 7.534, 10.0, 13.594	# Spot check wavelengths for the report to summarise over (microns).
DichroicNum	4	# Number of instruments
Dichroic_transmission	\$root\$/data/instrument/Dichroic_Transmission_v5.csv	# Dichroic transmission filename
Dichroic_reflection	\$root\$/data/instrument/Dichroic_Reflection_v5.csv	# Dichroic reflection filename
Dichroic_emission	\$root\$/data/instrument/Dichroic_Emission_v3.txt	# Dichroic emission filename
T_optics	45, 45, 45, 45	# Optical bench temperature (K)



**[Telescope]**

MNUM	3	# Number of mirrors
M_Temp	45, 45, 45	# Mirror temperatures (K) (Ensure that M_Temp contains MNUM datapoints.)
A_eff	1.131	# Affective area of the telescope (m^2)
Reflectivity	\$root\$/data/telescope/Mirror_R effectivity_v2.txt	# Reflectivity file name (Ensure that datafile contains data for all MNUM)
Emissivity	\$root\$/data/telescope/Mirror_E missivity.txt	# Emissivity file name (Ensure that datafile contains data for all MNUM)

**[Detector]**

detector_model	1	# Selects which detector model to use. 0 = Radiometric, 1 = Complex Model.
InstNum	5	# Number of instruments
Detector_On	1,1,1,1,1	# Turns detectors off and on for complex model. (InstNum number of values.)
Lambda_min	0.4, 2.5, 5.0, 8.5, 11.0	# Bandwidth mininum wavelength (microns) (InstNum number of values.)
Lambda_max	2.5, 5.0, 8.5, 11.0, 16.0	# Bandwidth maximum wavelength (microns) (InstNum number of values.)
LD	15840, 4835, 370, 516, 230	# Linear Dispersion of bandwidths (InstNum number of values. Used in complex model)
R	330, 530, 52, 103, 62	# Spectral Resolution of passband (InstNum number of values. Used in radiometric model to estimate ILF and wavelength bin size). Single value used across a channel (i.e. no dependence for lambda). DeltaLambda = Lamda_min/R\
DetPix_X	284, 805, 52, 52, 47	# Number of pixels per detector in the x and y axis (InstNum number of values).
DetPix_Y	10,22,12,12,10	
WidPix	90, 18, 25, 25, 25	# Dimensions of the detector pixels (microns).
DC	1.0, 1.0, 1.0, 1.0, 1.0	# Dark current of the detectors (electrons pixel^-1 s^-1)
Dcalpha	1e-10, 1e-10, 1e-10, 1e-10, 1e-10	#Exponential constant between detector temperature and Dark Current (K)
DetTemp	35, 35, 35, 35, 35	# Detector temperatures (K)
d	1.55, 3.31, 3.90, 3.90, 3.86	# Width of spectrometer slit (in number of pixel widths).
Kx	85, 2.146019535868839, 1.8386982449228082, 1.8386982449228082, 1.1184137613253515	# Kx = F_eff / sqrt(pi Kax A_eff); Kax is the aberration parameter of Marc Farlet. (Kax = 1, 0.55, 0.8, 0.8, 0.9). ( For VNIR, Kx is the diameter of the optical fibre in the focal plane. )
Ky	85, 2.146019535868839, 2.702886420036528, 2.702886420036528, 1.6440682291482667	# Ky factor of PSF (InstNum number of values)
F_no	5.5, 2.5, 2.6, 2.6, 2.0	# Effective focal number (InstNum number of values)
F_eff	4800, 3000, 3100, 3100, 2400	# Effective focal length (mm) (InstNum number of values)
Quantum_eff	\$root\$/data/instrument/Quantu m_Efficiency_v4.txt	# Quantum efficiency filepath of the detectors (electrons/photon)

**[Noise]**

t	20.0	# Detector timeline sampling rate. (seconds)
add_noise	1.0	# Turn noise addition off or on. 0 = off, 1 = on.
sigma_P	1.0	#Normalisation constant for pointing jitter (in milliarcsec)
sigma_DC	1.0	#Normalisation constant for darkcurrent noise
sigma_DG	1.0	#Normalisation constant for detector gain
sigma_RE	10.0, 10.0, 100.0, 100.0, 100.0	#Normalisation constant for readout noise
seed_no	1.0	# Seed number for random noise.



N_stack	100.0	# Number of observation stacks of detector timelines used to reduce noise.
pointing_jitter_model	0.9, 1e-10, 1.0, 1.91, 300.0, 1.91, 330.0, 1e-10	# [Freq(Hz) , Power] sets of points, defining the Pointing Jitter Complex power.
pointing_jitter_uncert	10.0	ing HK - StDev of white noise added to the Pointing HK (in milliarcsec)

#### 7.4.2 EChOSim Observation Pipeline Parameter File

##### [Extraction]

use_psf	TRUE	#Use PSF calculated by EChOSim for optimal extraction? 1 = yes, 0 = no
background_sub	mean	#Background subtract median/mean/max/min
use_qback	FALSE	#Use EChOSim flux estimate of the background rather than calculating it.

##### [Fitting]

fit_dyn_on	0	#turn dynamic fitting on or off. If off static fitting will be performed.
fit_wave_binning_on	1,1,1,1,1	#binning adjacent channels in wavelength per detector (InstNum number of values.)
fit_wave_bin_res	50, 50, 50, 30, 30	#resolution to which detector will be binned
fit_wave_bin_lambda	1.2, 3.5, 6.75, 9.75, 13.5	#central wavelength for wave bin
bin_type	2	#constant-R = 1, log-deltalambda = 2

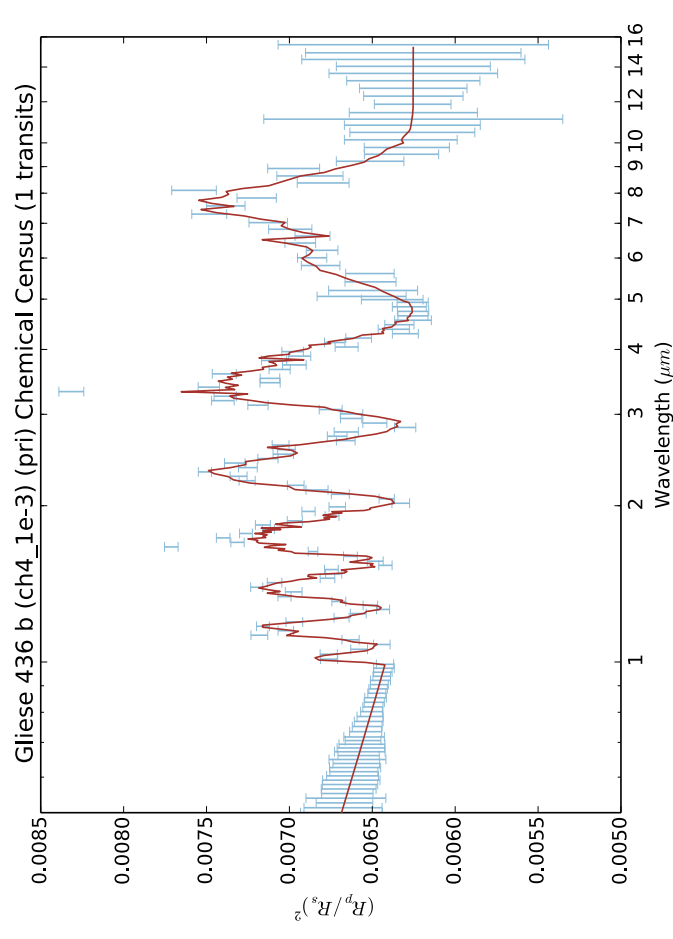
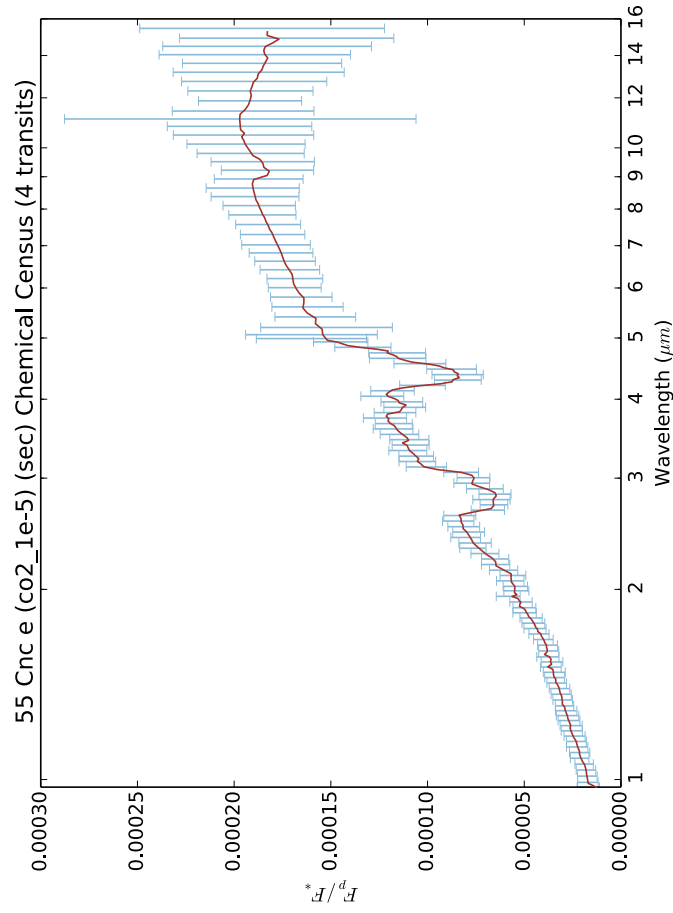
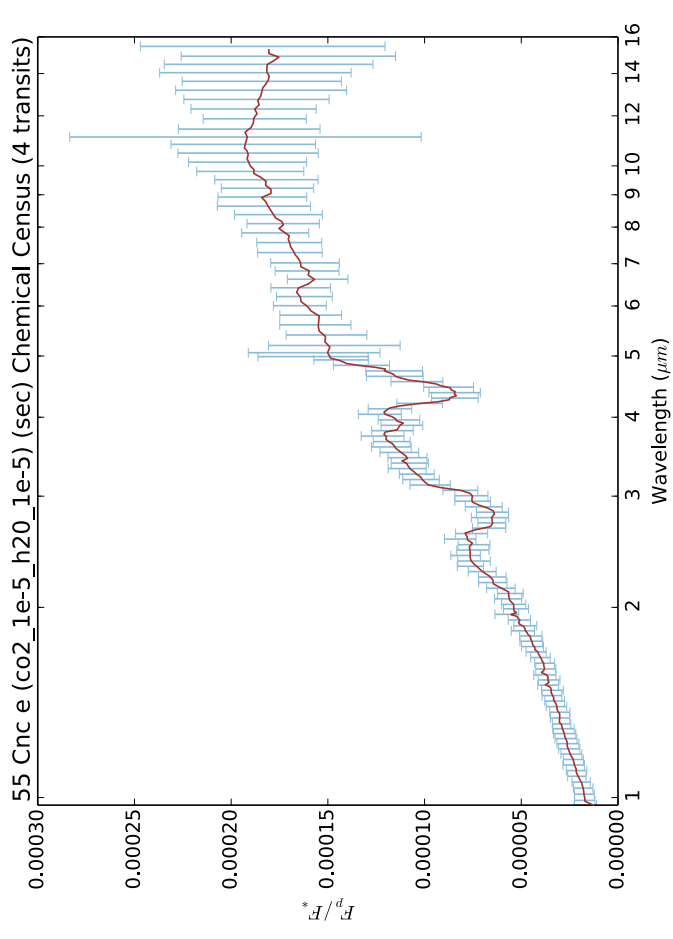
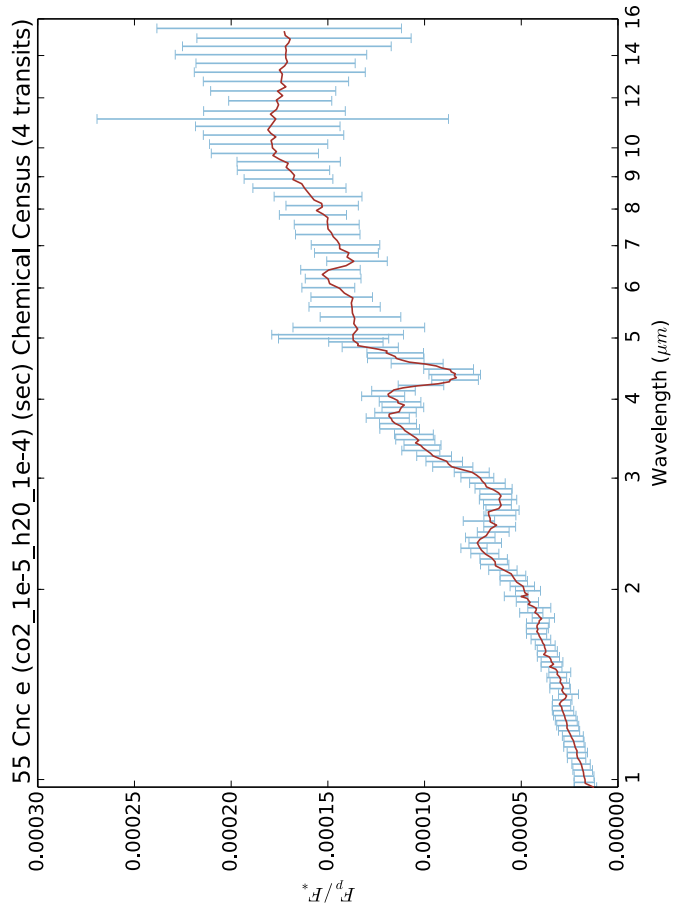


## **7.5 FIGURES**

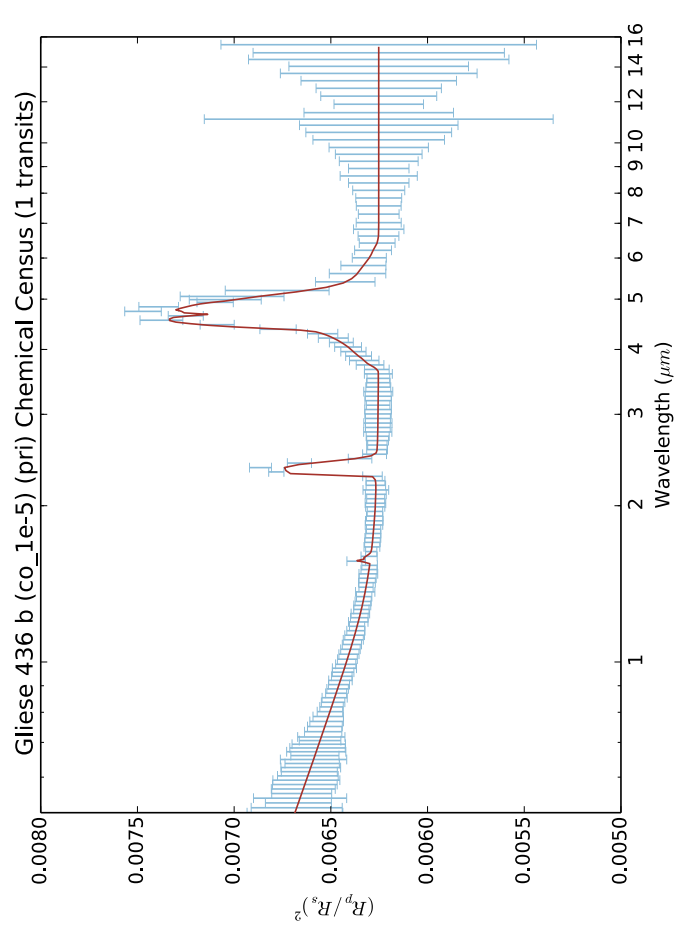
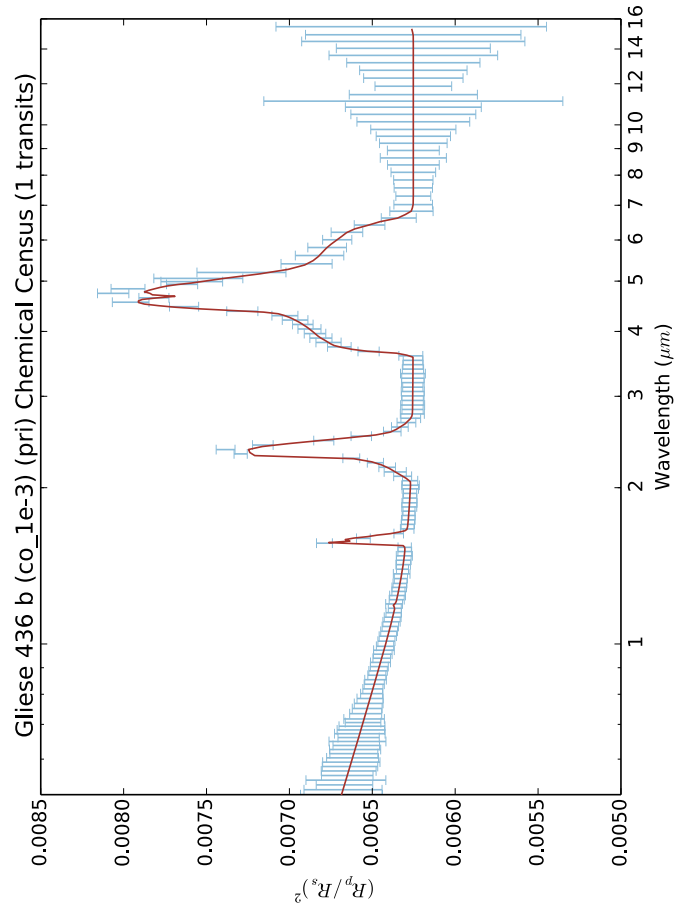
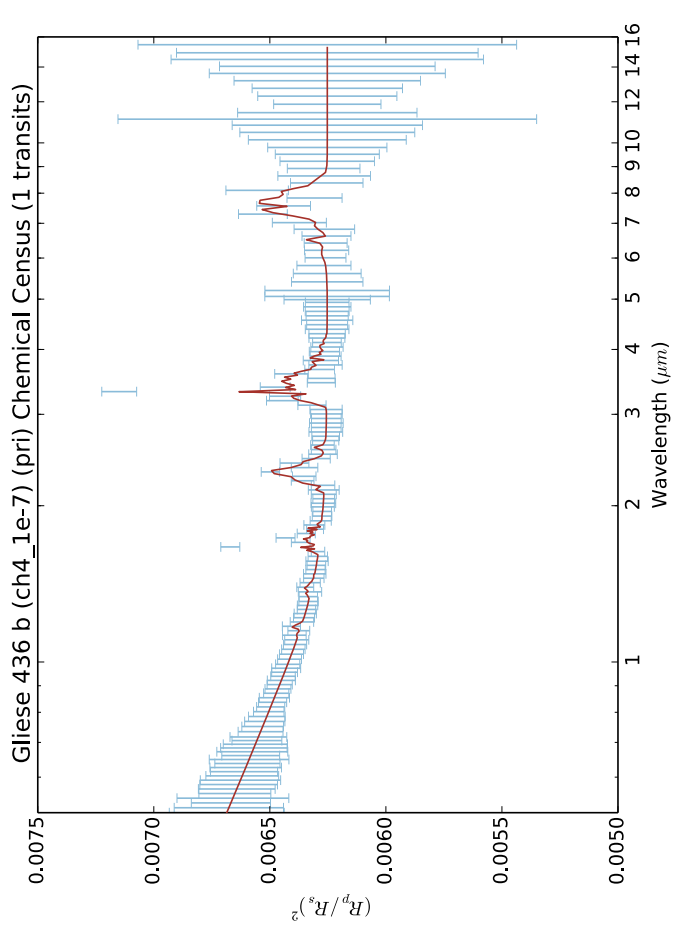
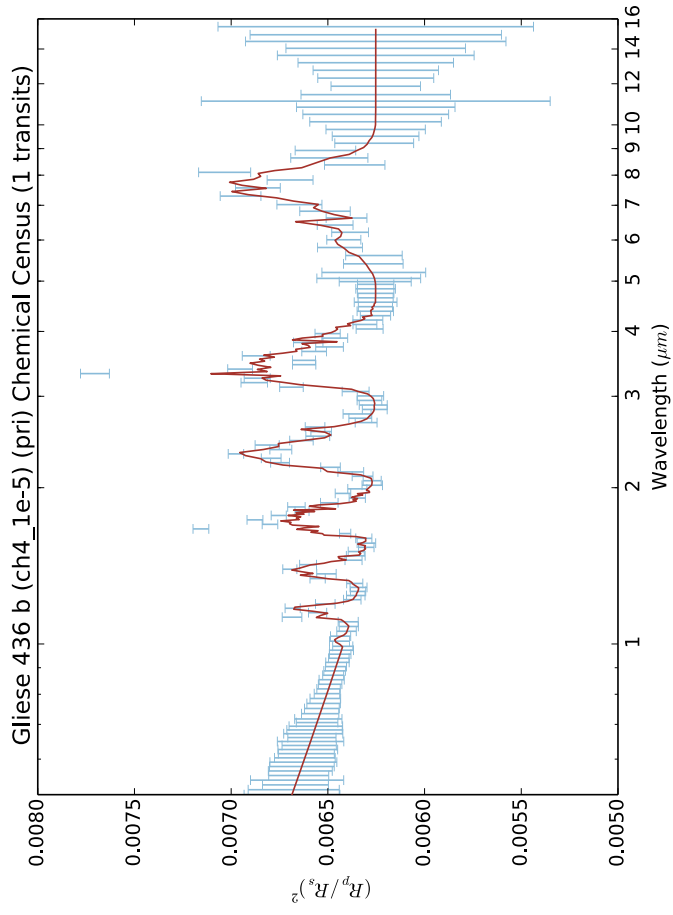
All figures generated in our work are included here. They are also available in the appropriate areas of the data packet. Not all compositions could be simulated to 16 microns resulting in a flat signal where there was no model data. These cases are visible when the under plotted model is absent.

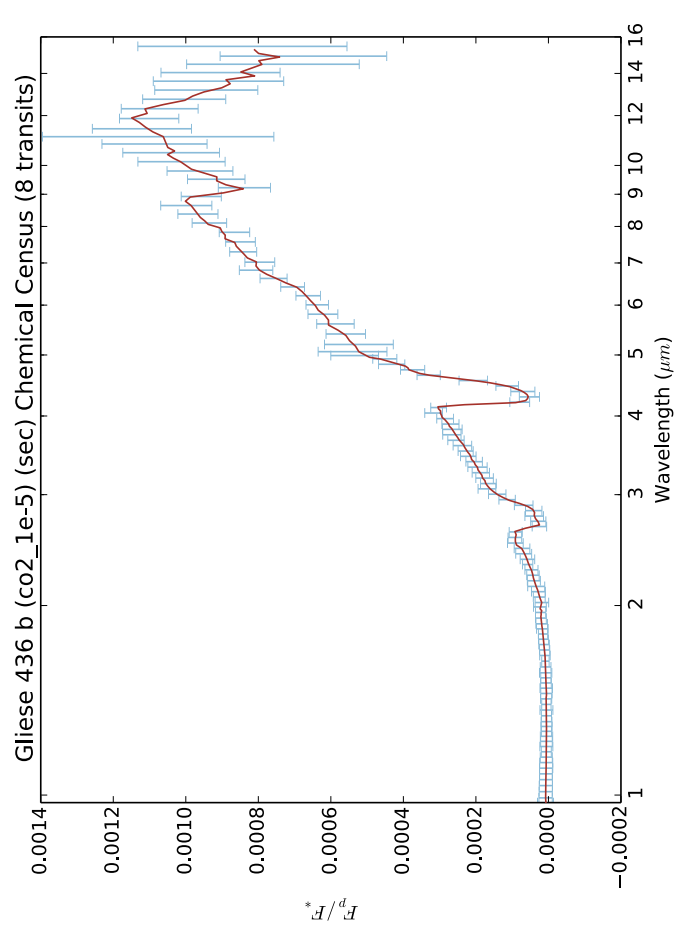
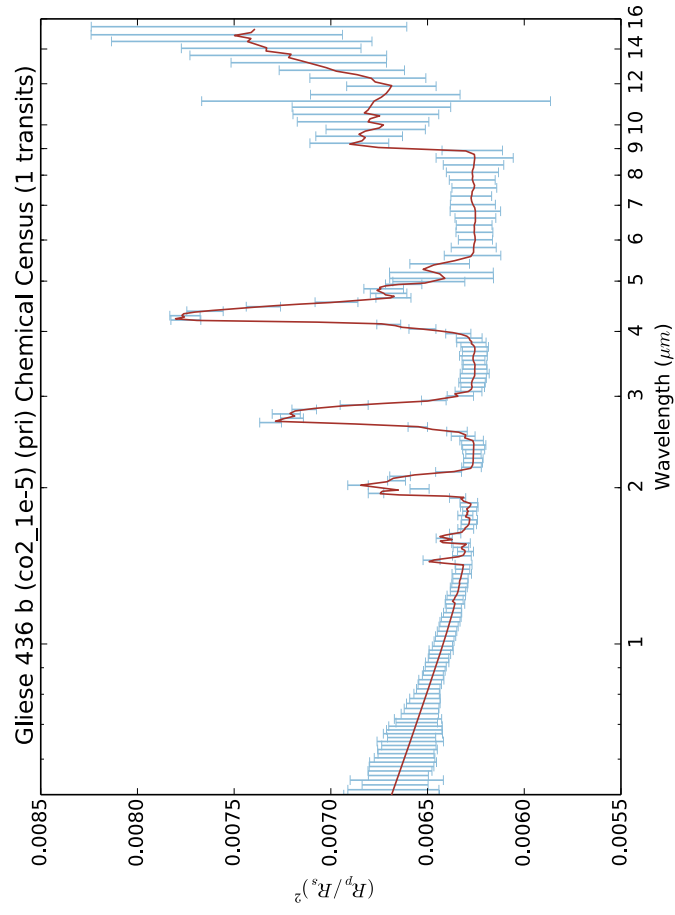
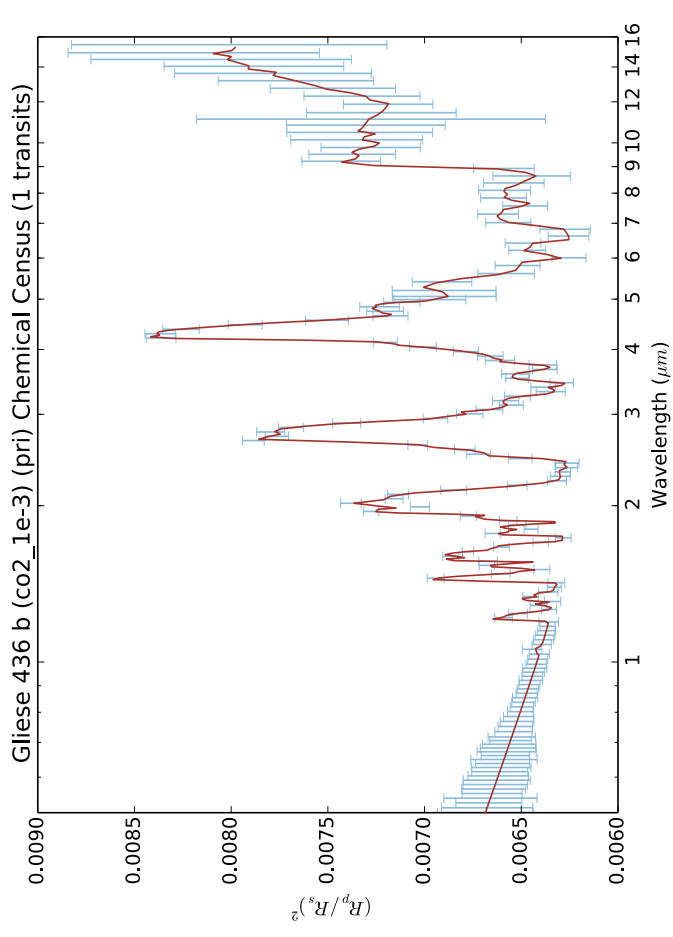
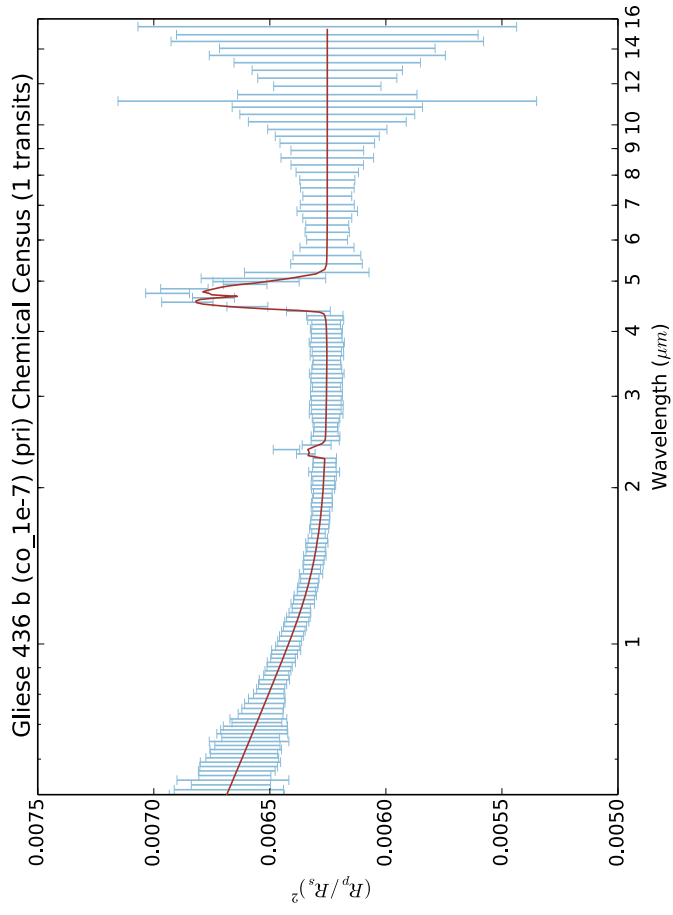
### **7.5.1 Planet signal with atmospheric compositions**

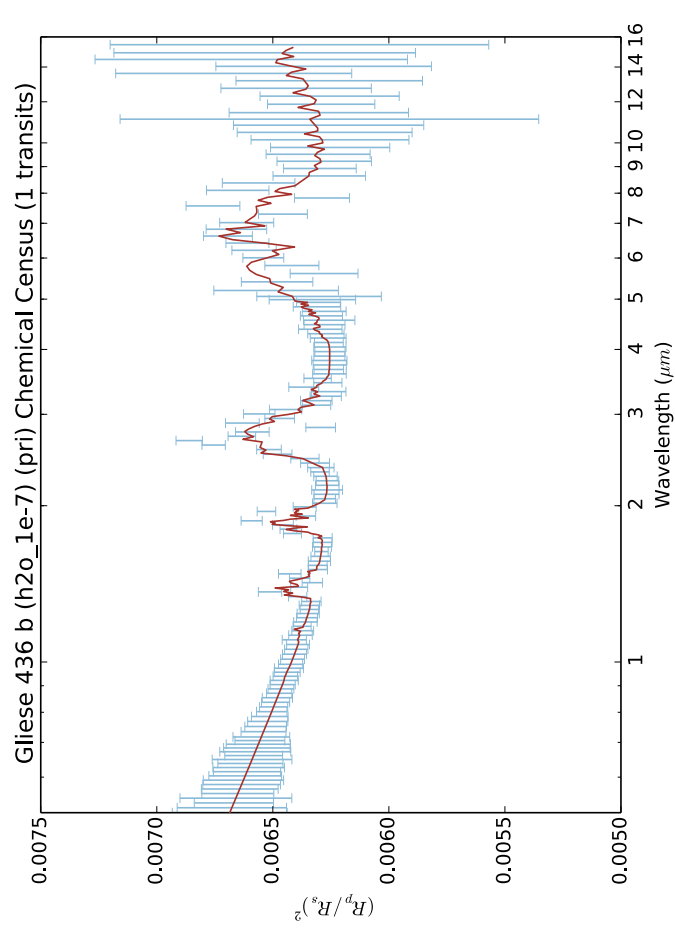
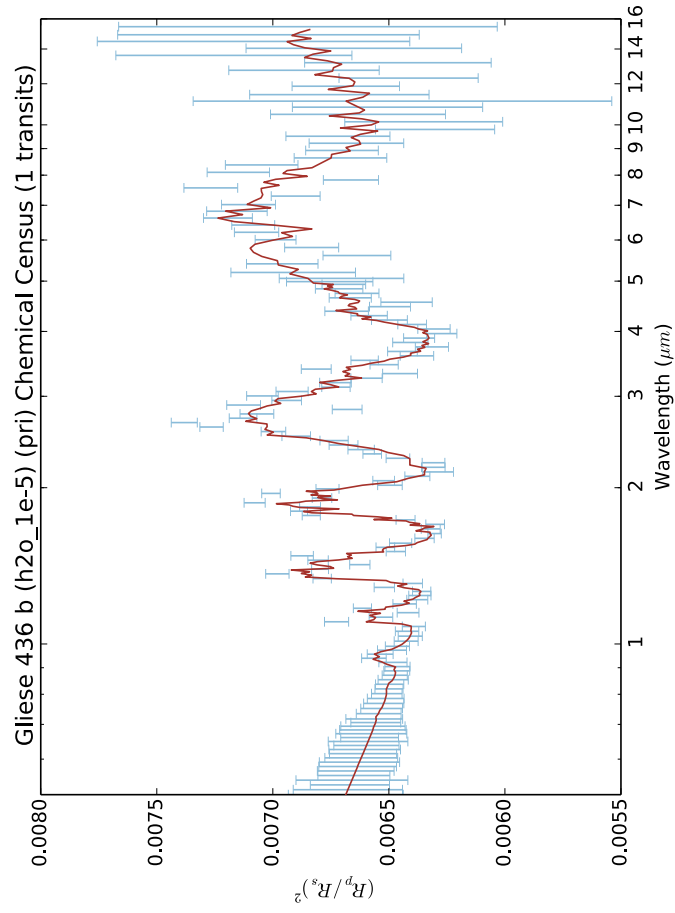
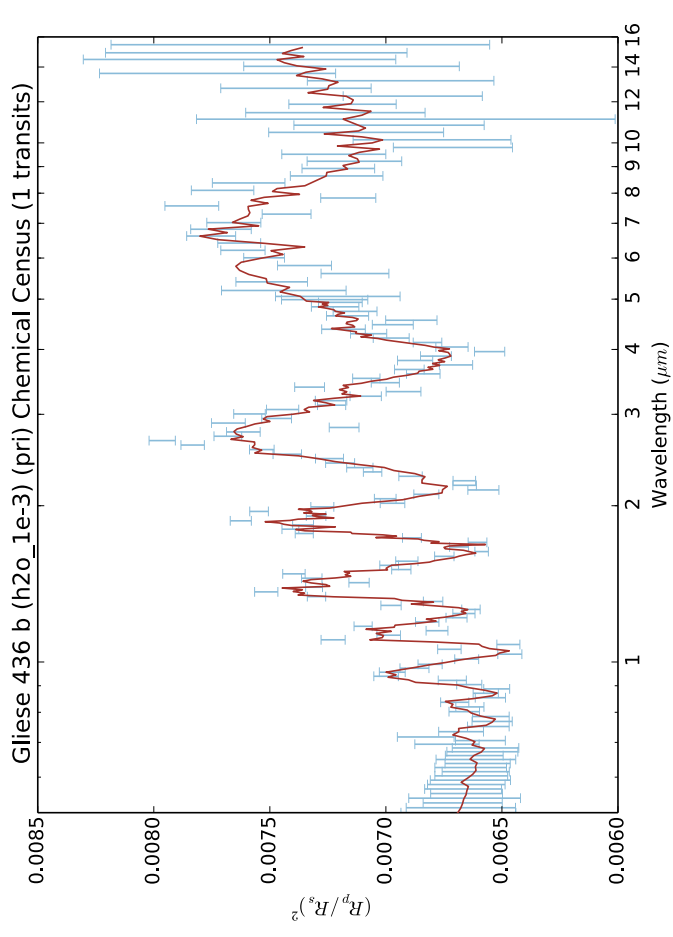
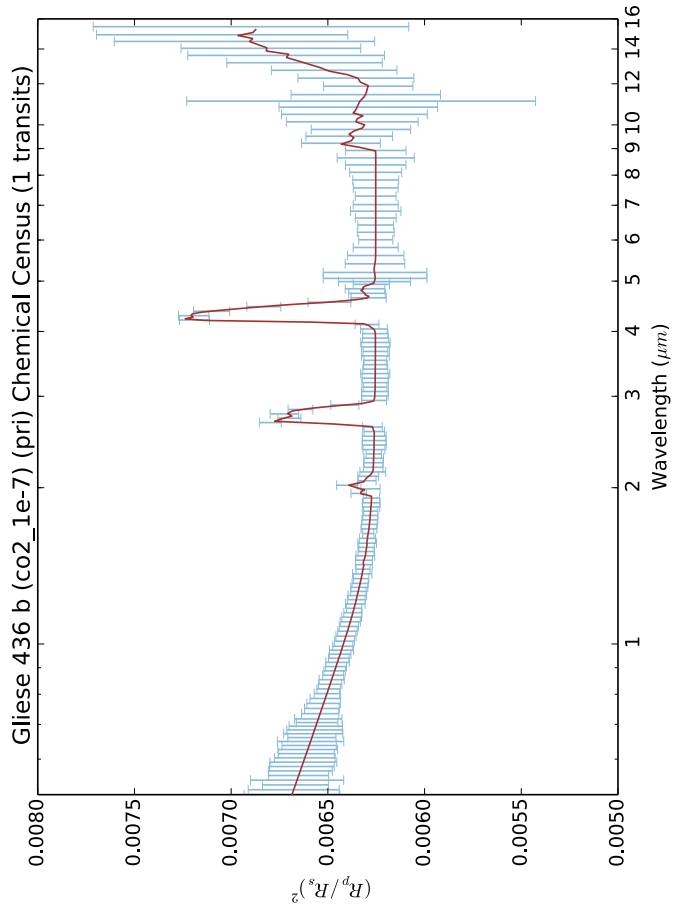
**Figure 7 Planet Signal for Chemical Census Mode for a sample of planets under different atmospheric compositions**

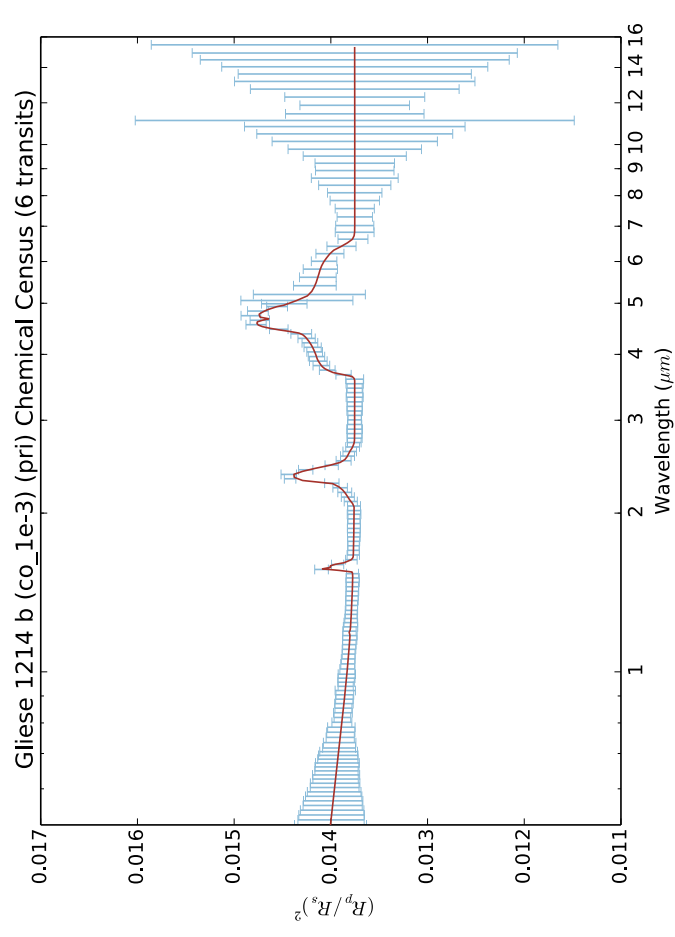
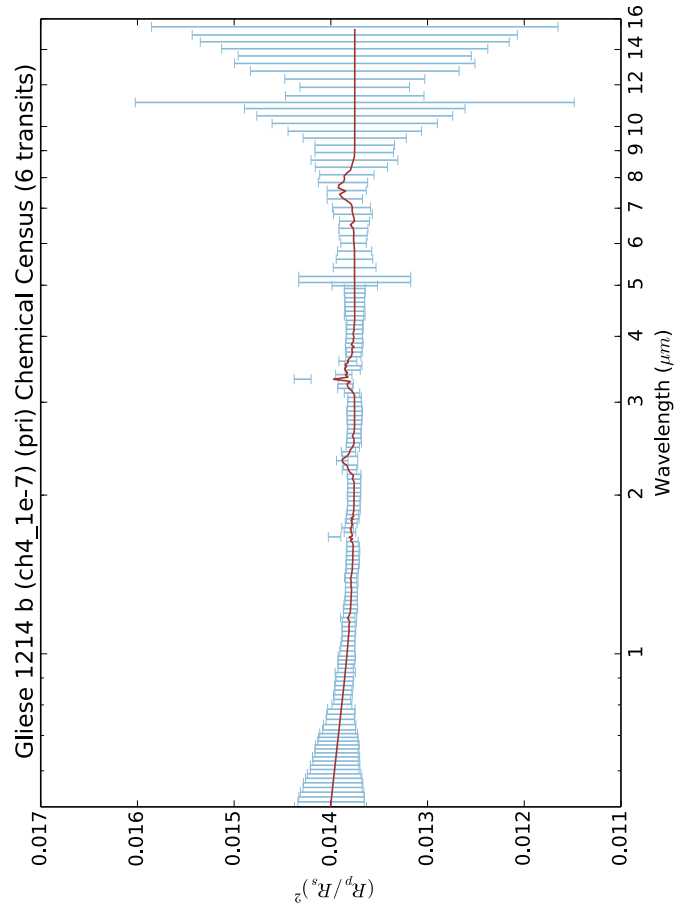
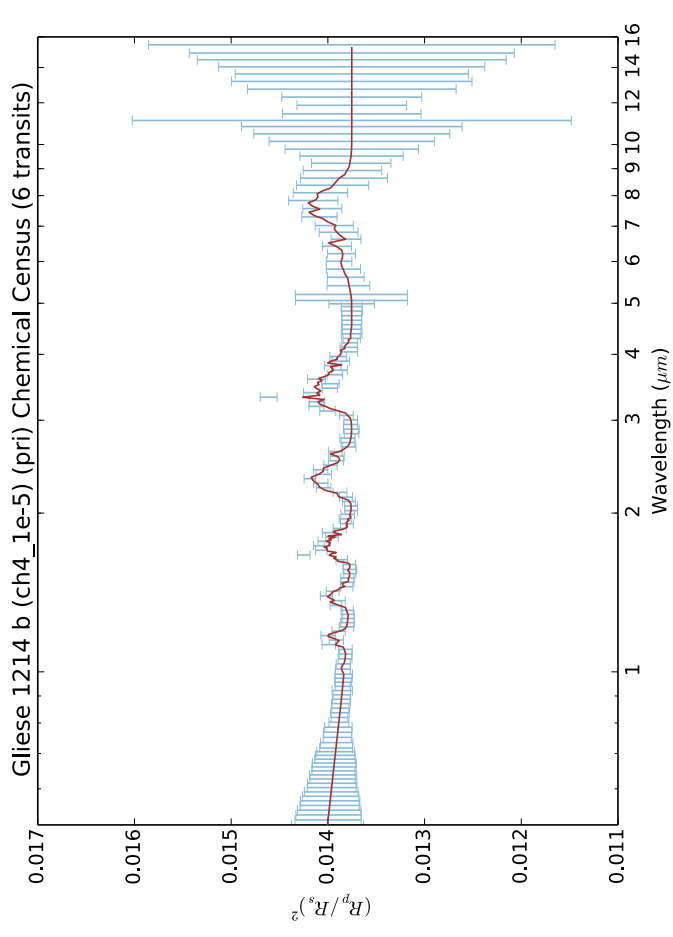
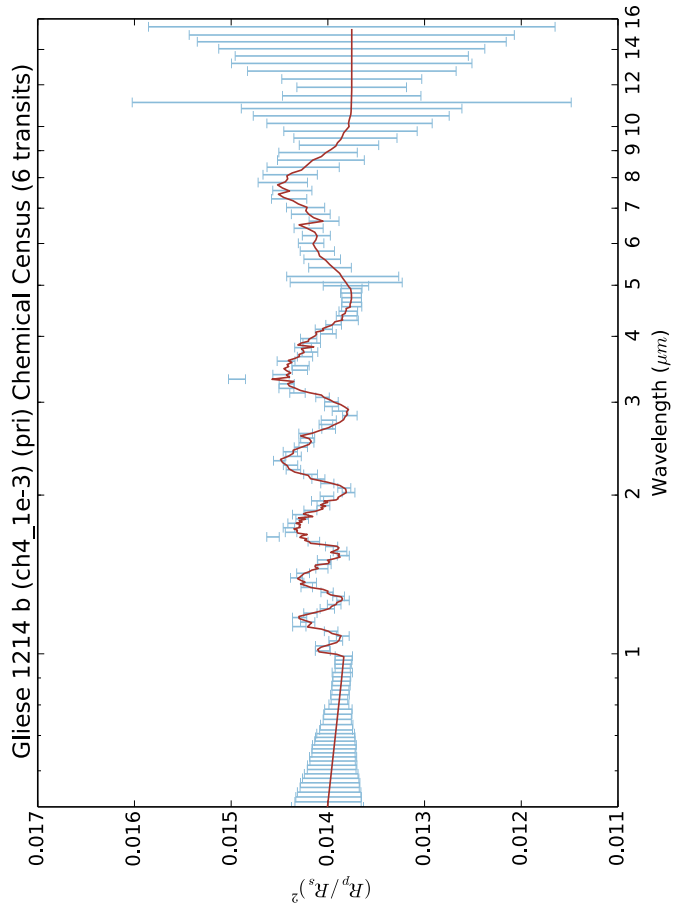


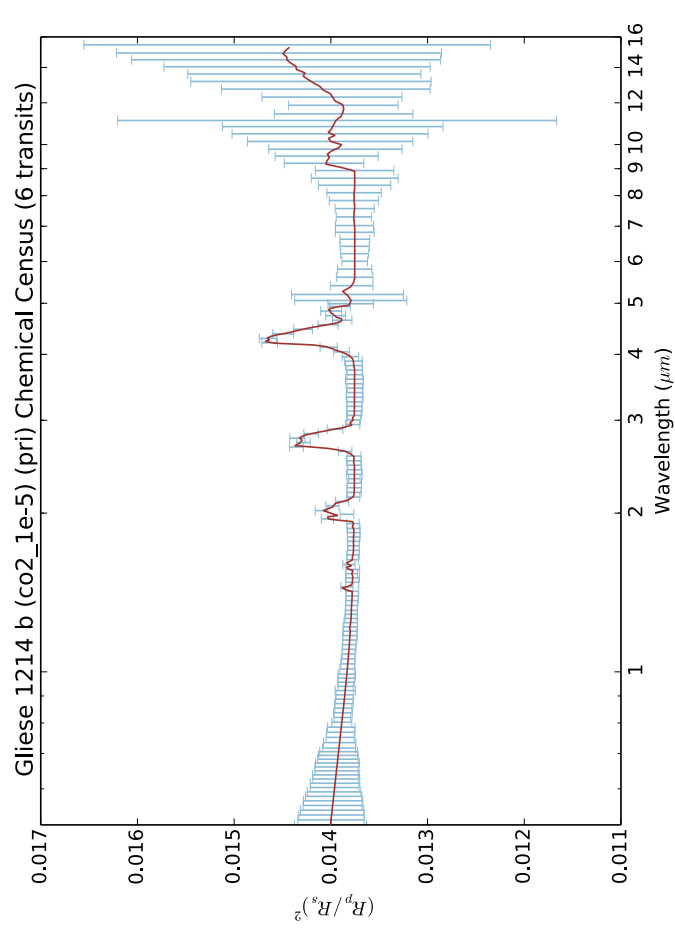
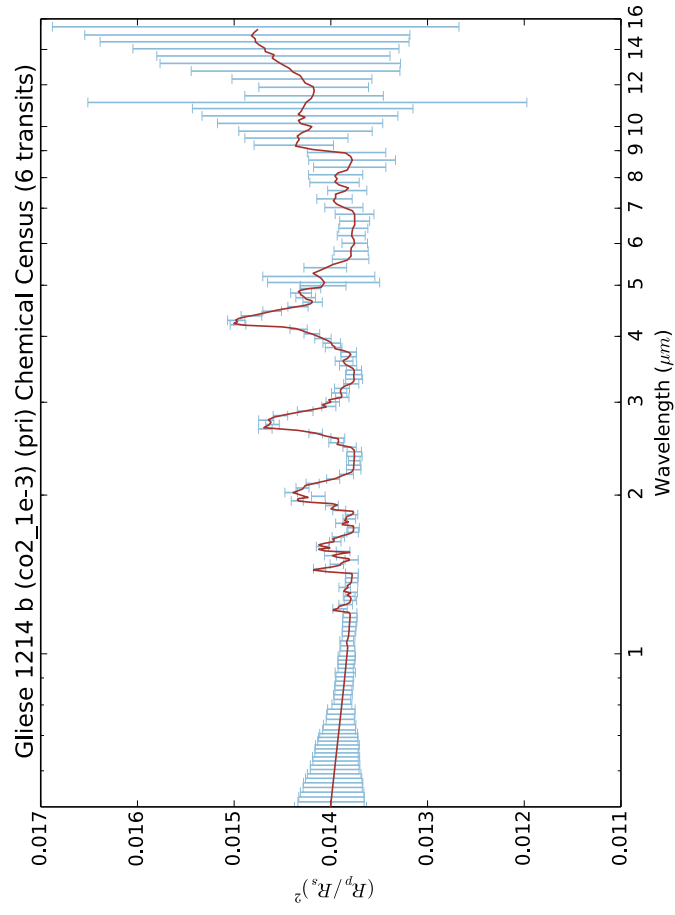
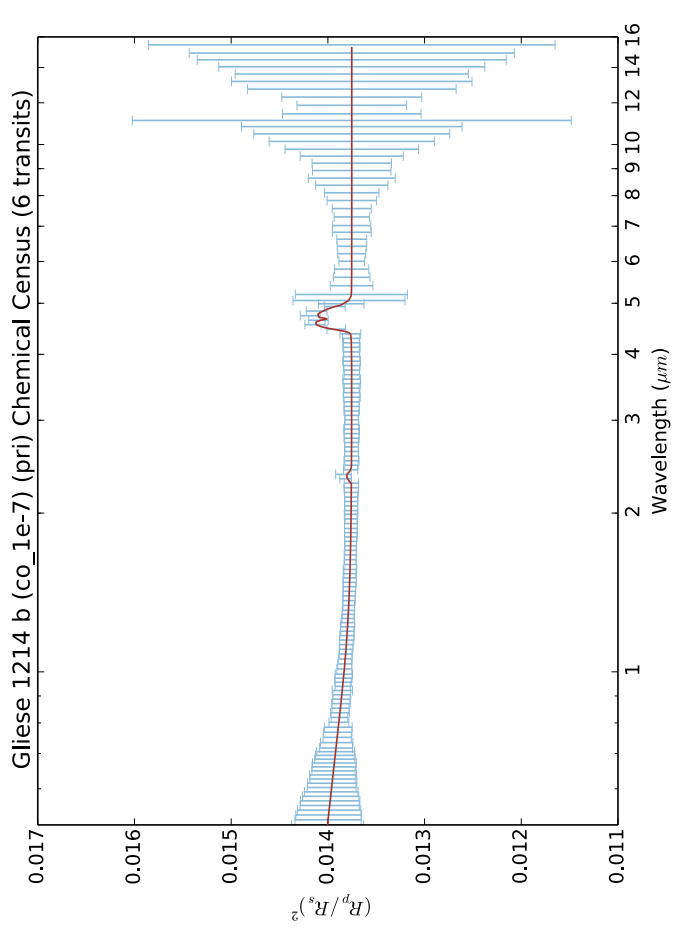
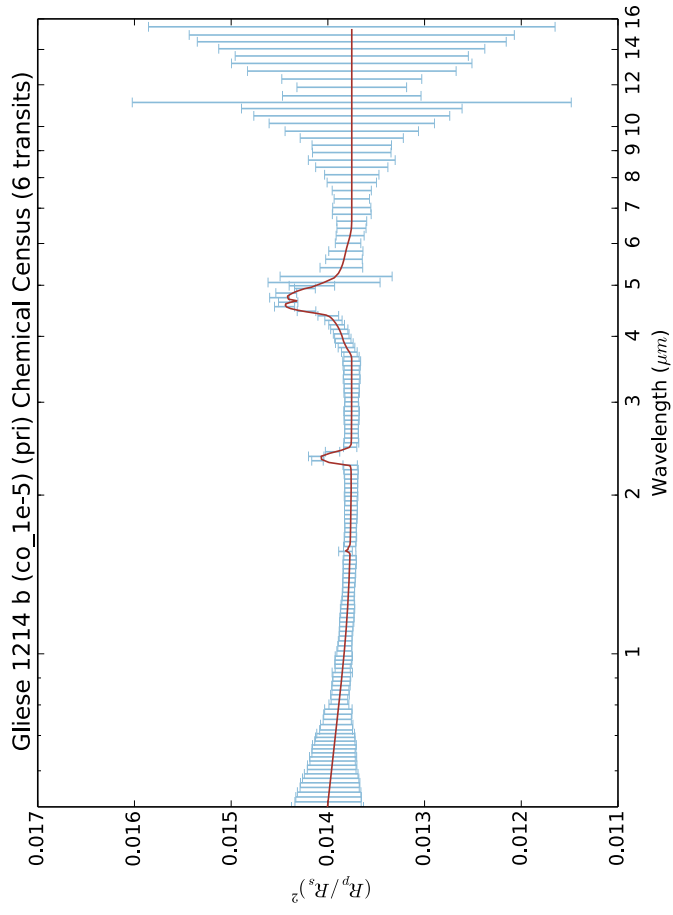


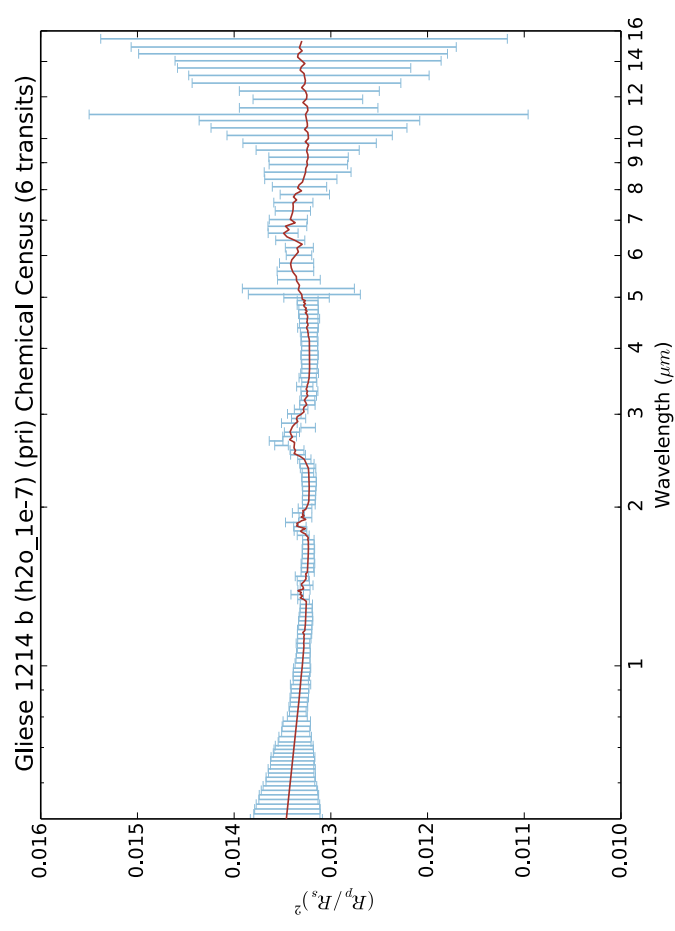
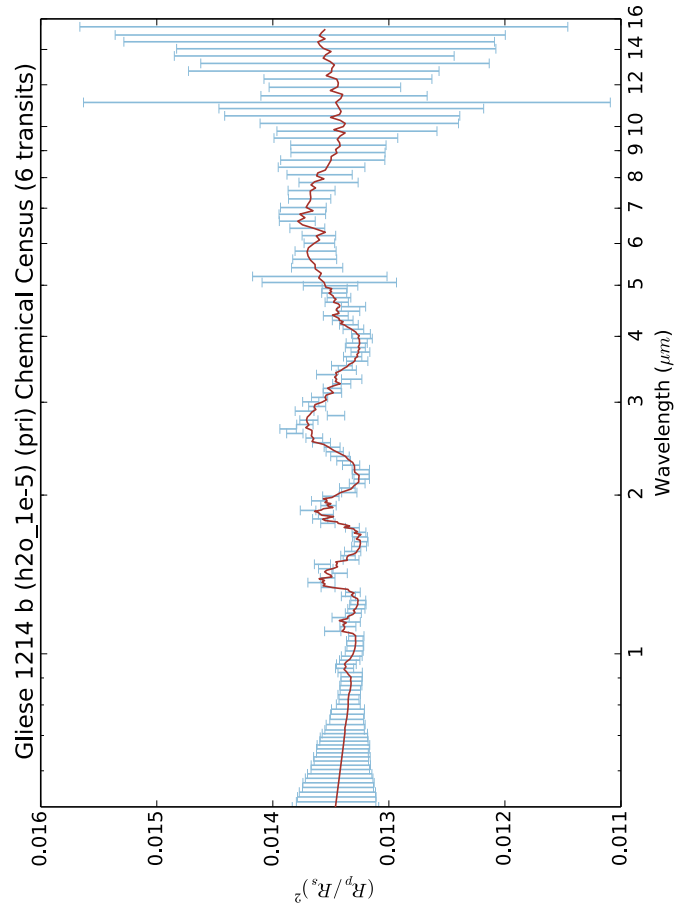
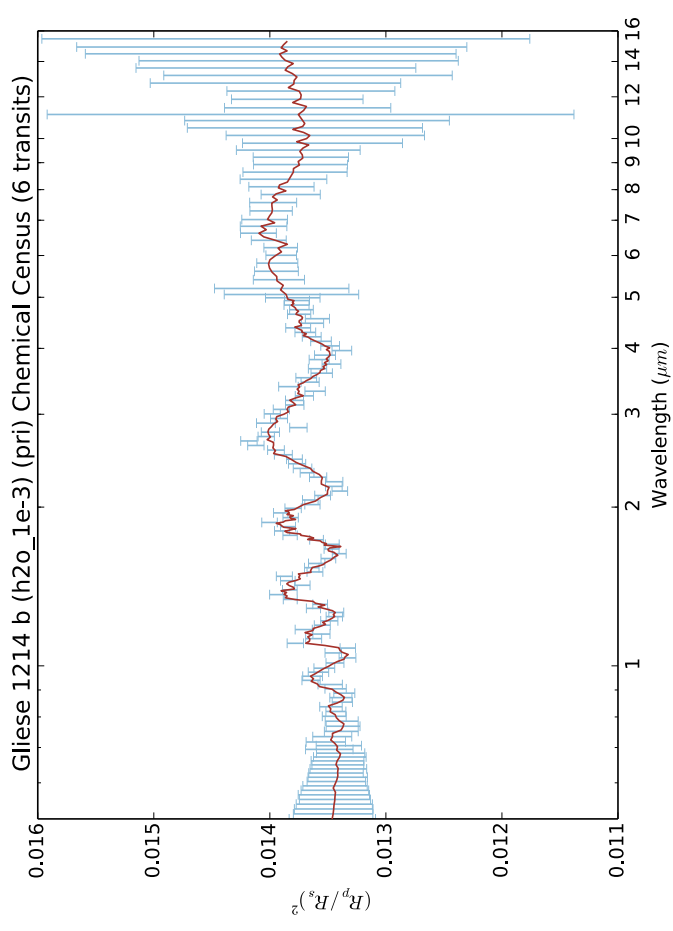
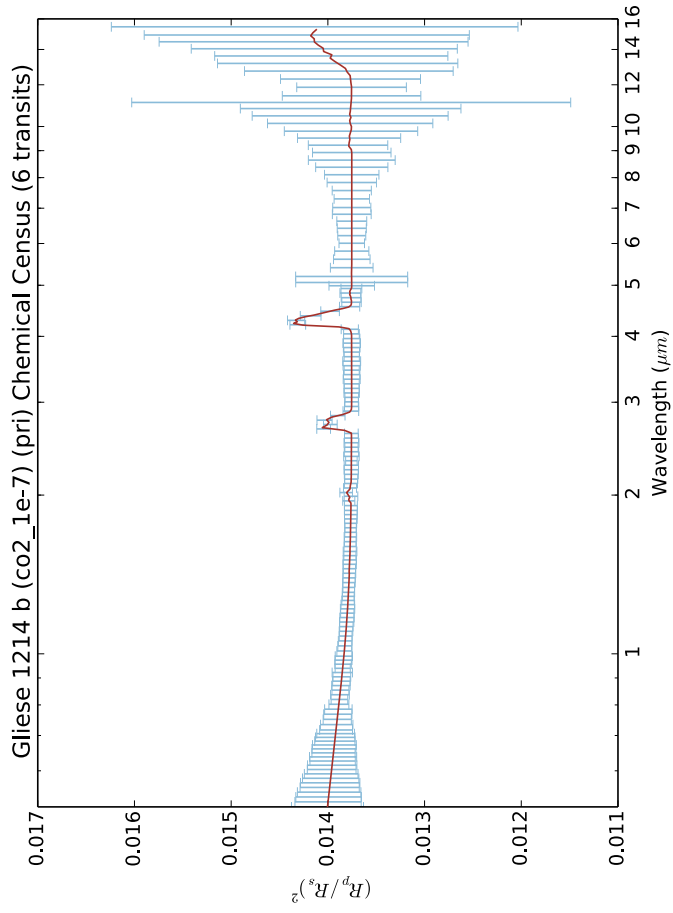


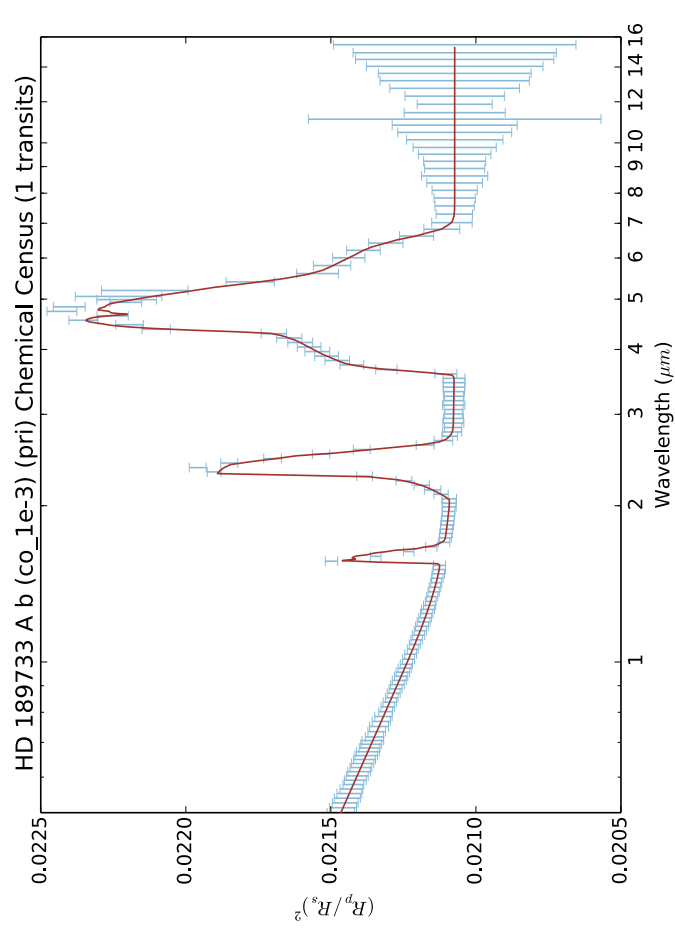
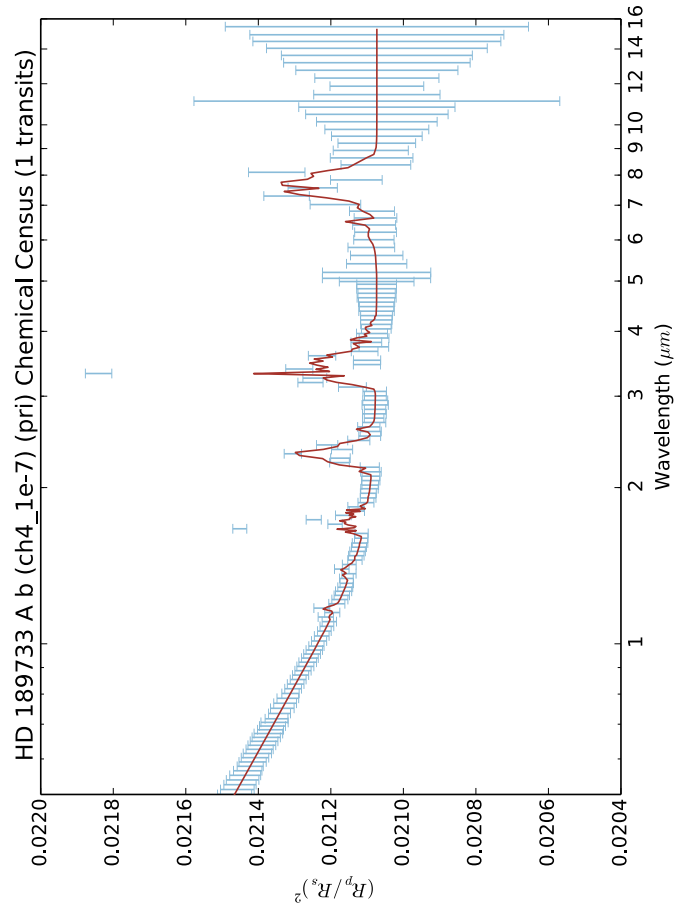
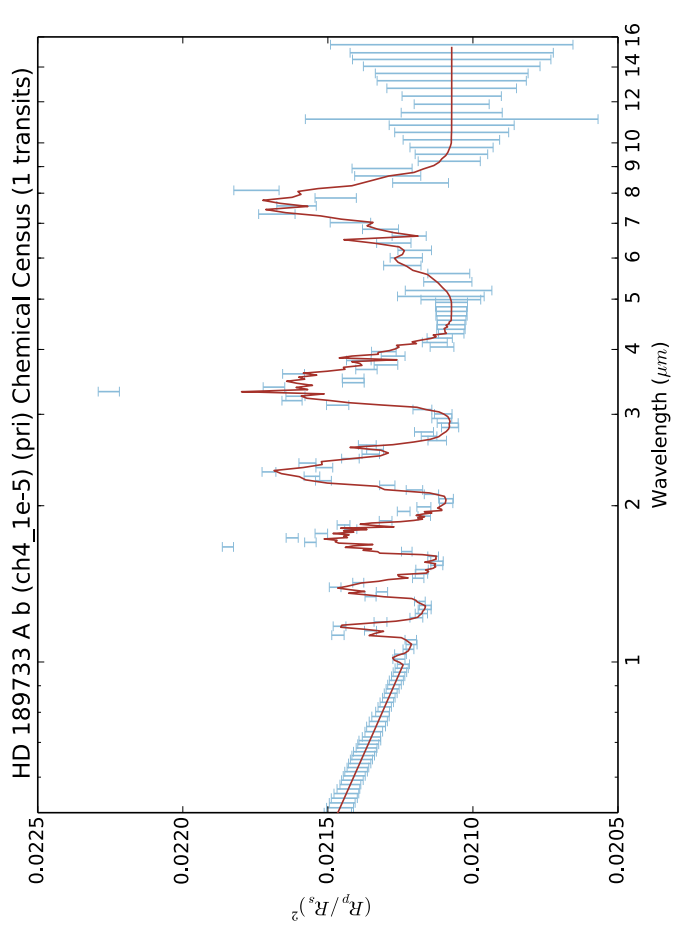
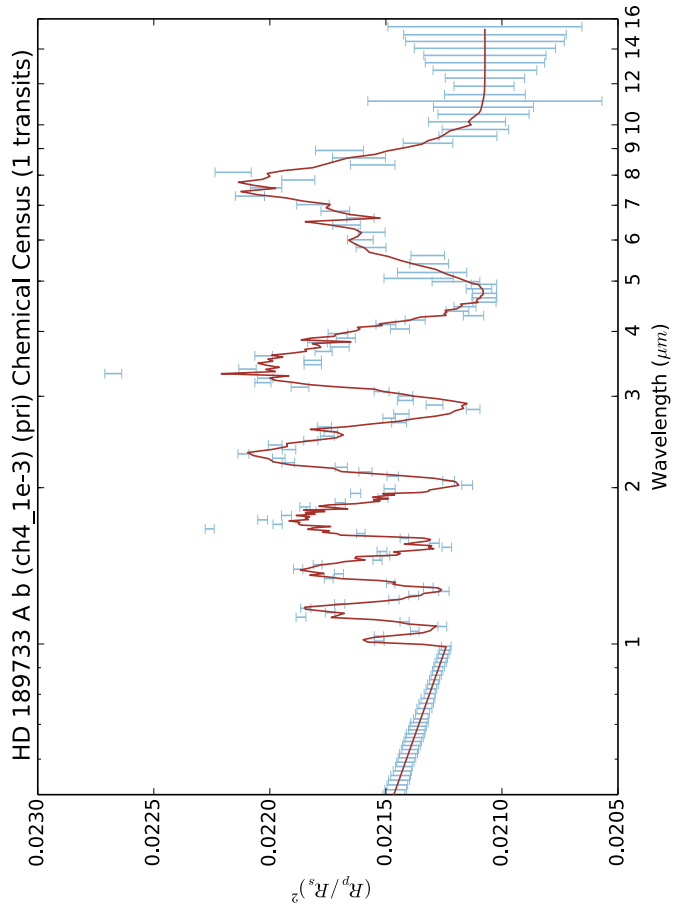


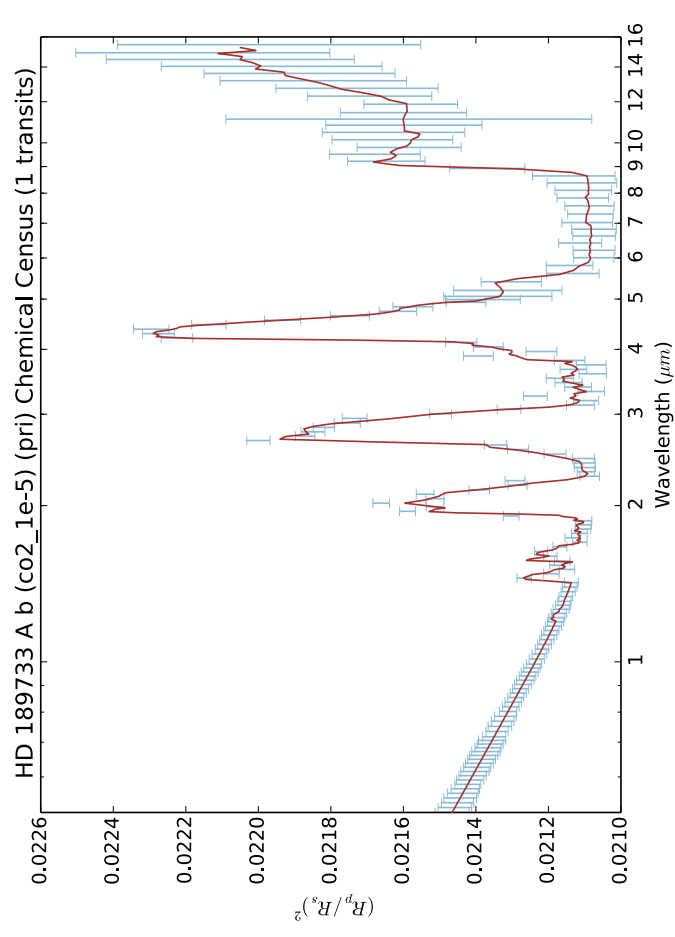
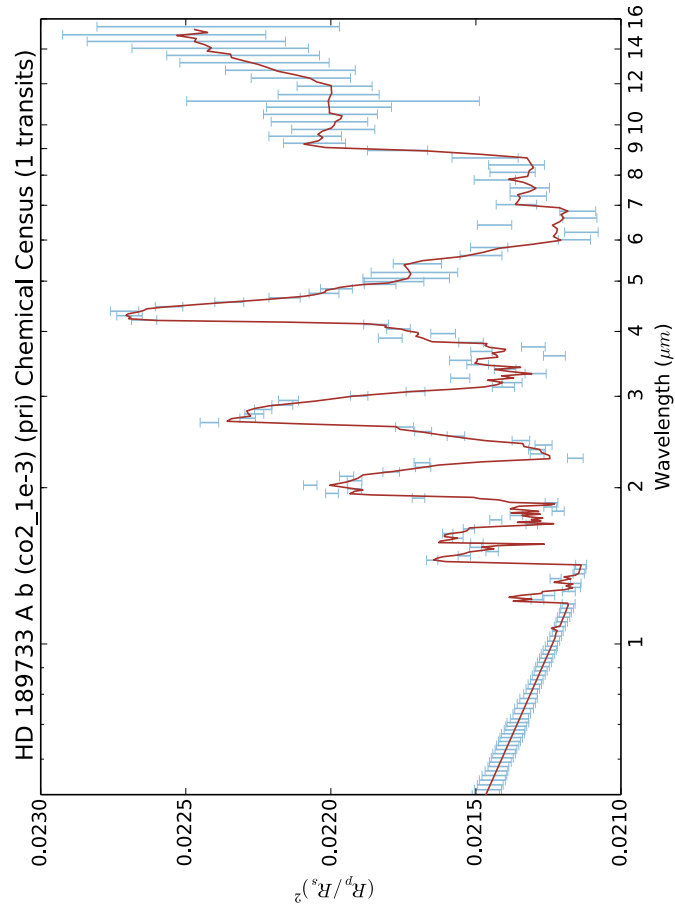
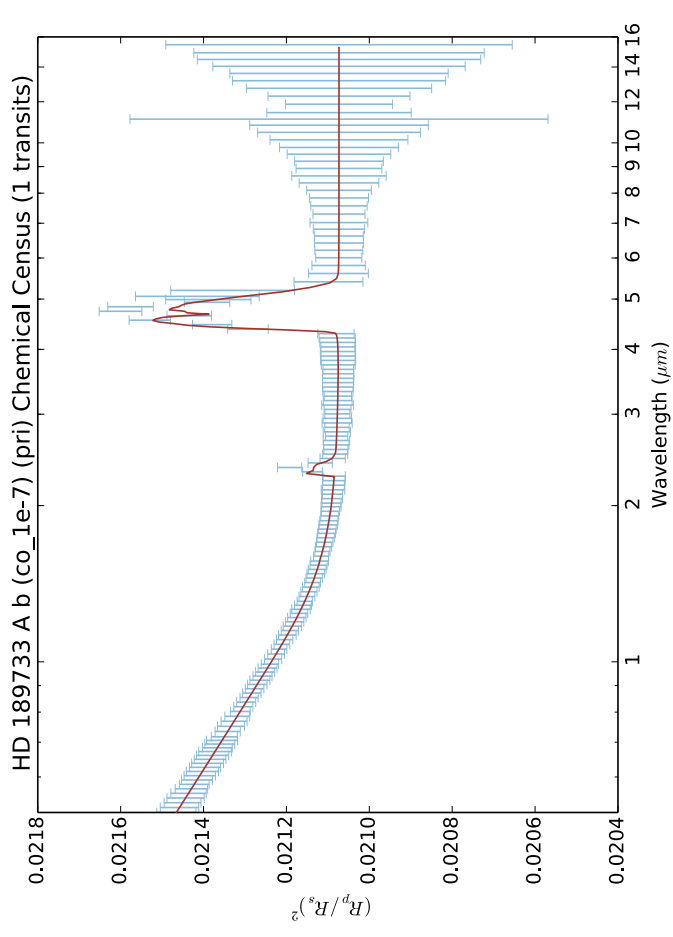
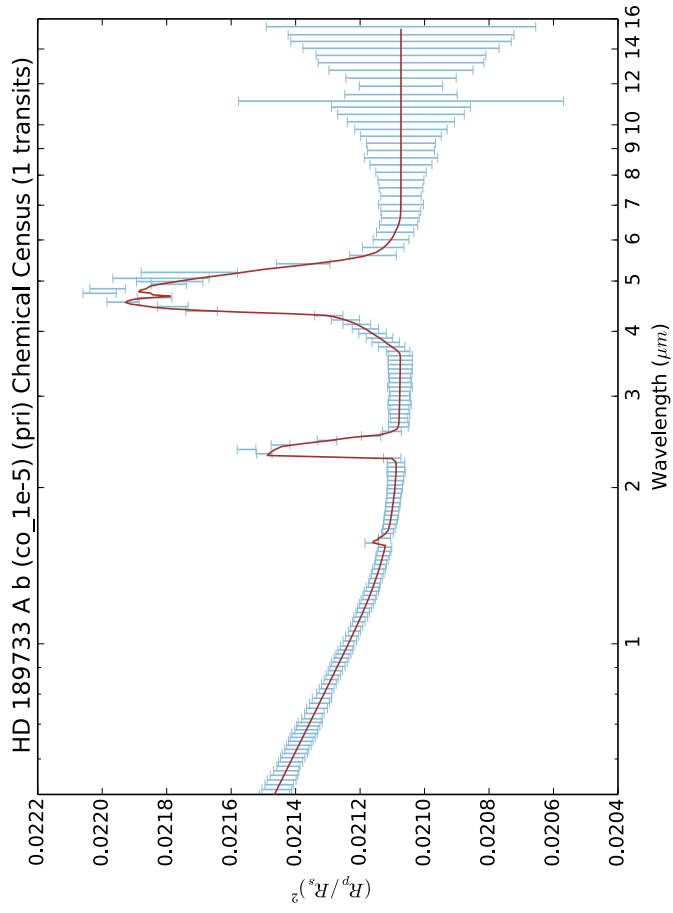




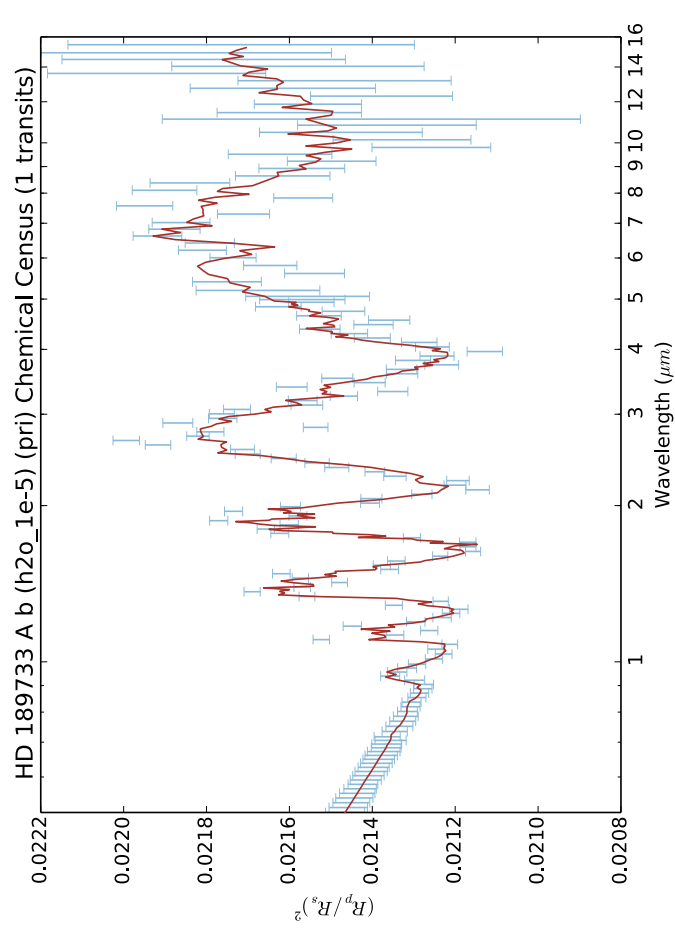
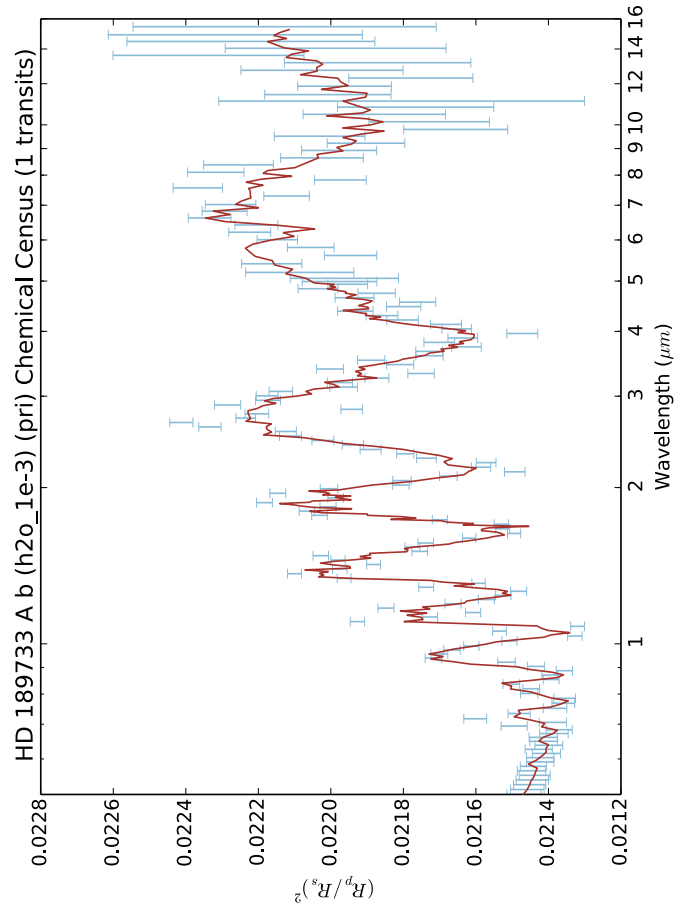
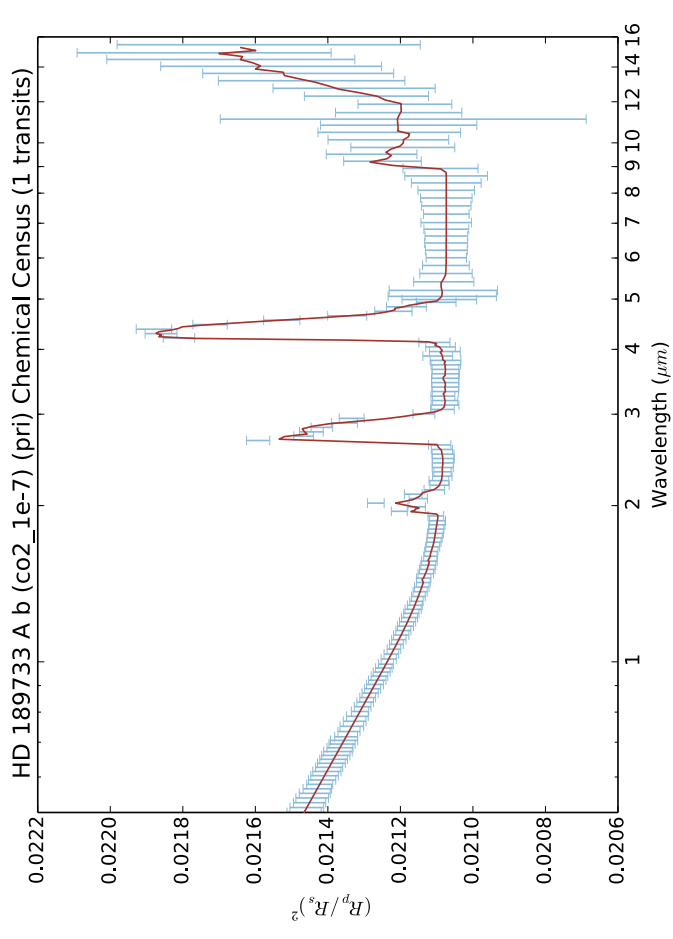
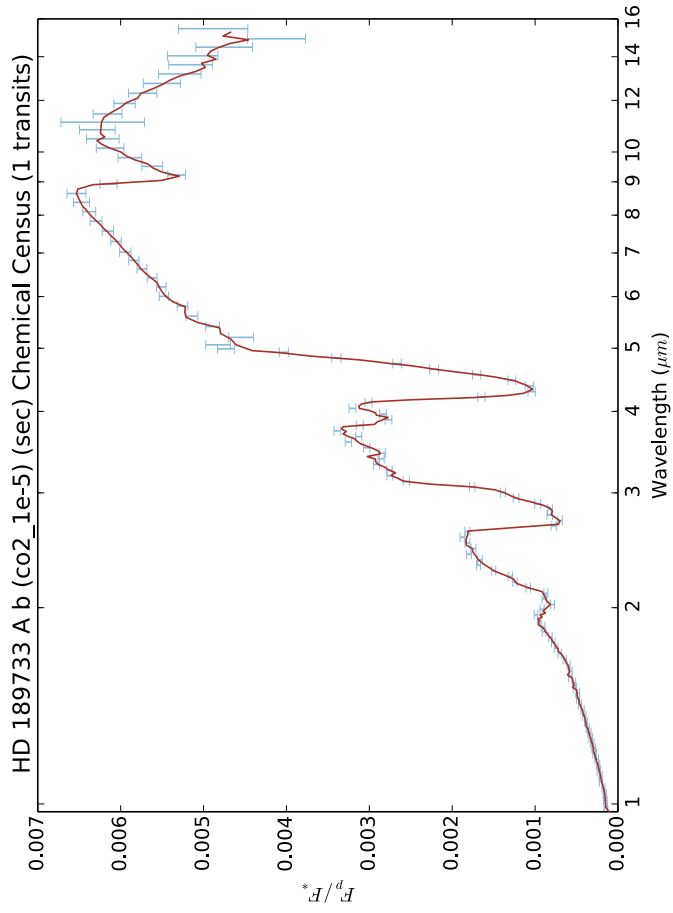


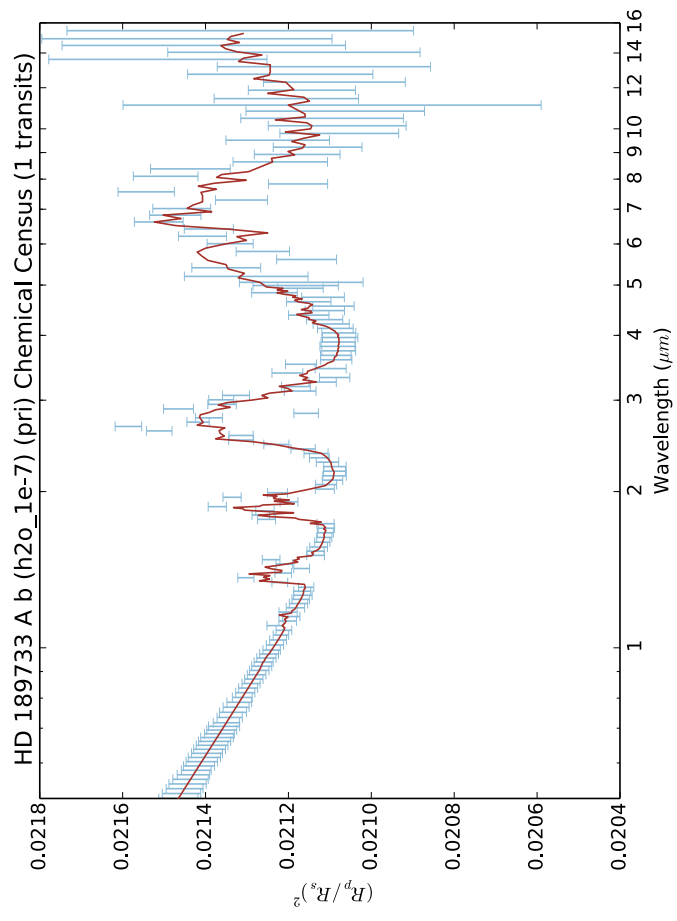






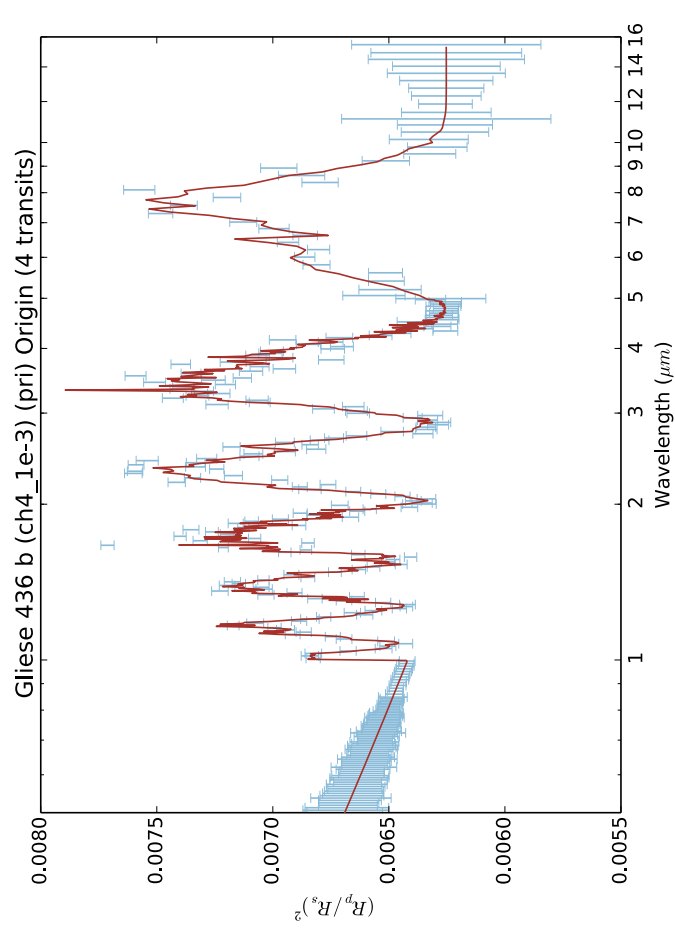
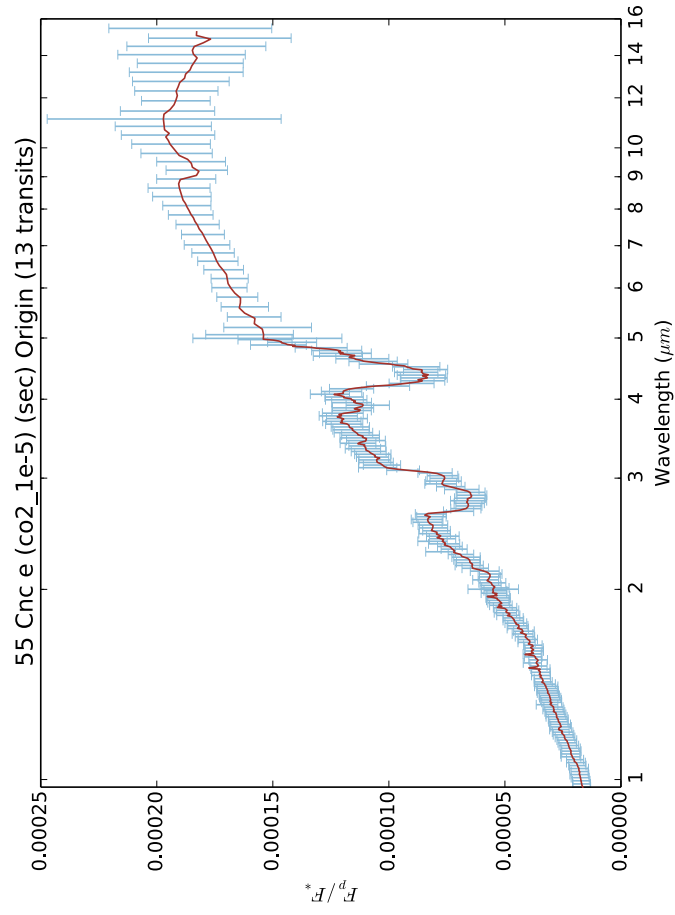
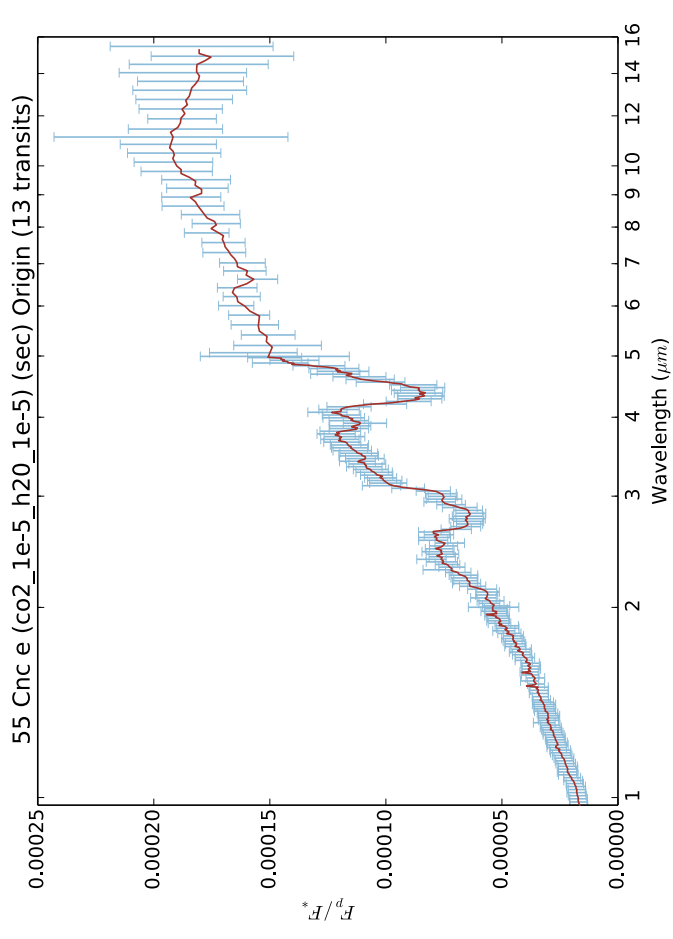
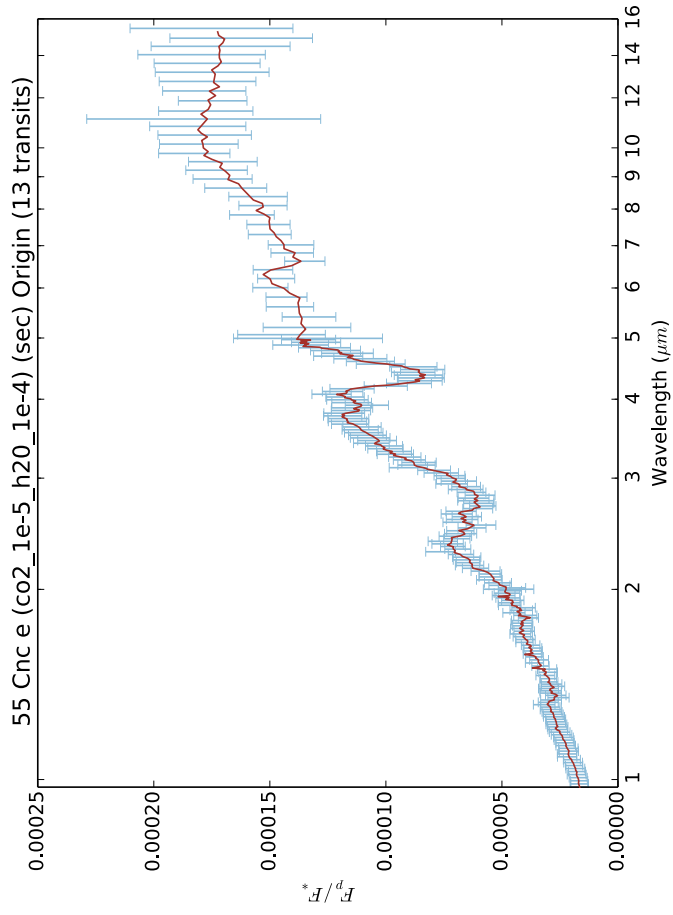


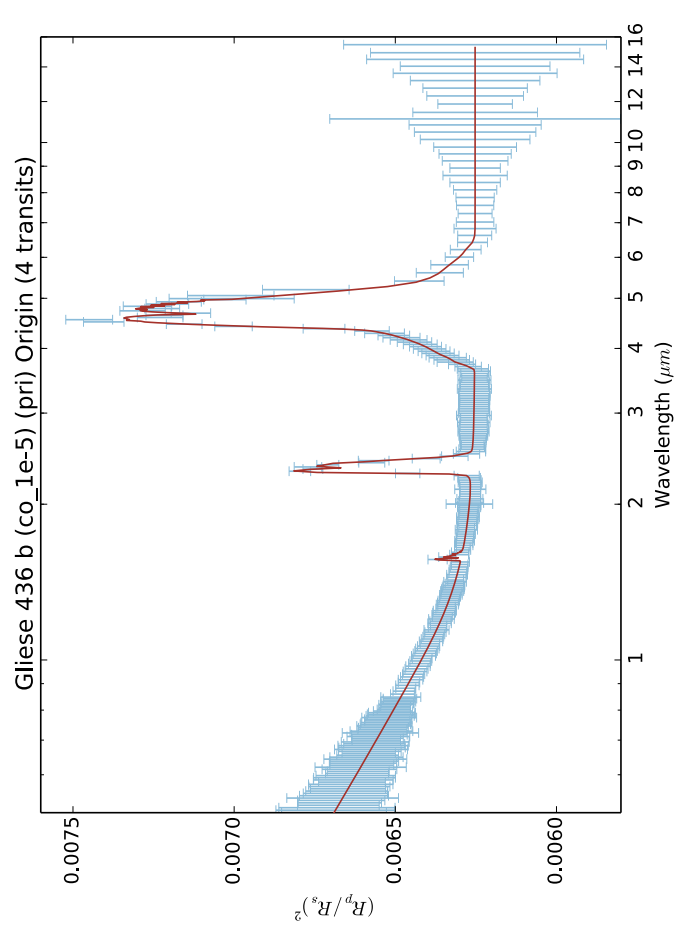
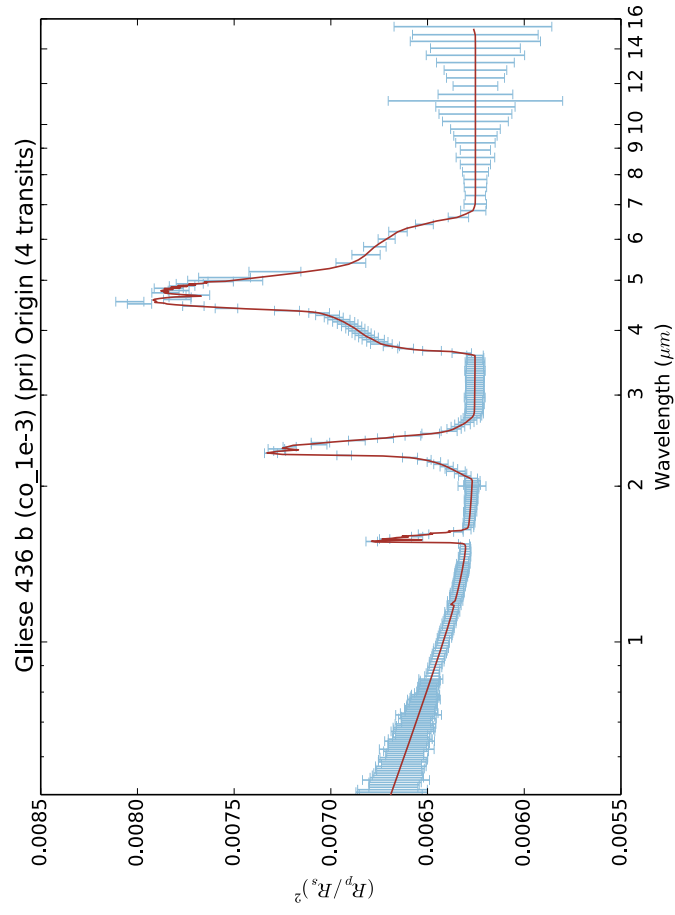
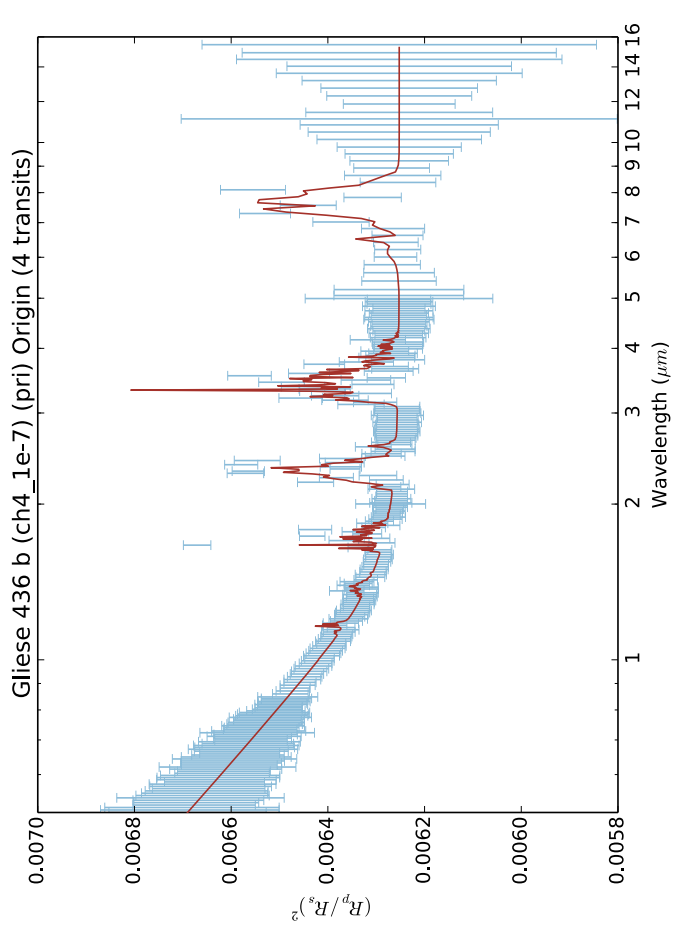
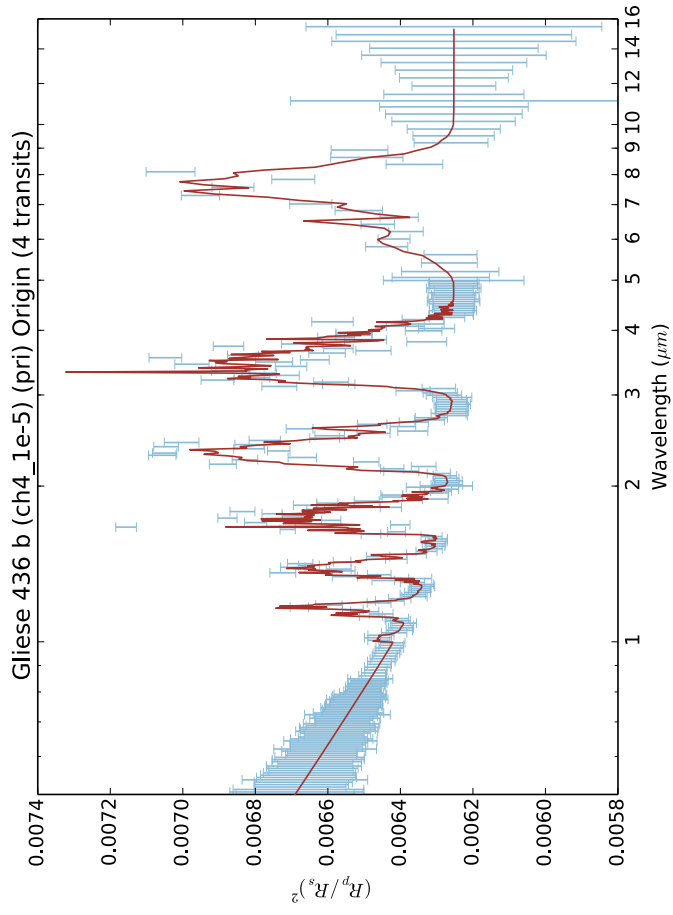


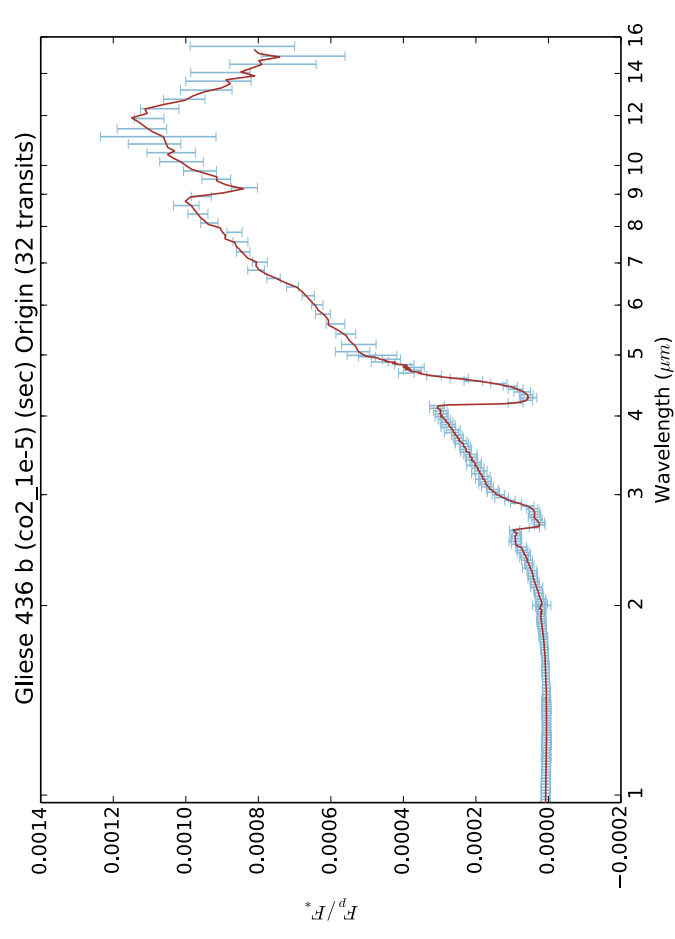
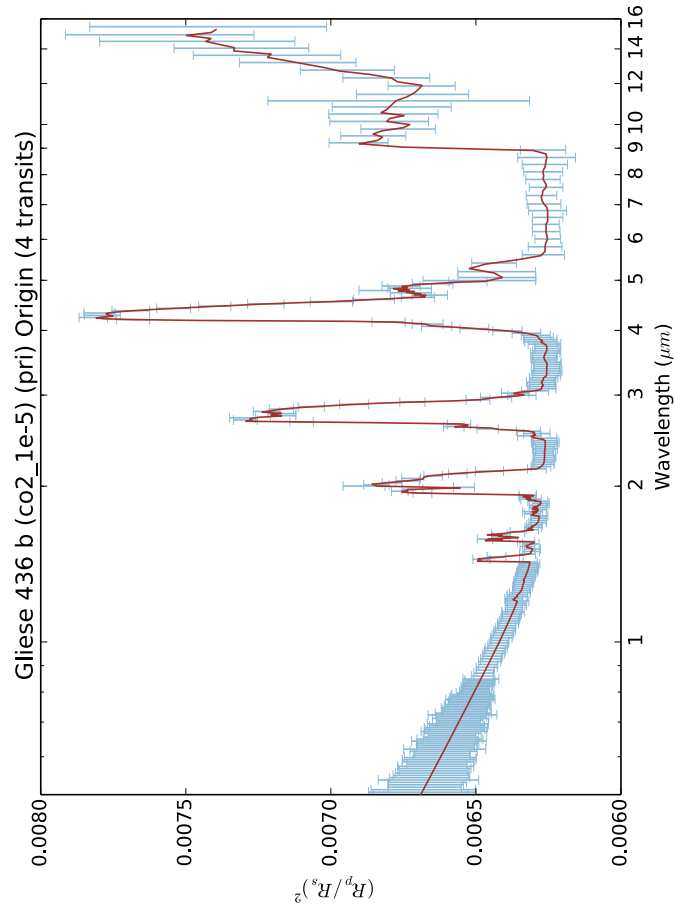
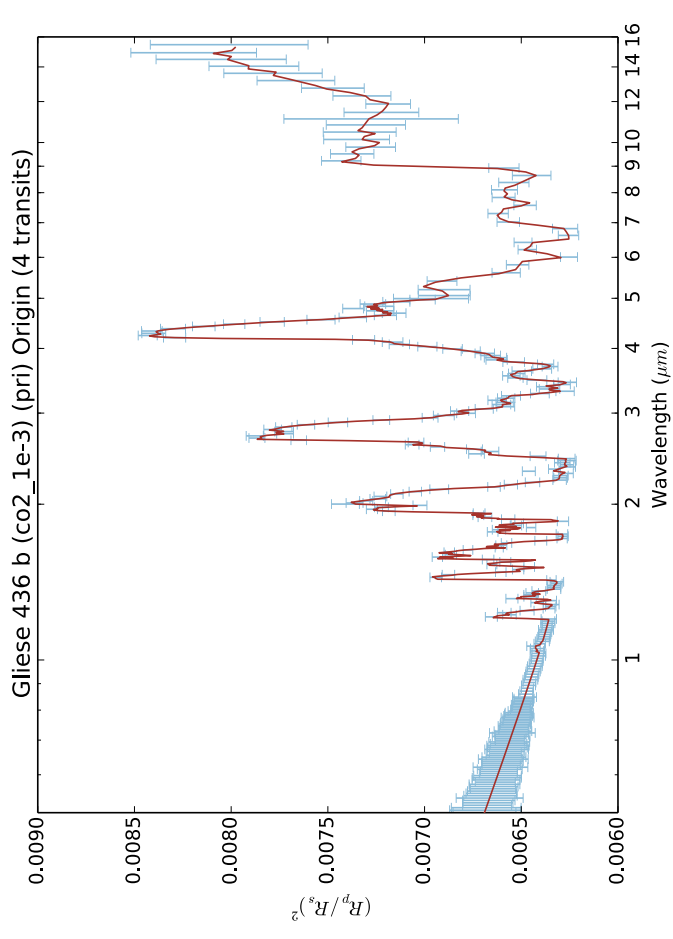
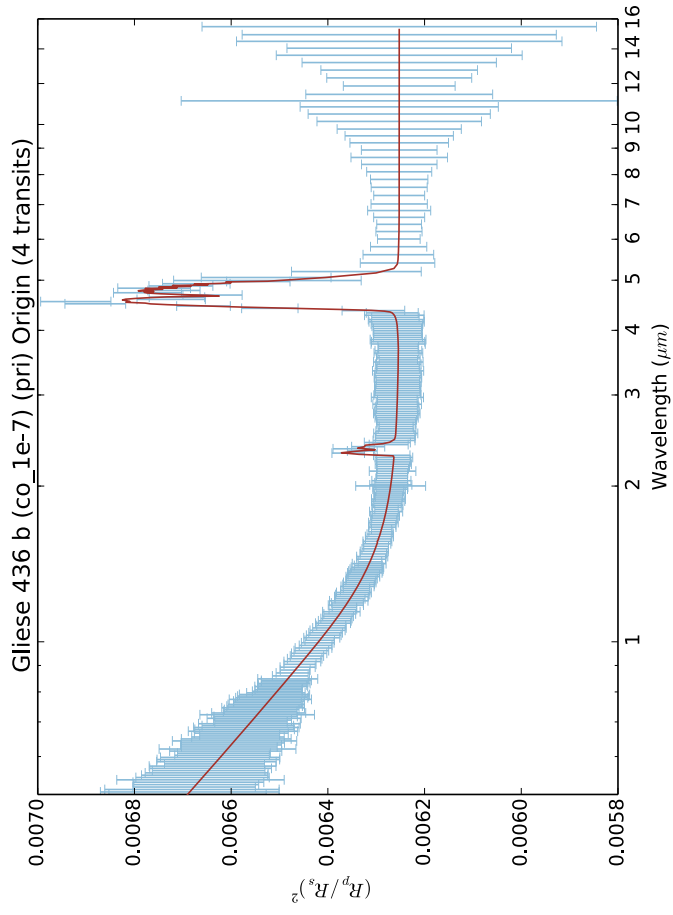


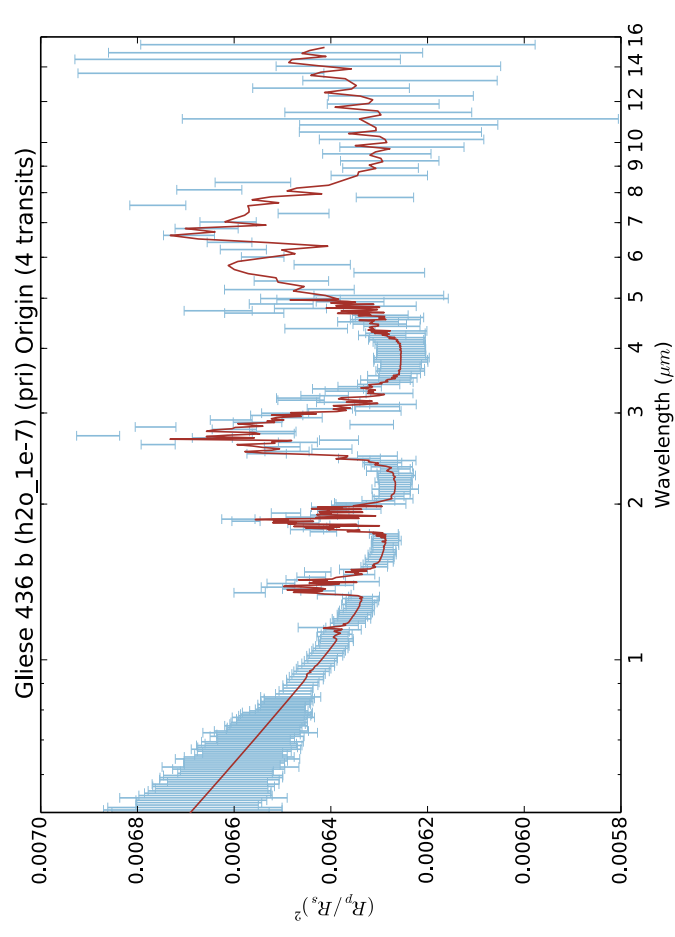
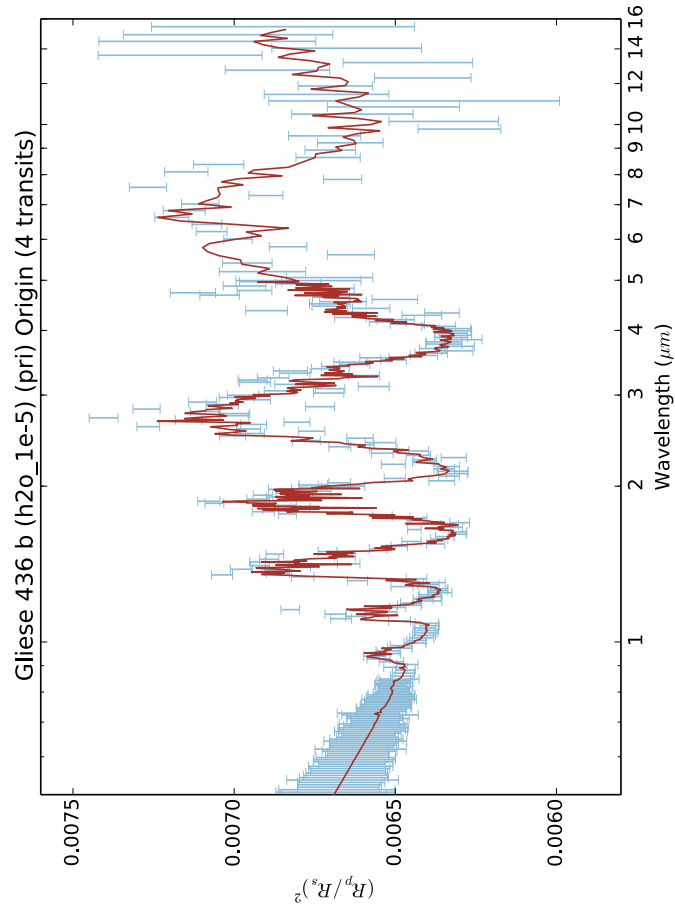
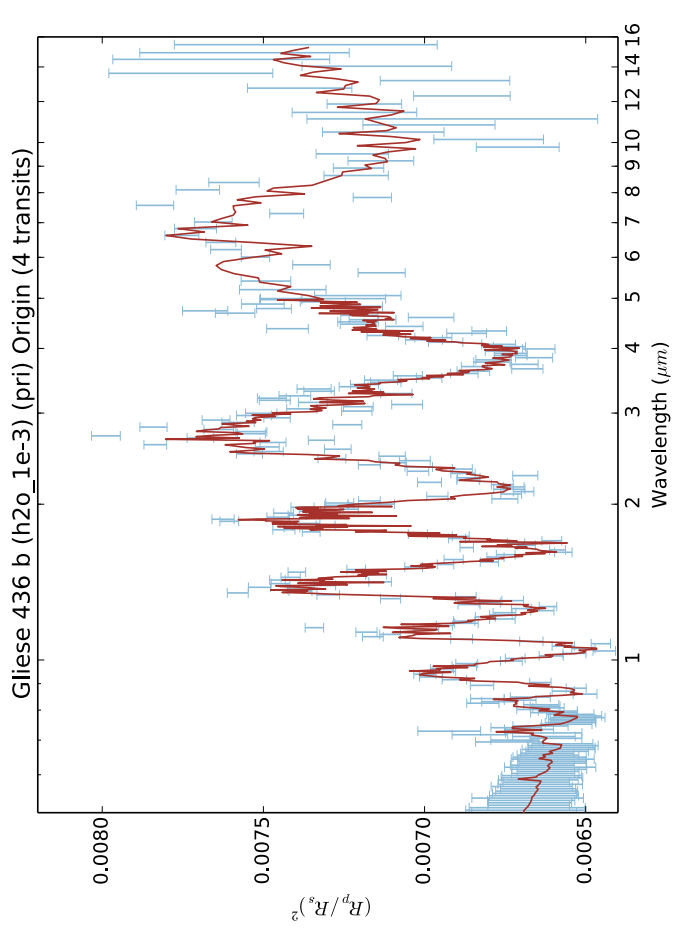
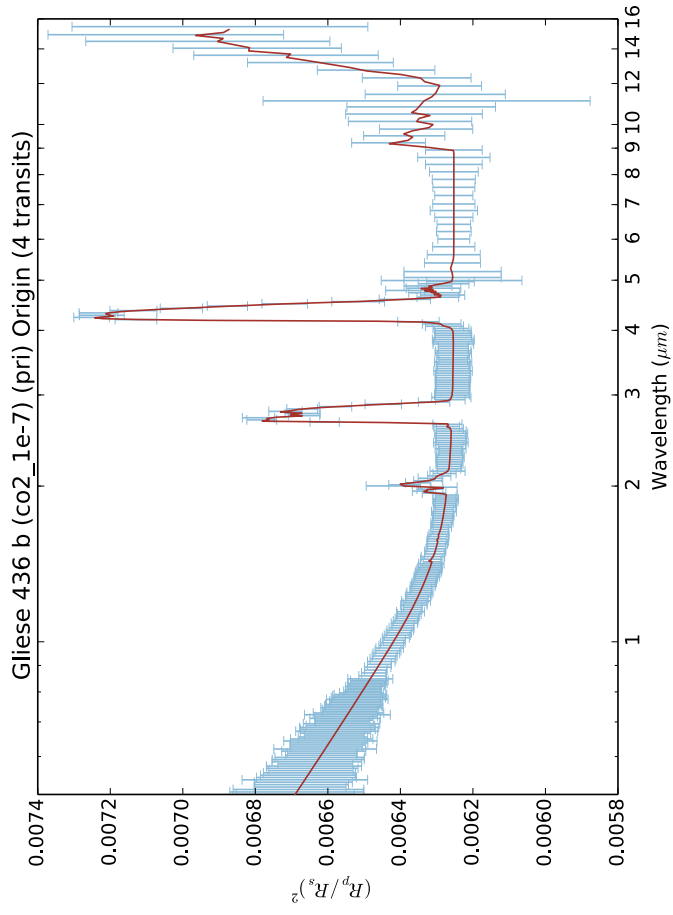
	<p><b>Exoplanet Characterisation Observatory</b></p>	<p>Doc Ref: ECHO-TN-0001-UCL Issue: 03 Date: 11-12-2013</p>
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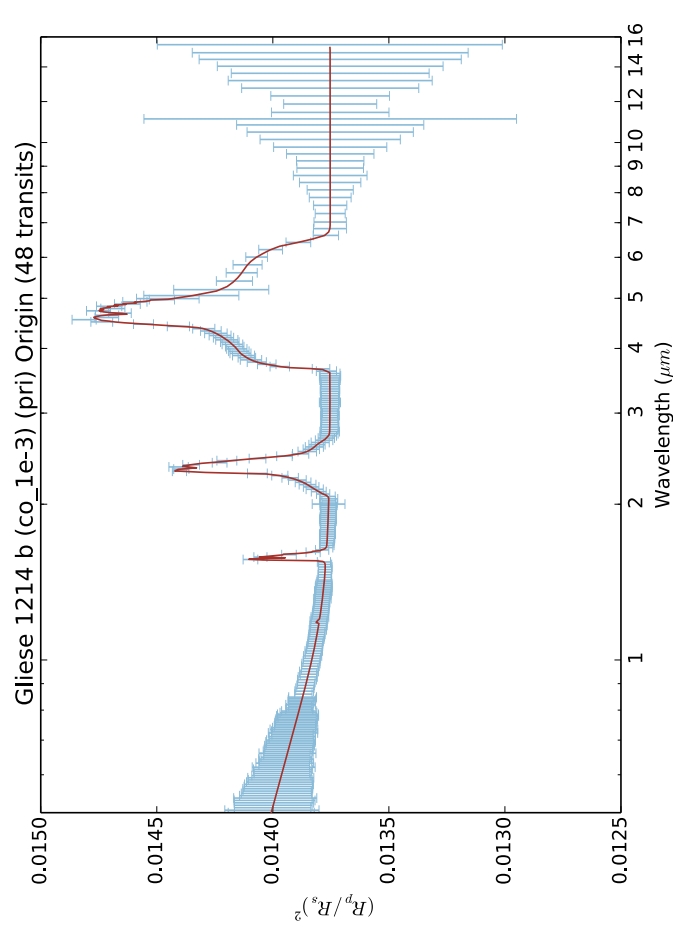
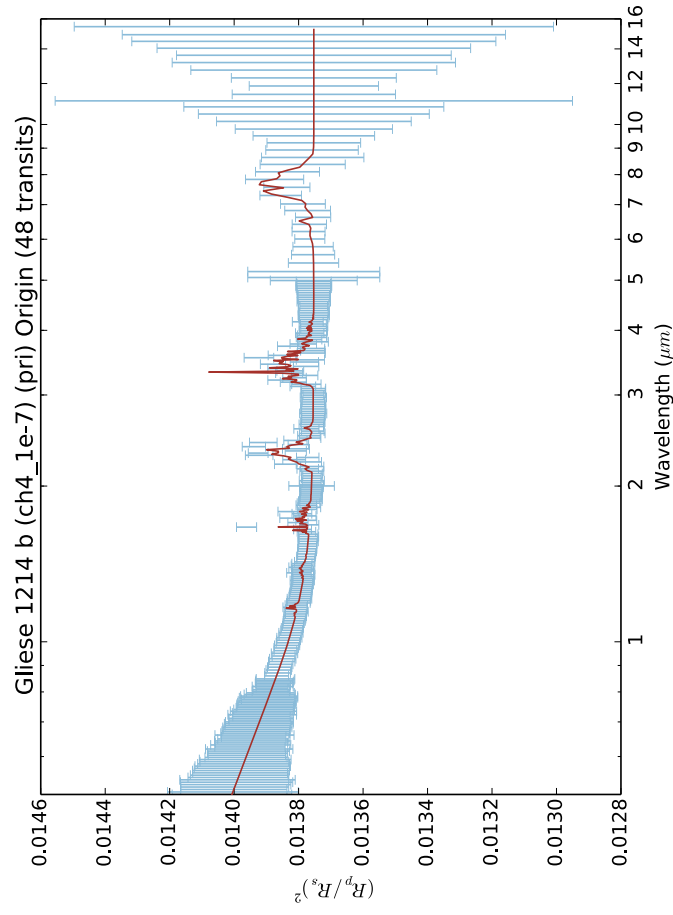
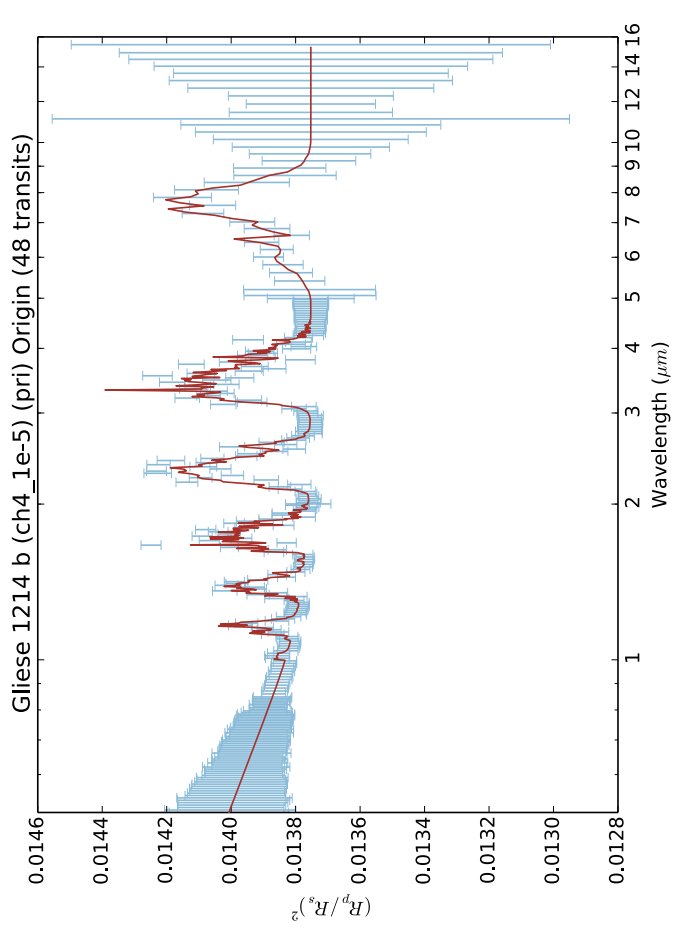
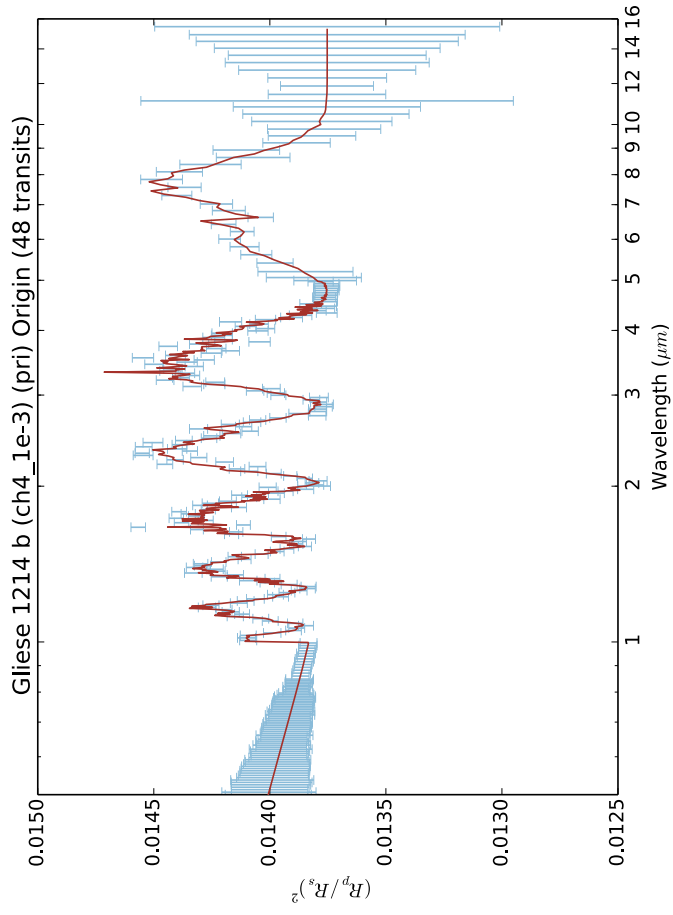
**Figure 8 Planet Signal for Origin Mode for a sample of planets under different atmospheric compositions**



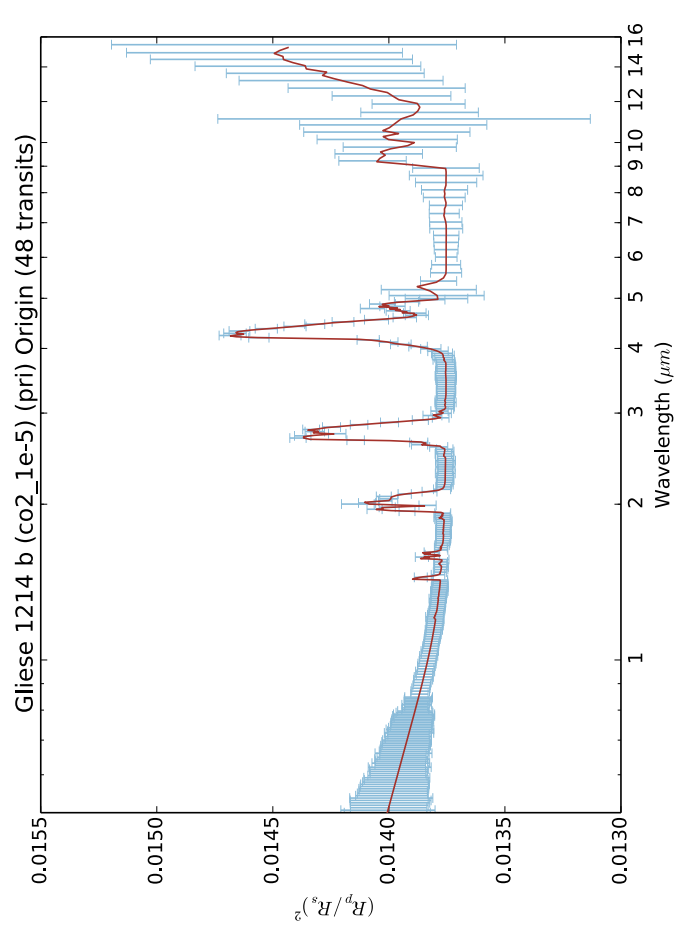
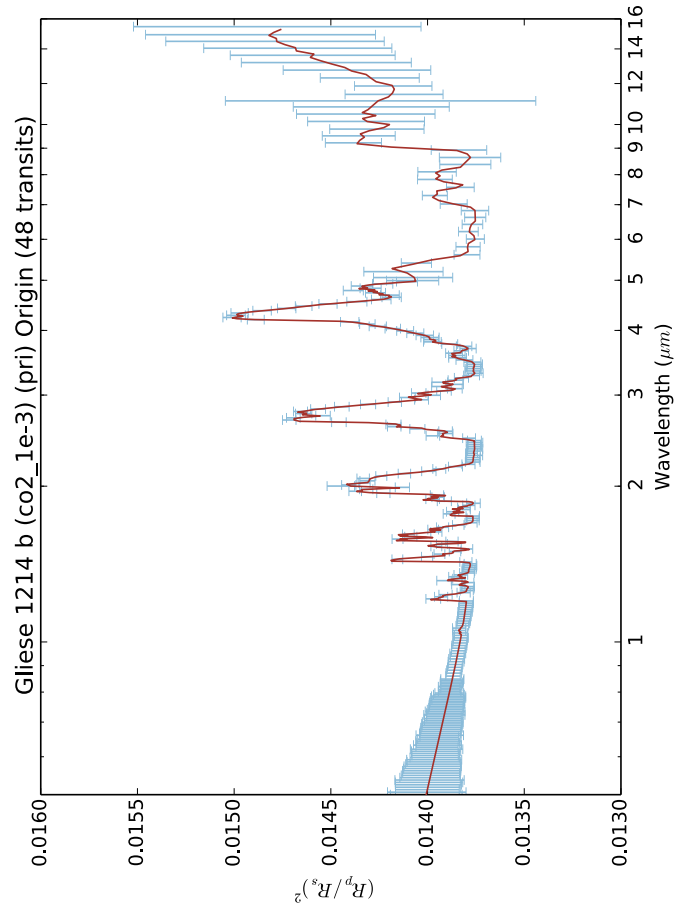
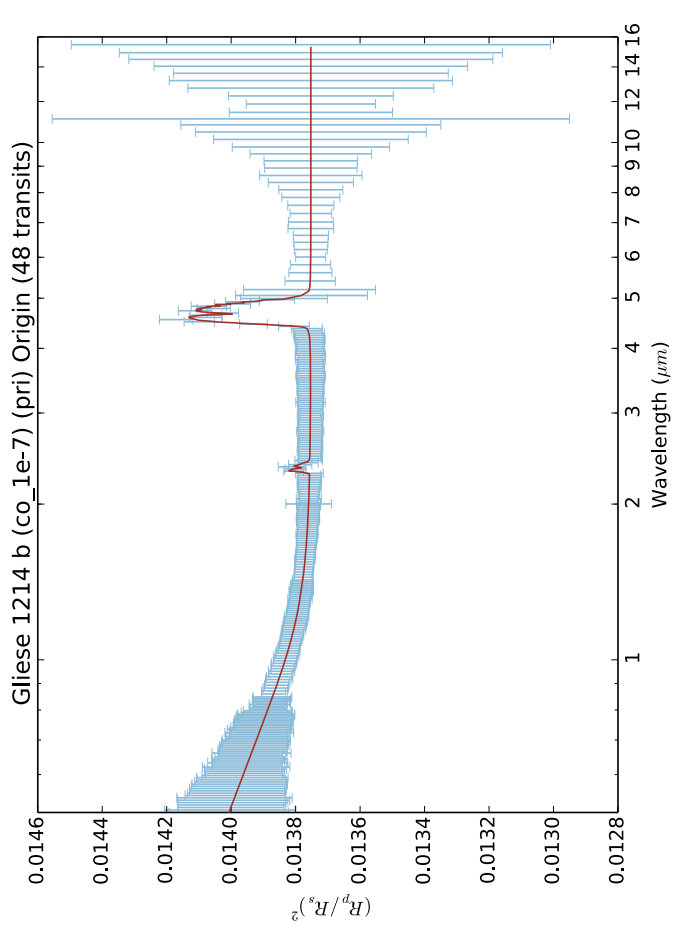
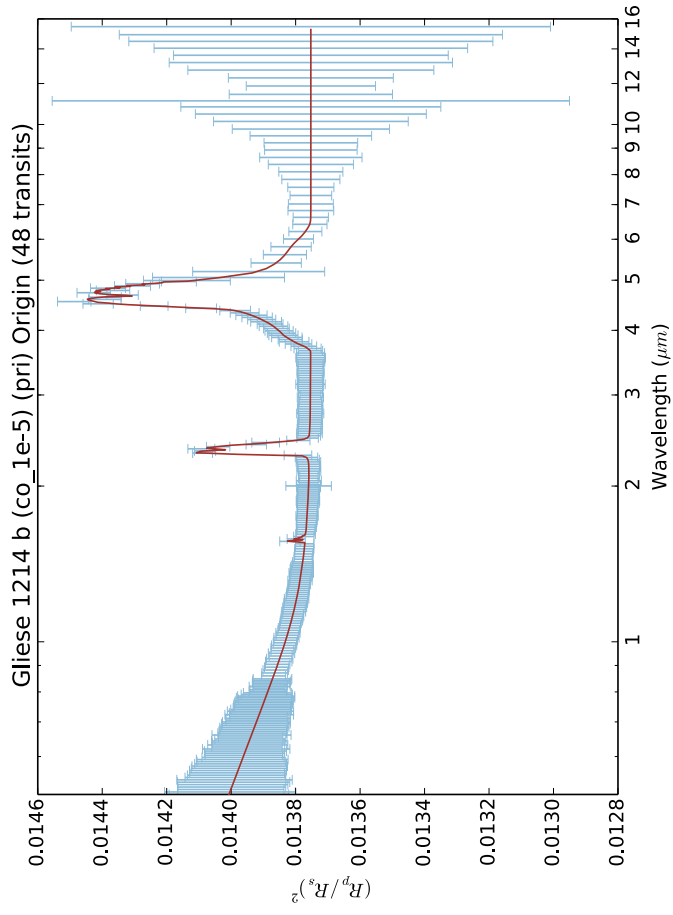


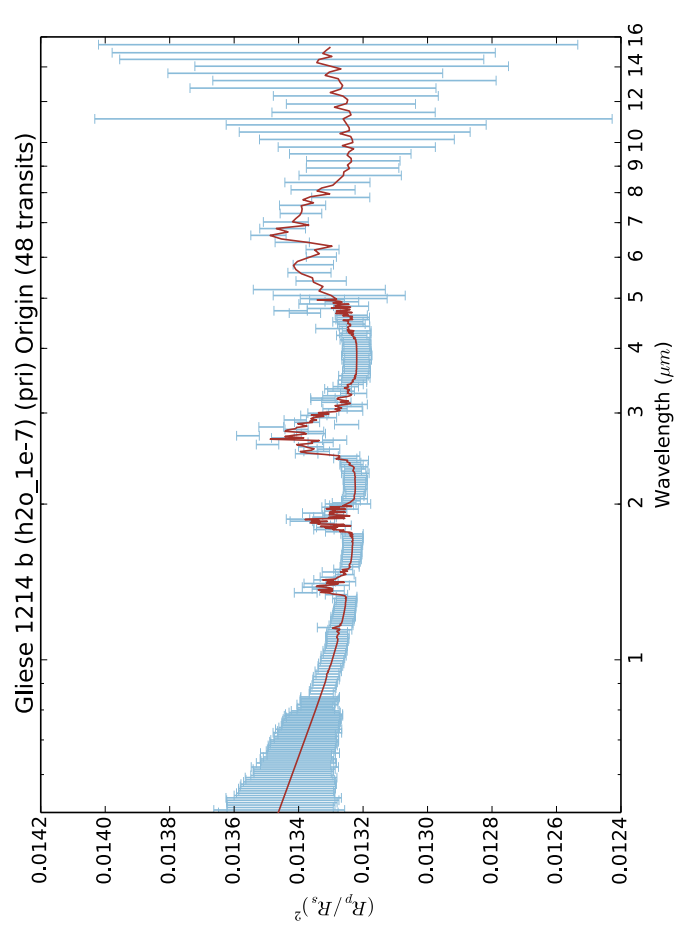
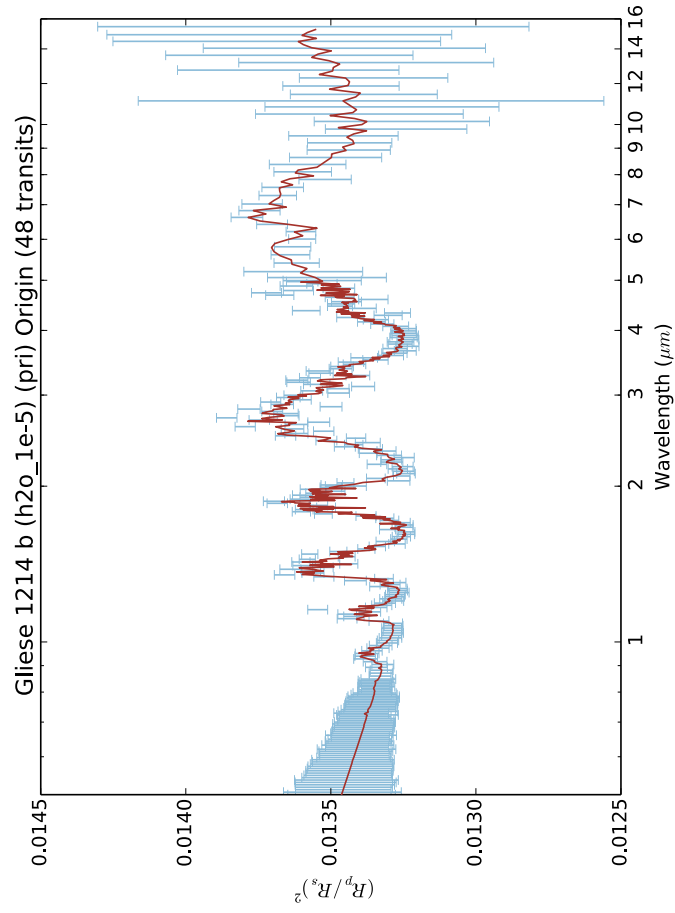
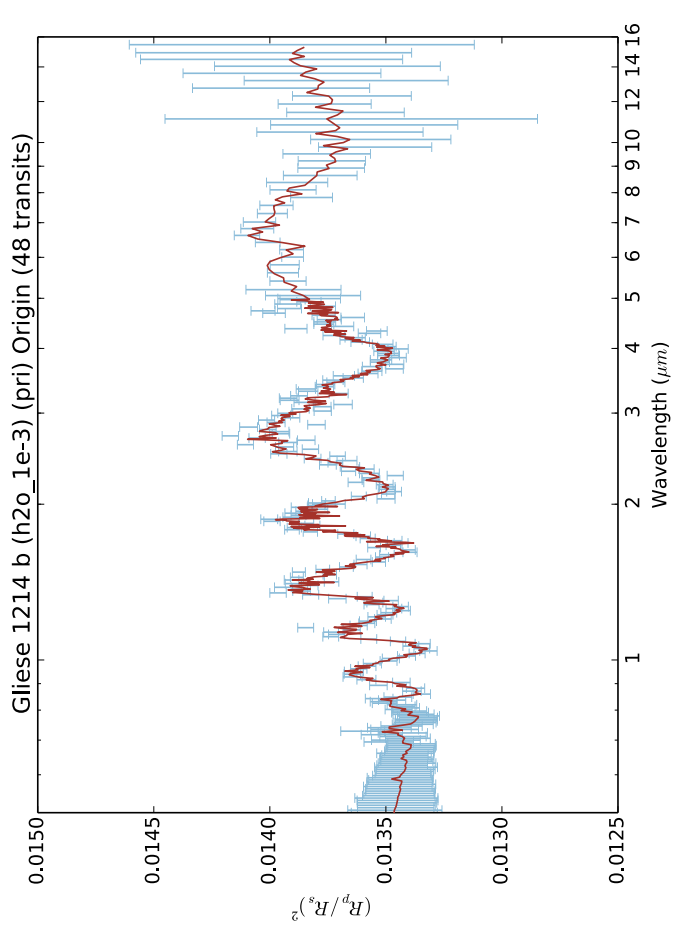
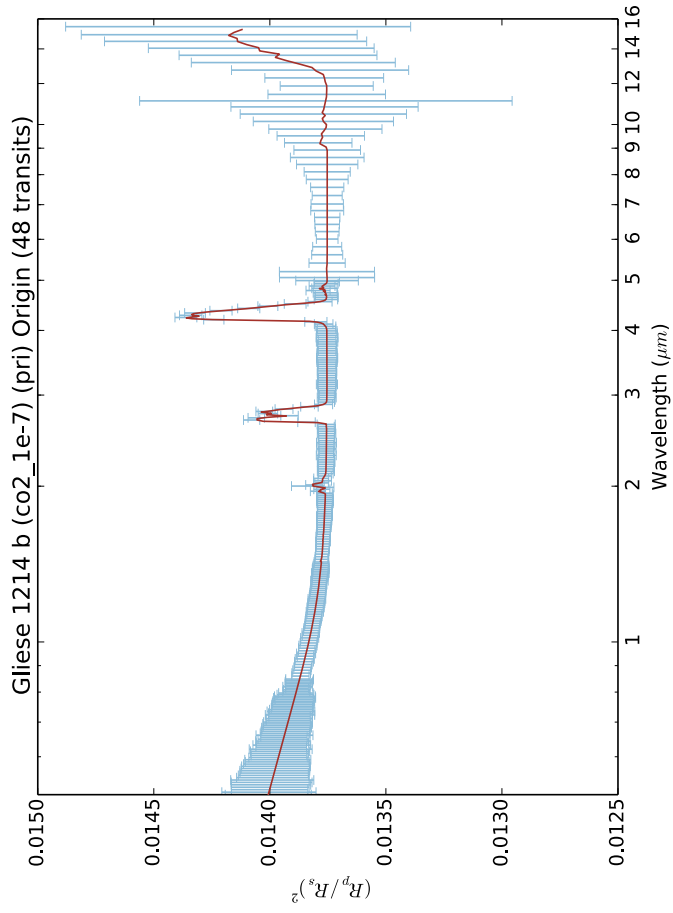


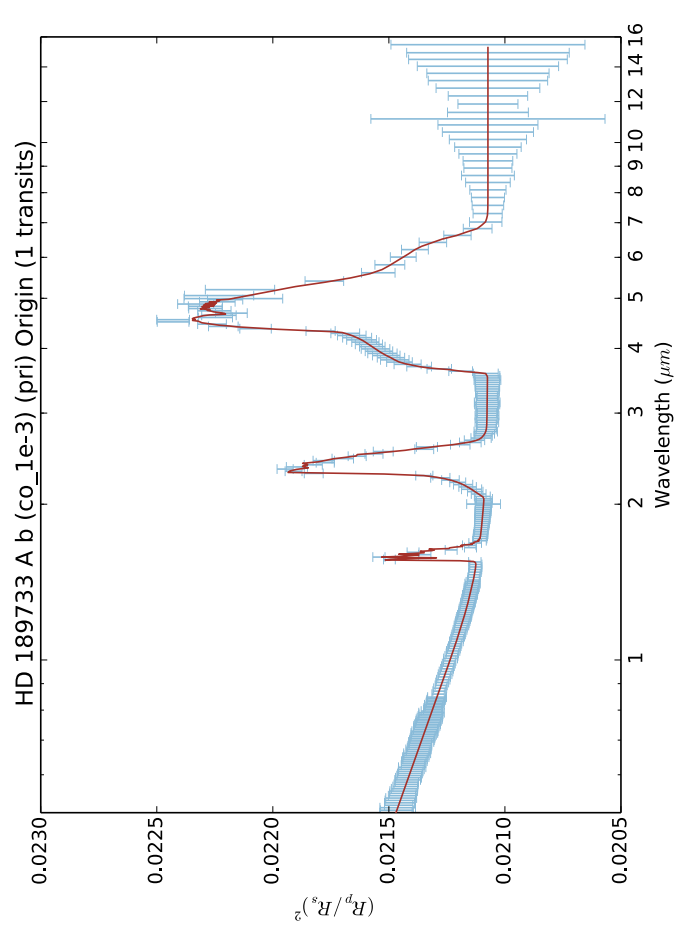
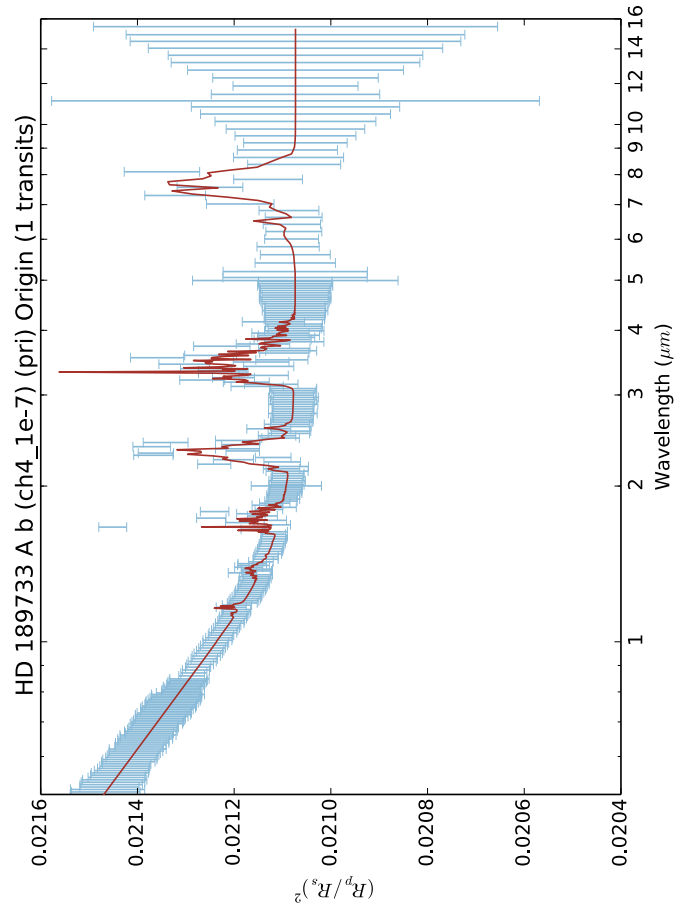
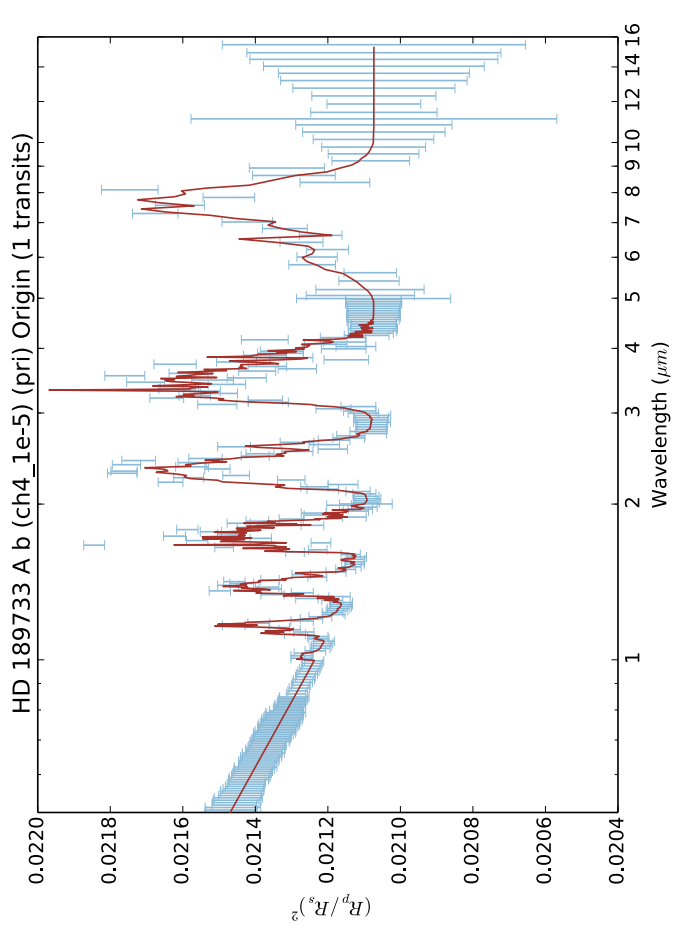
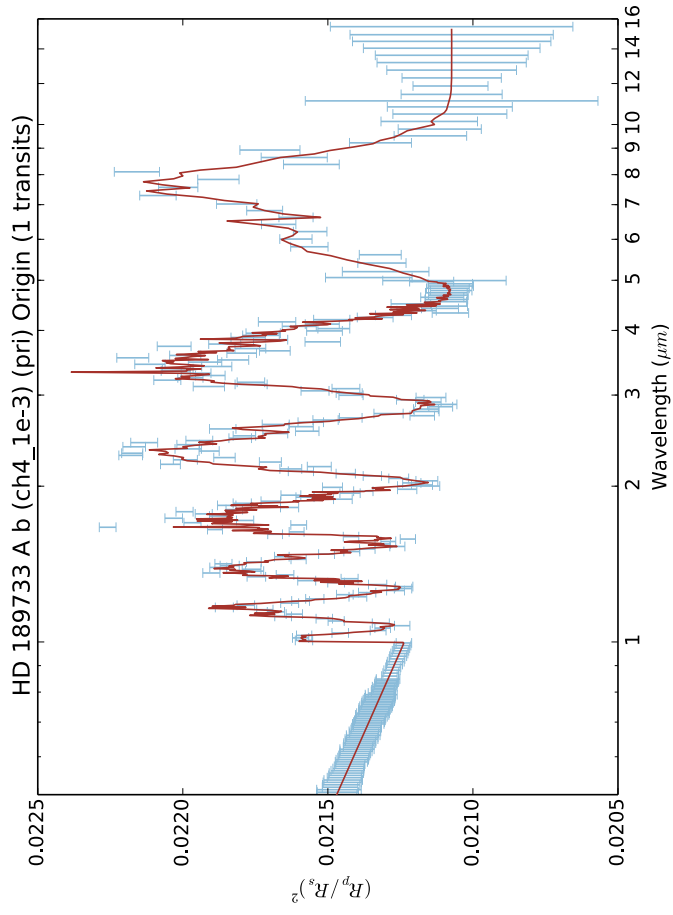


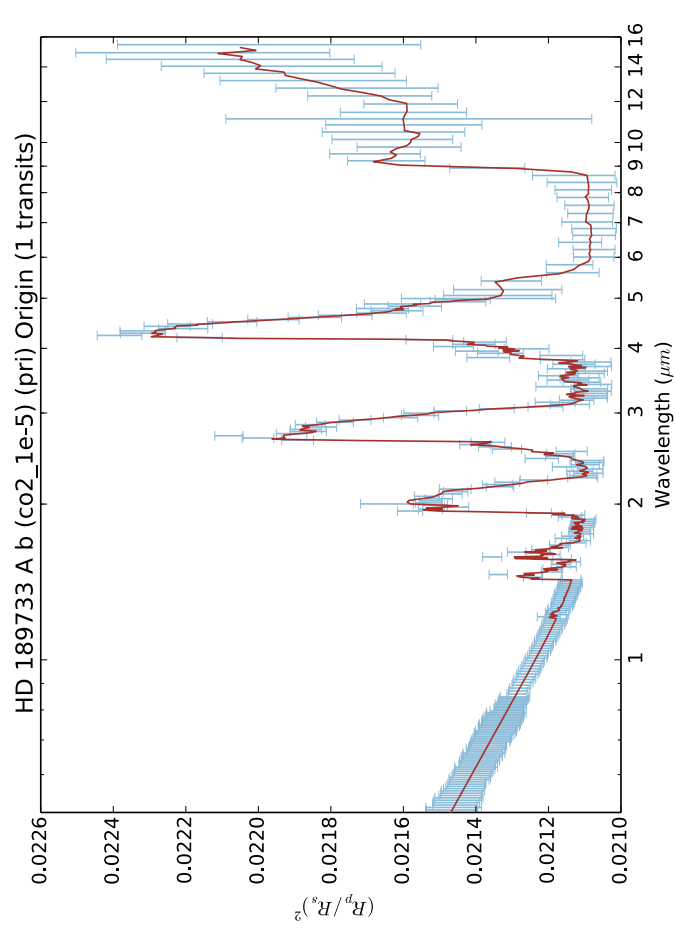
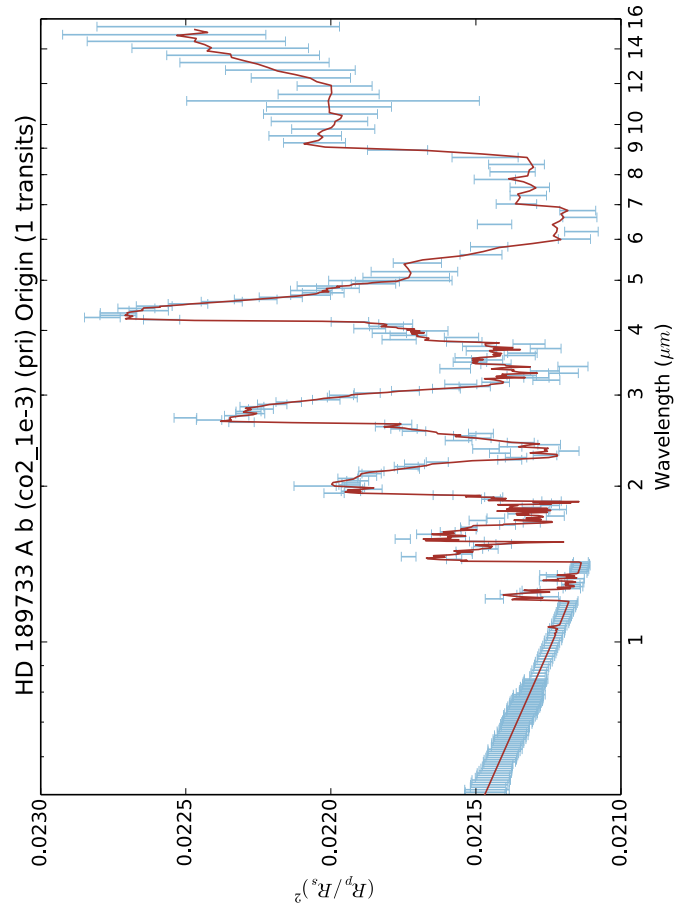
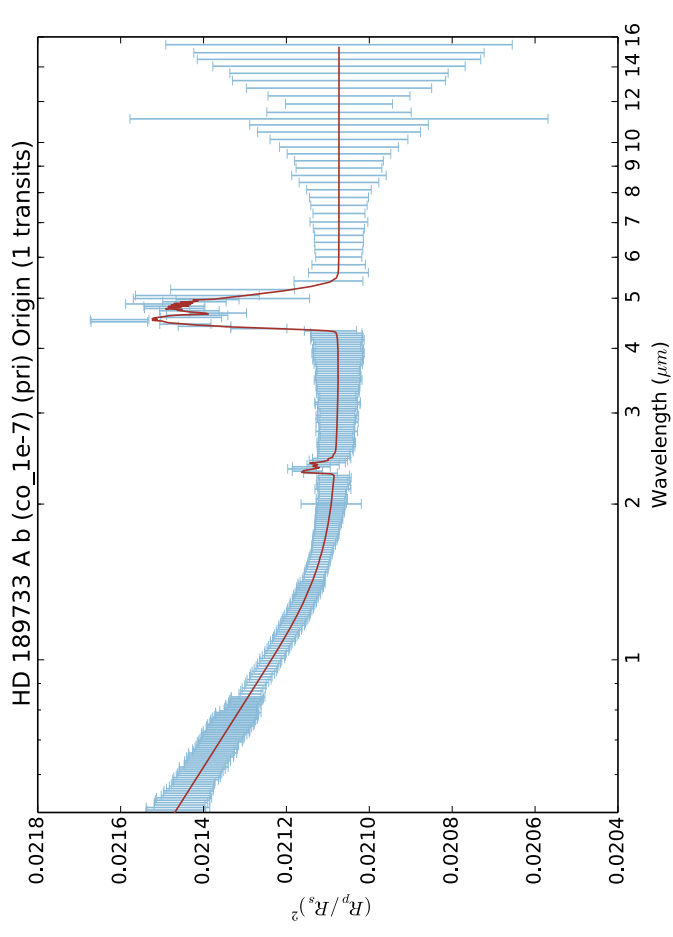
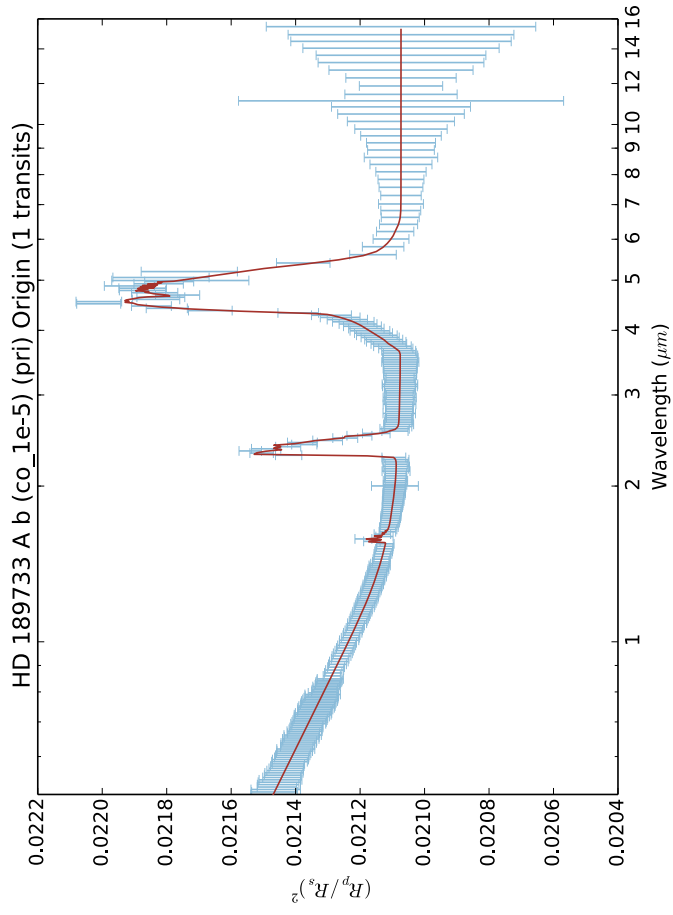


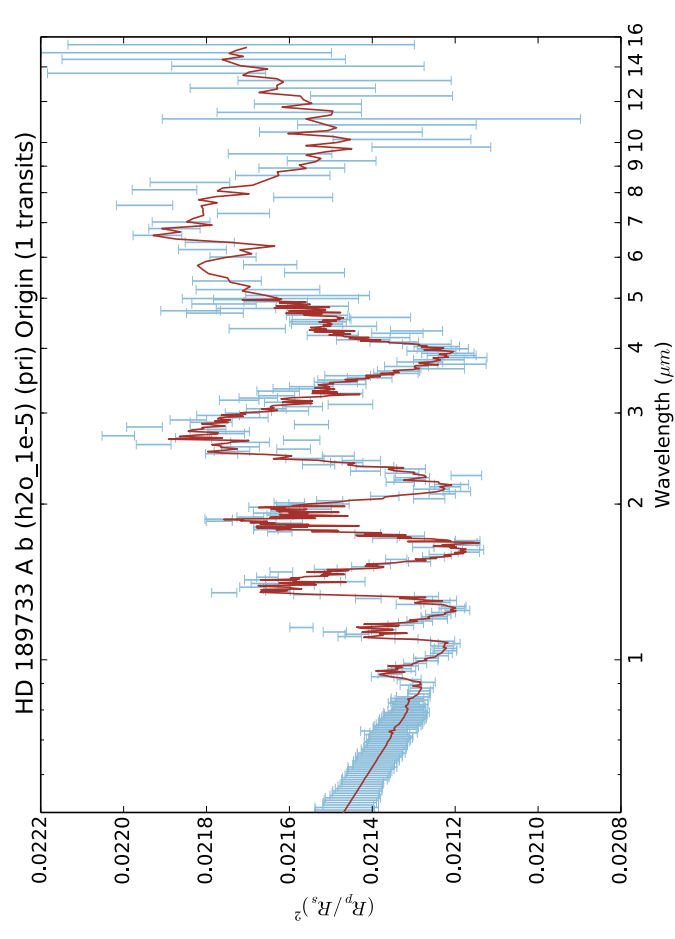
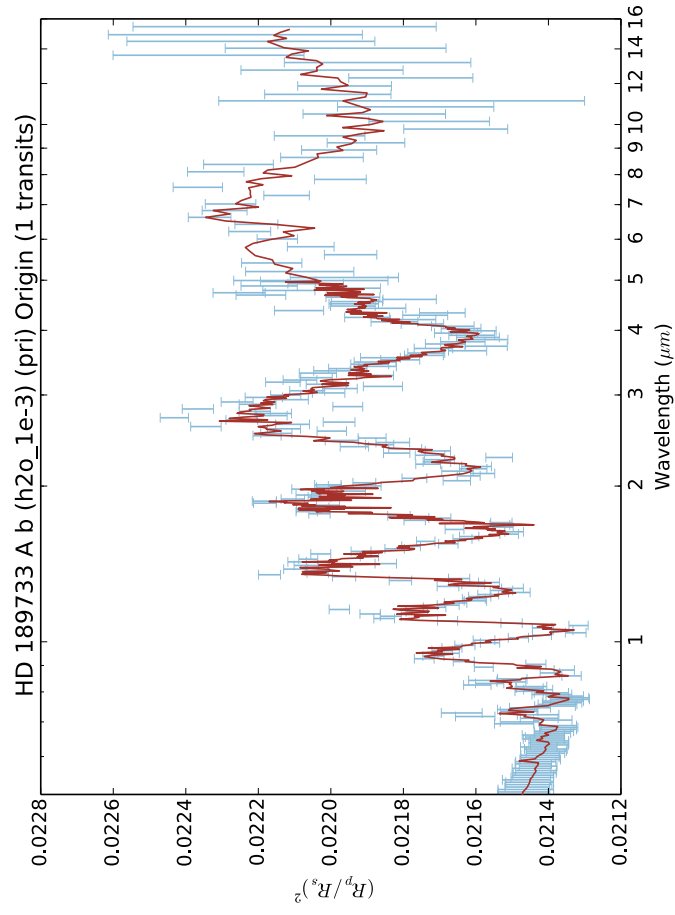
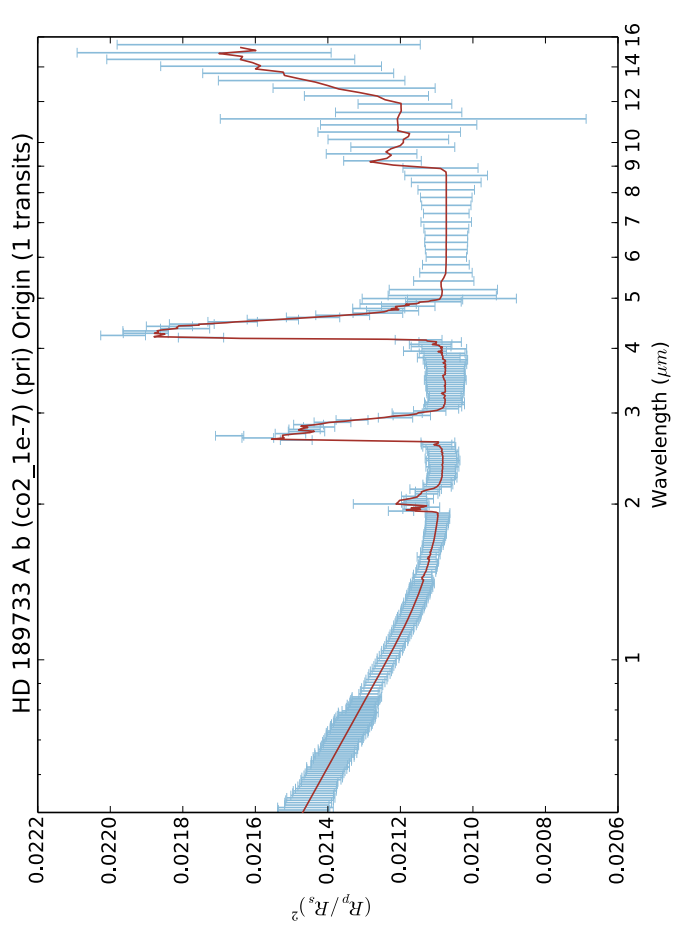
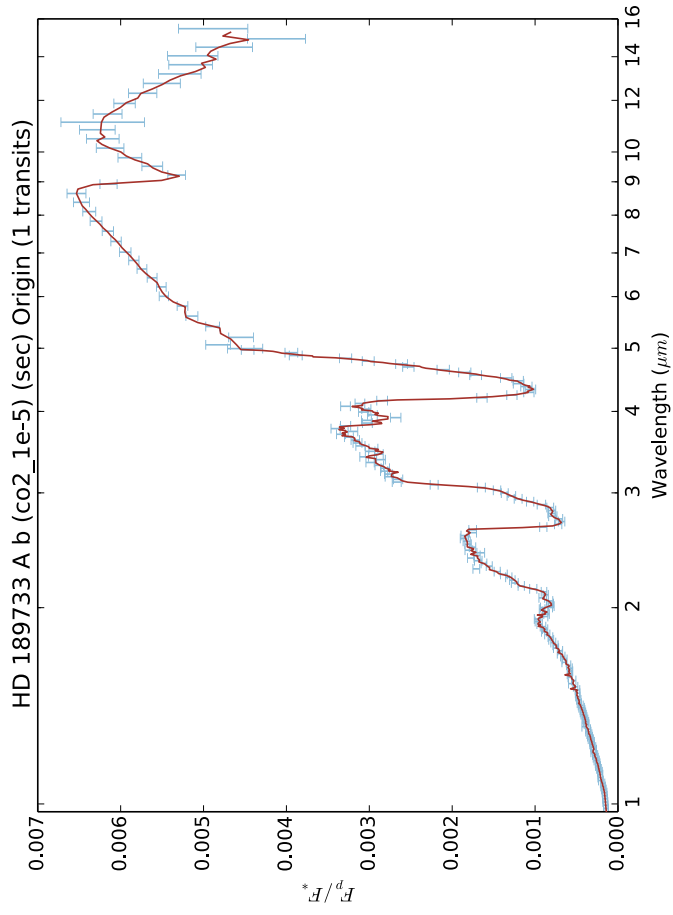


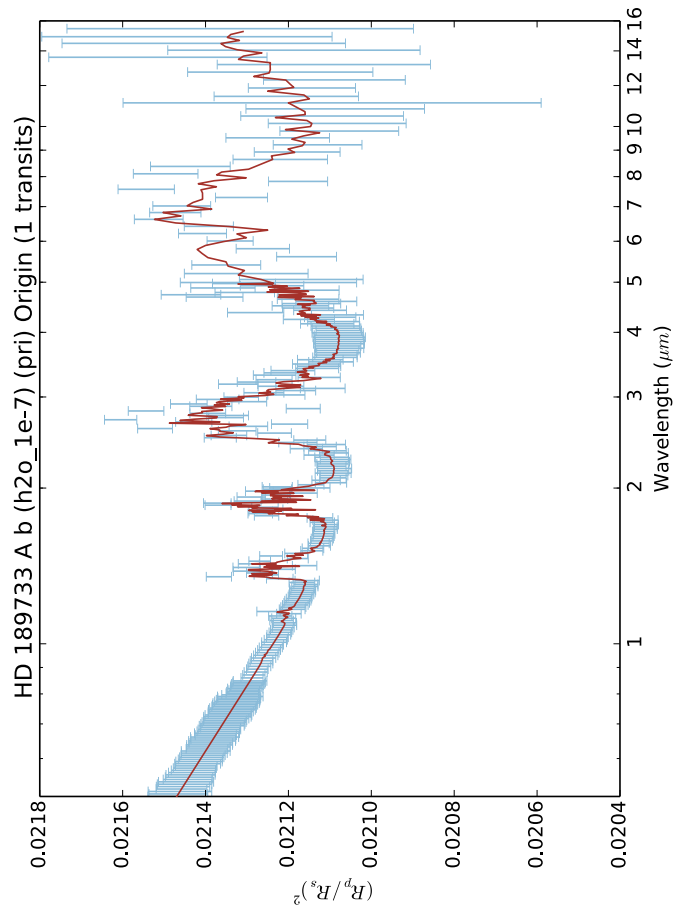




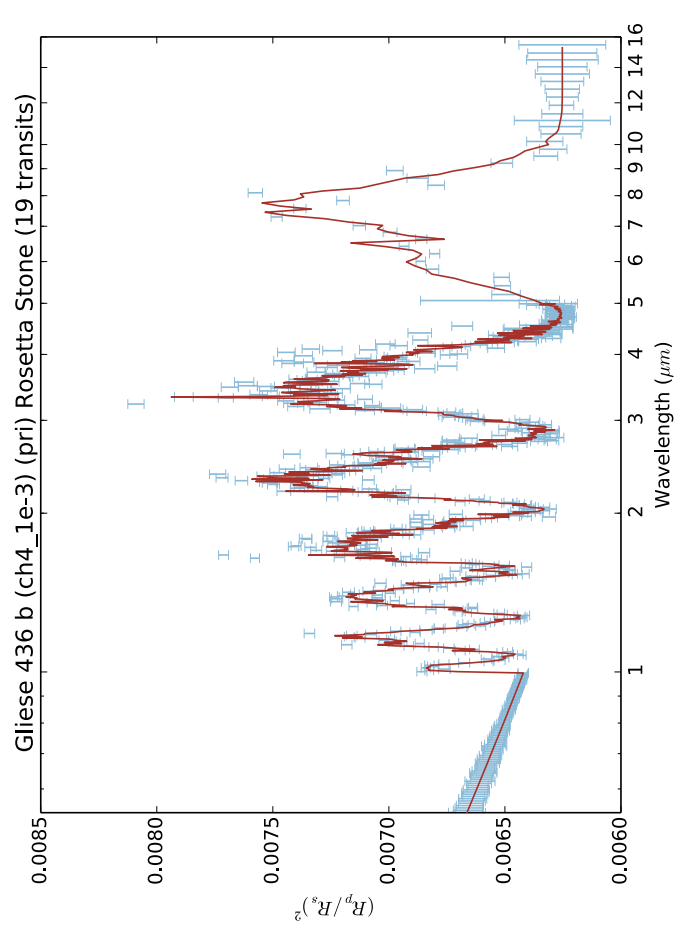
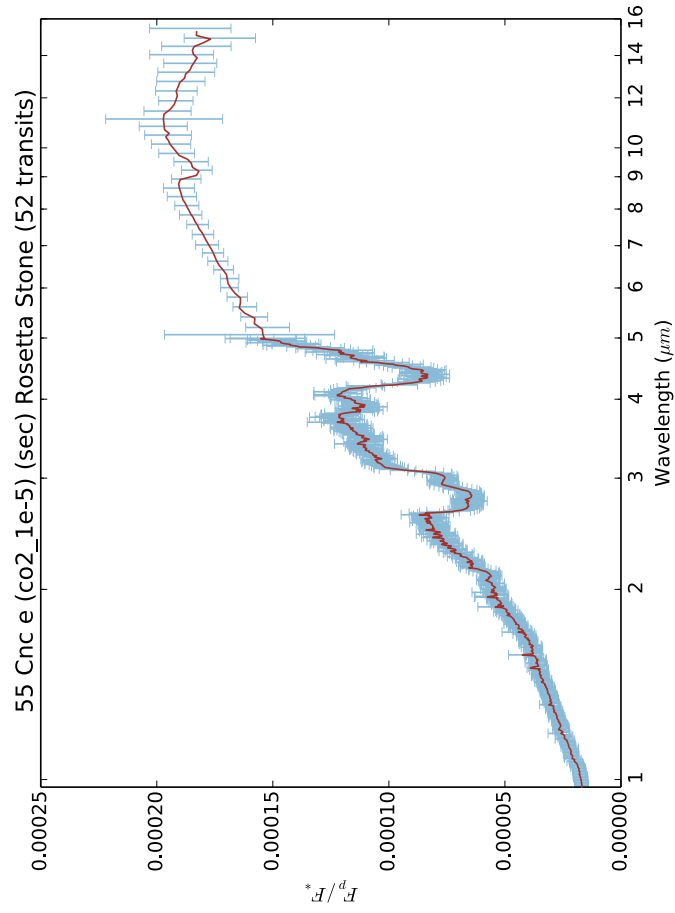
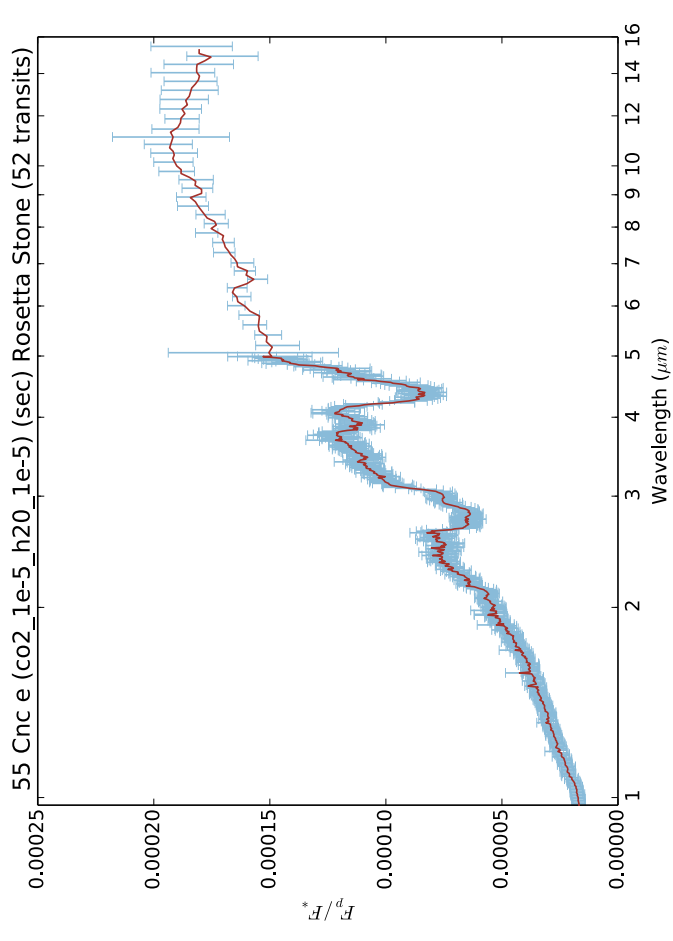
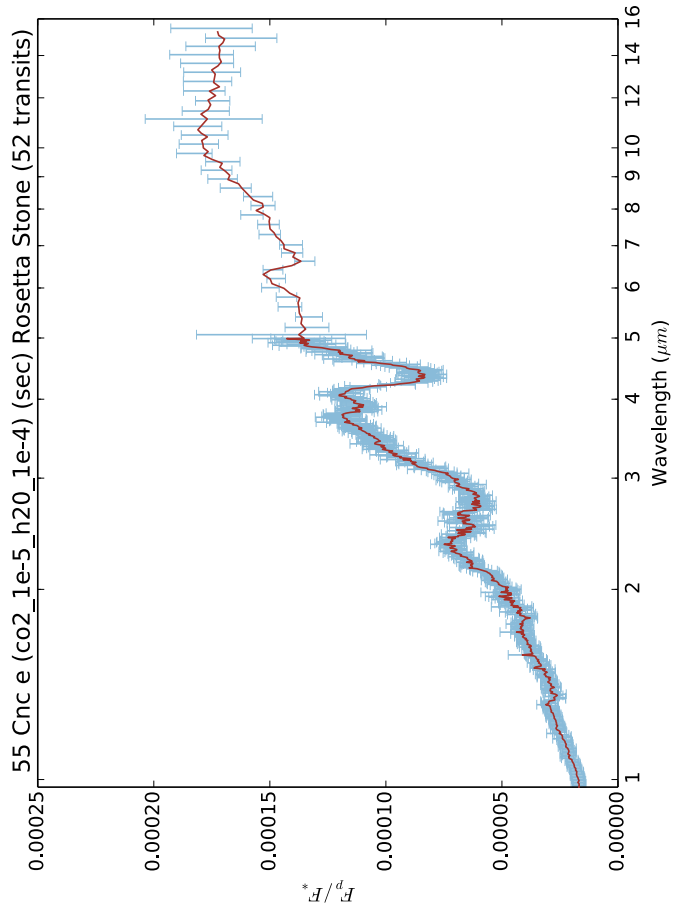




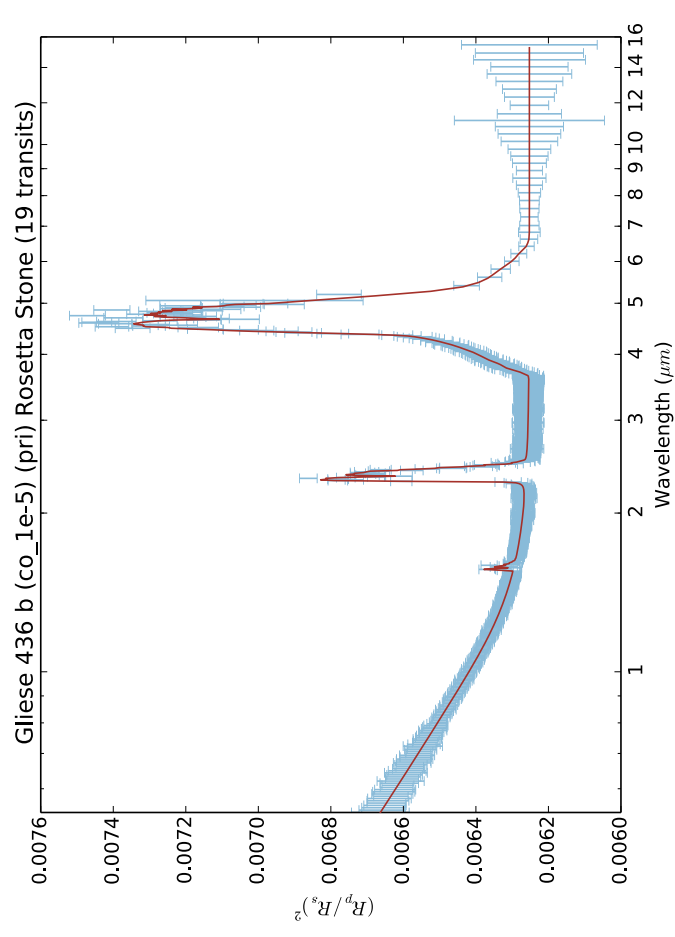
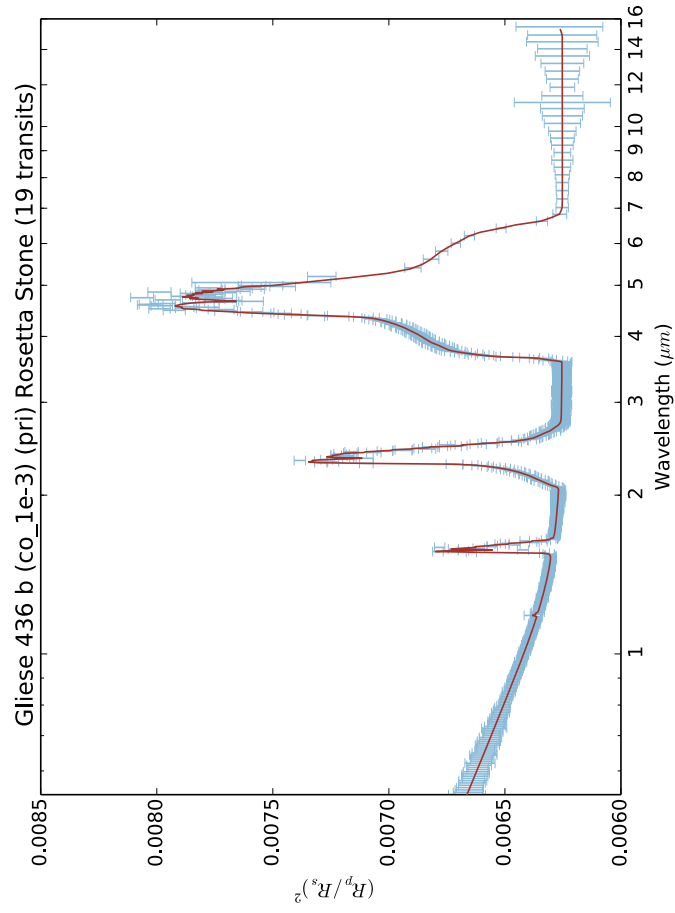
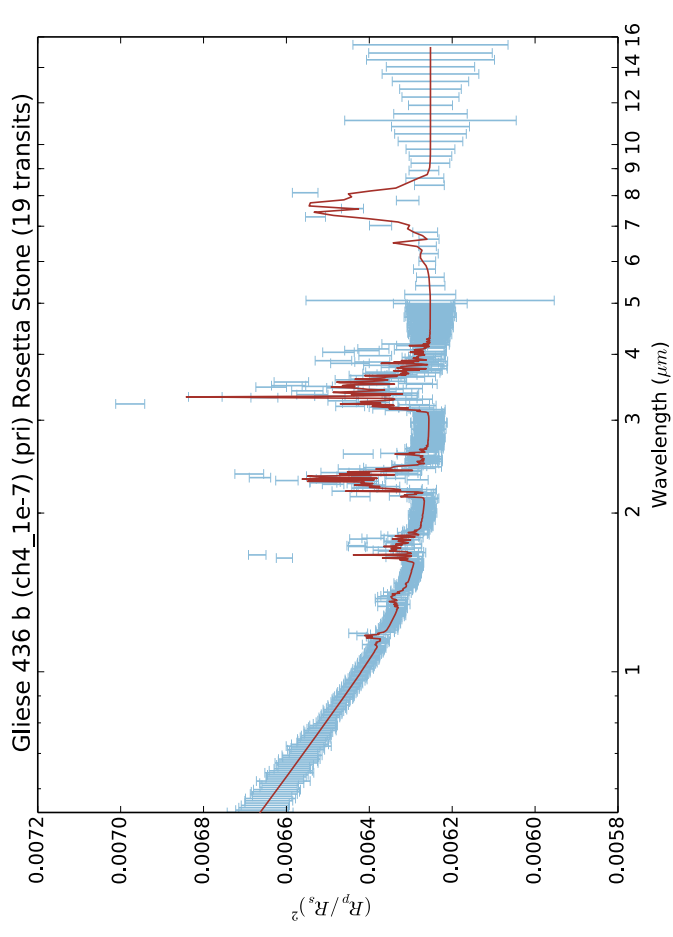
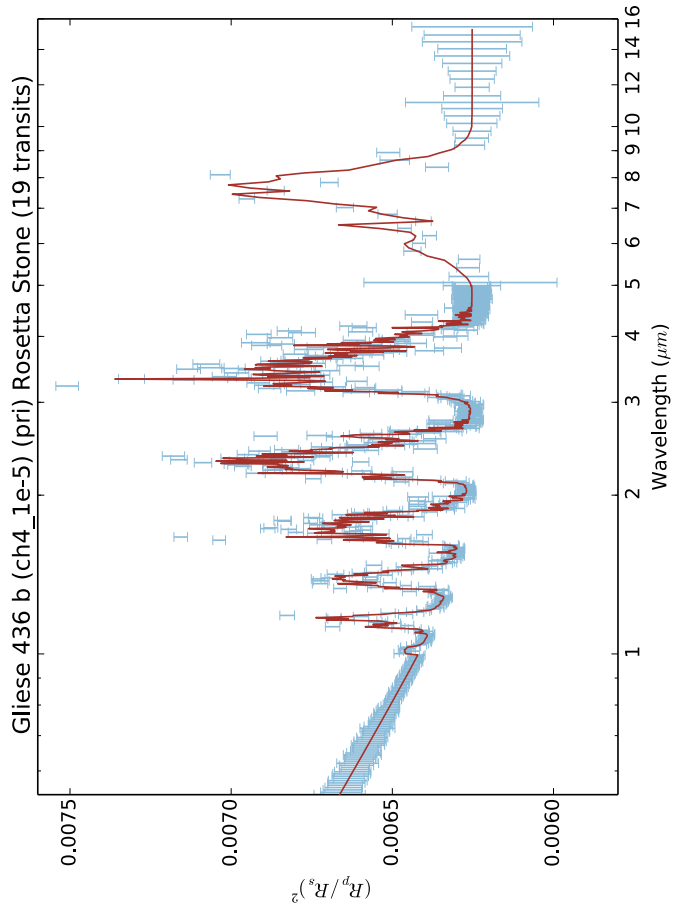


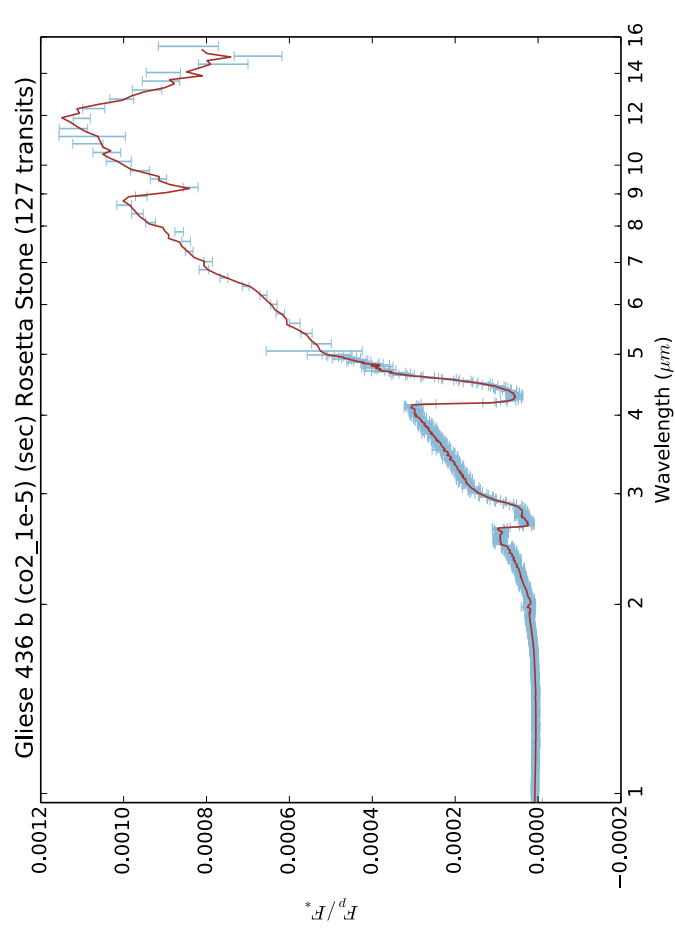
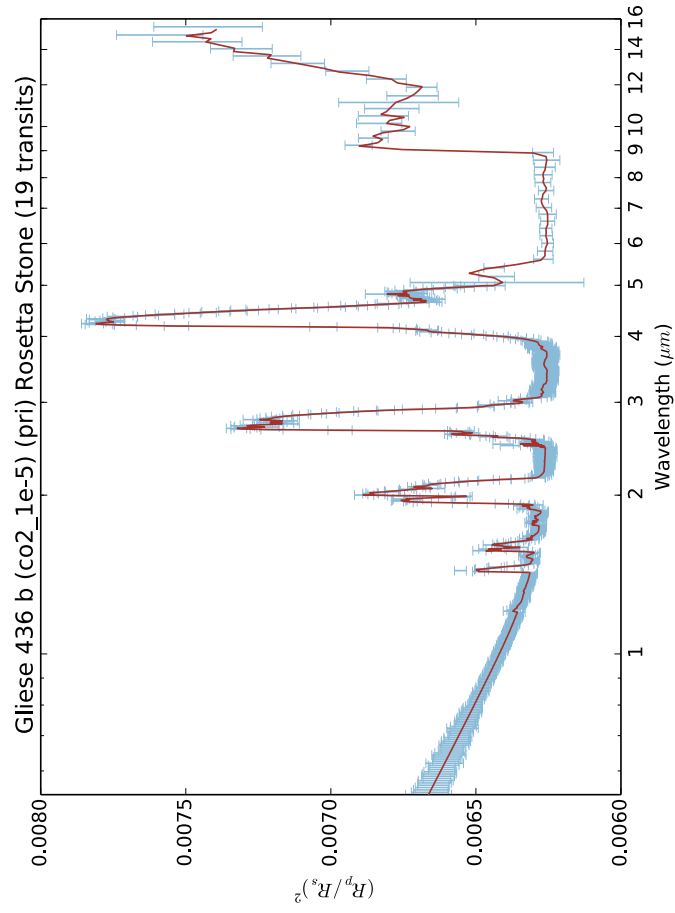
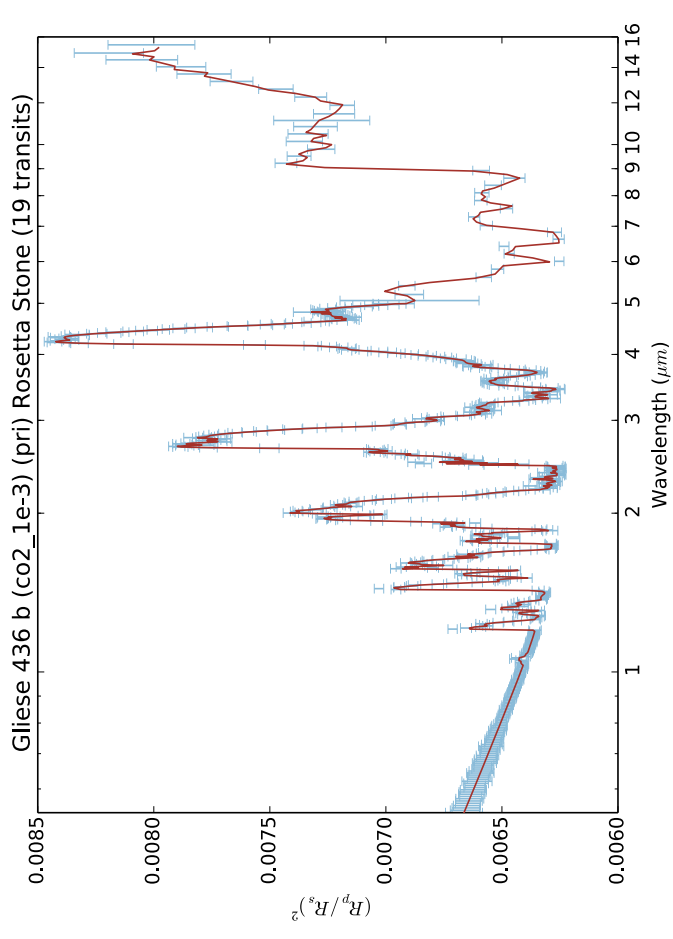
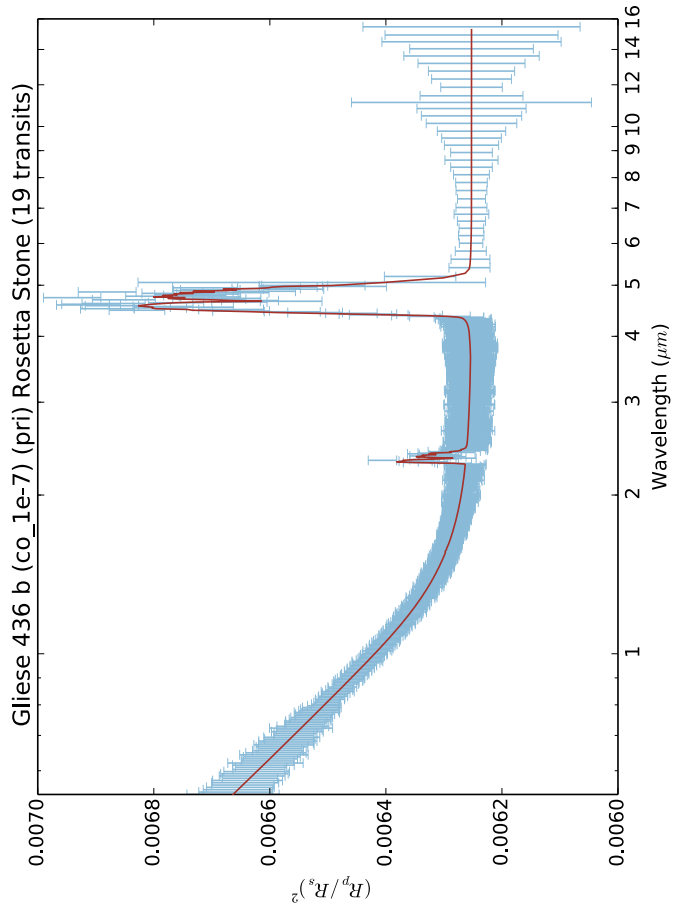


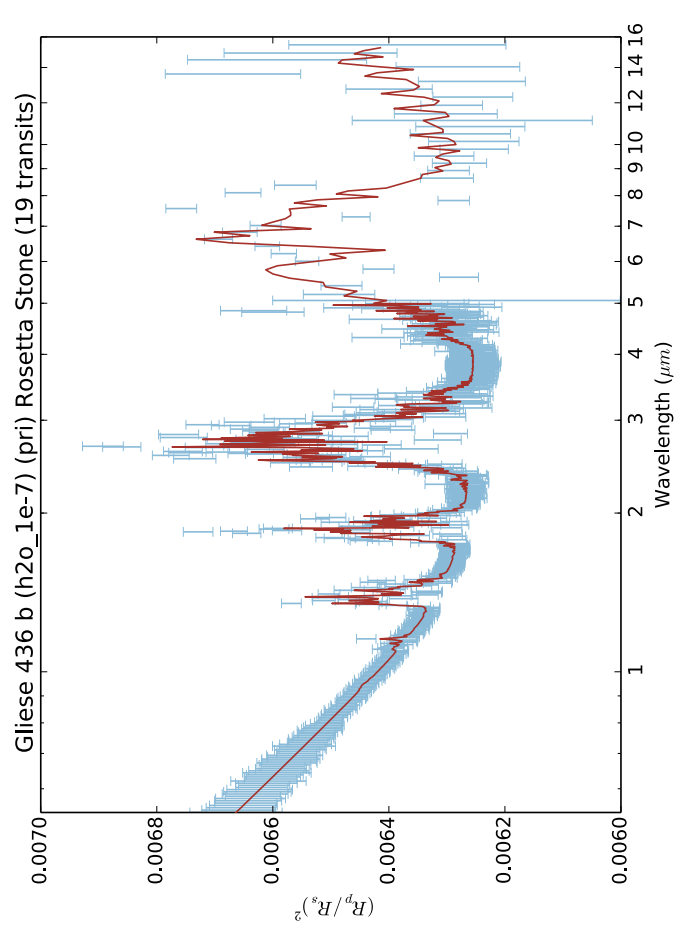
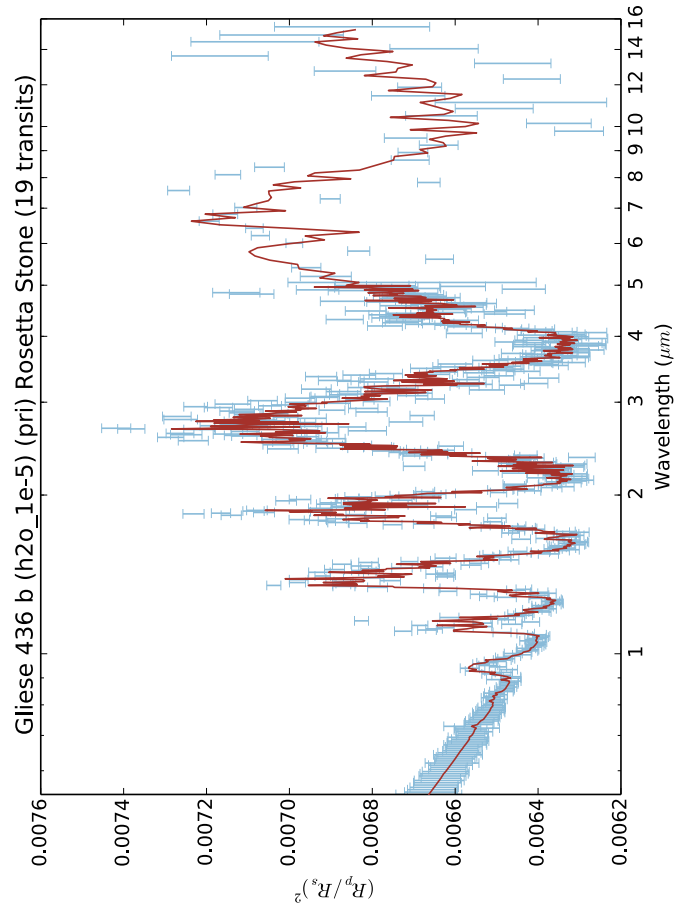
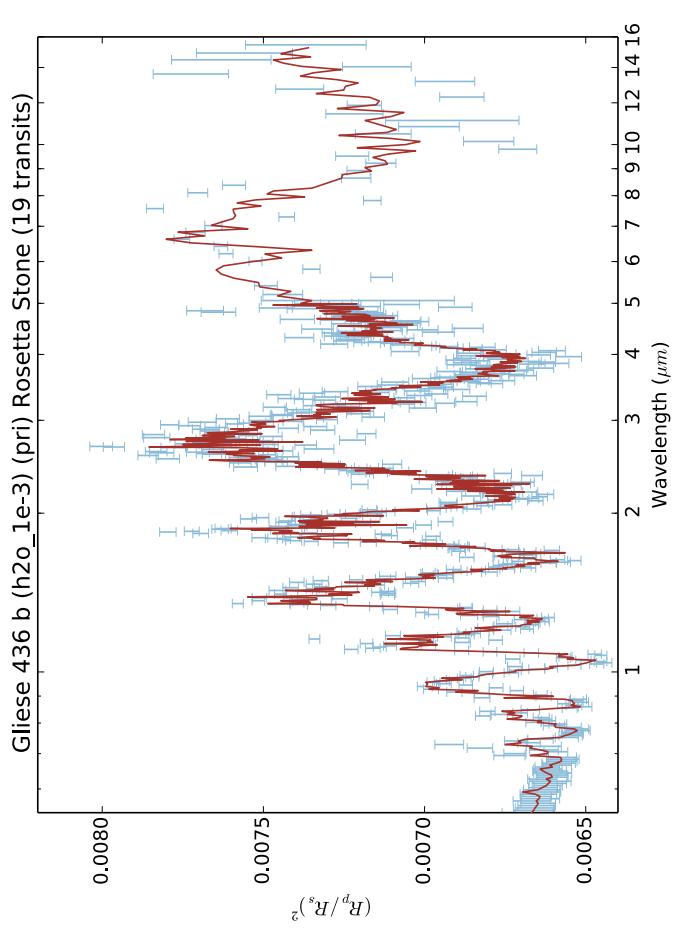
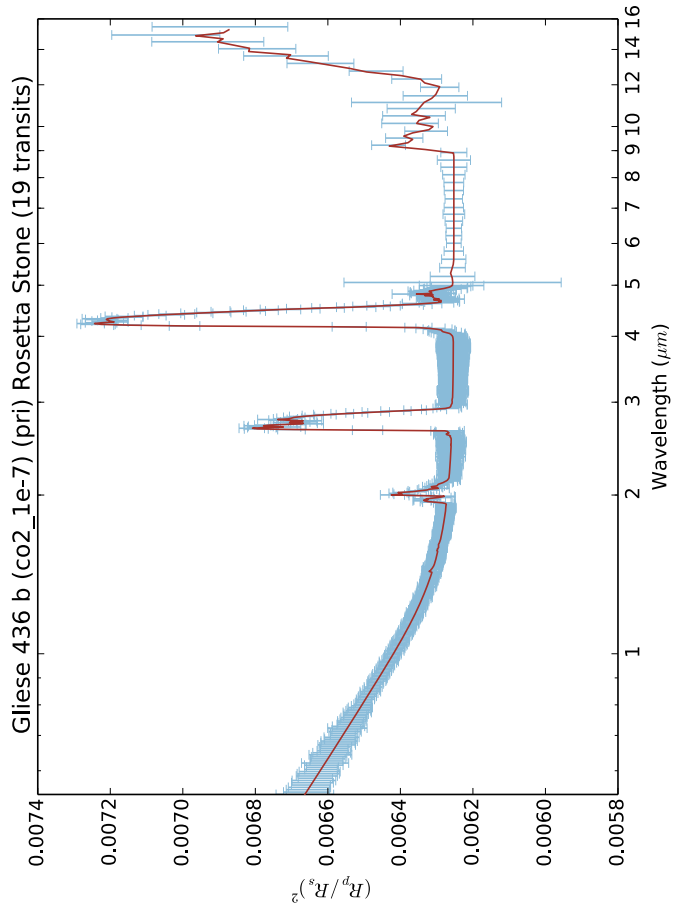
**Figure 9 Planet Signal for Rosetta Stone Mode for a sample of planets under different atmospheric compositions**

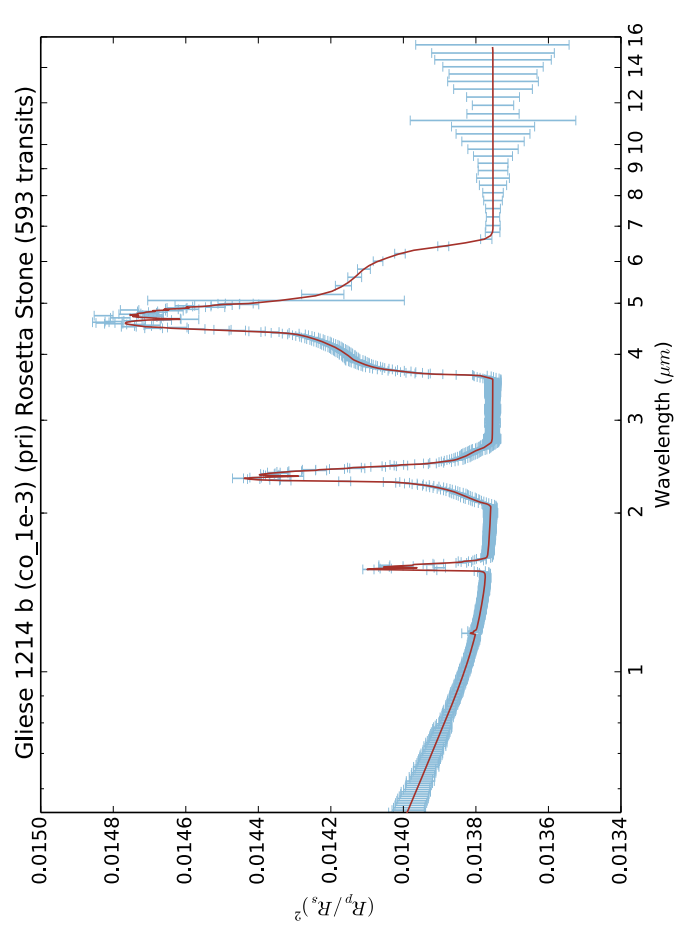
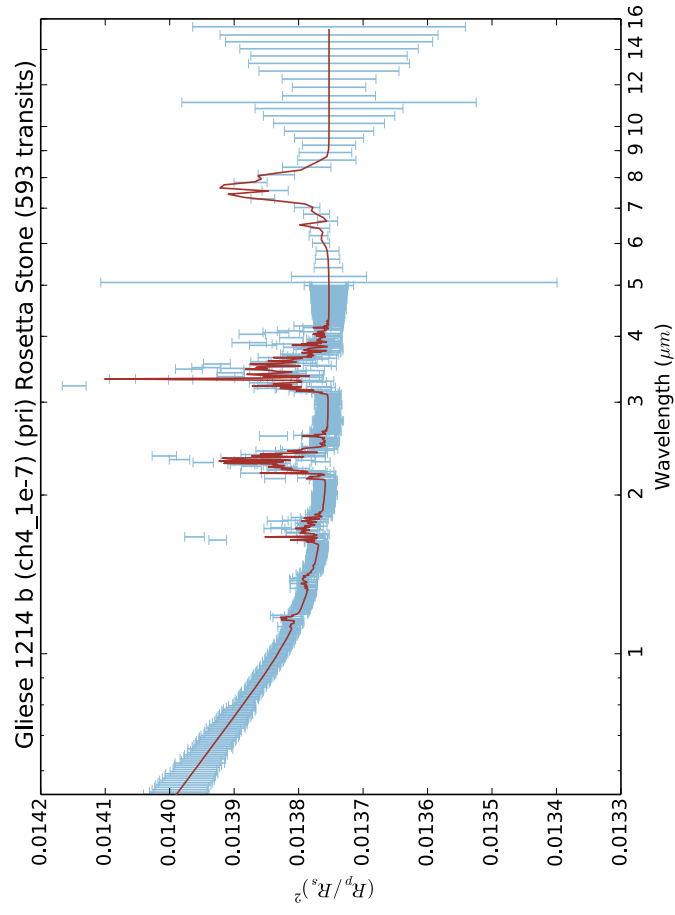
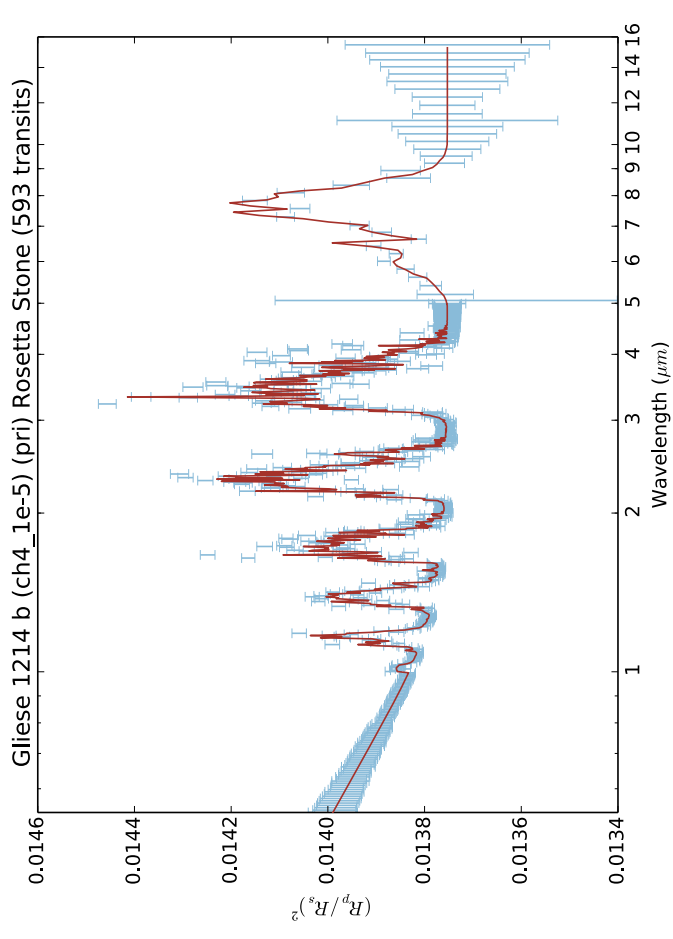
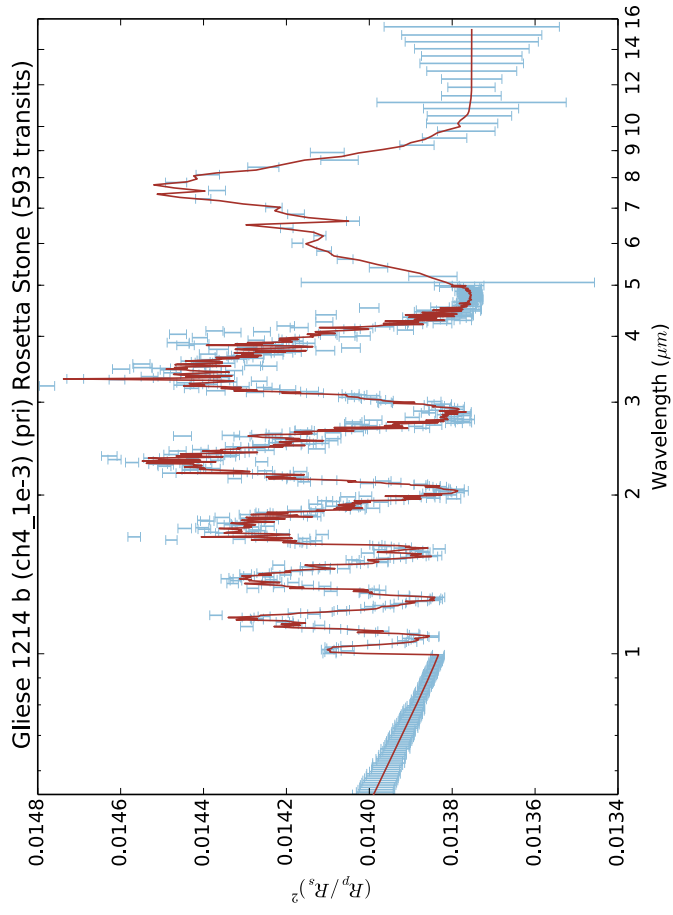


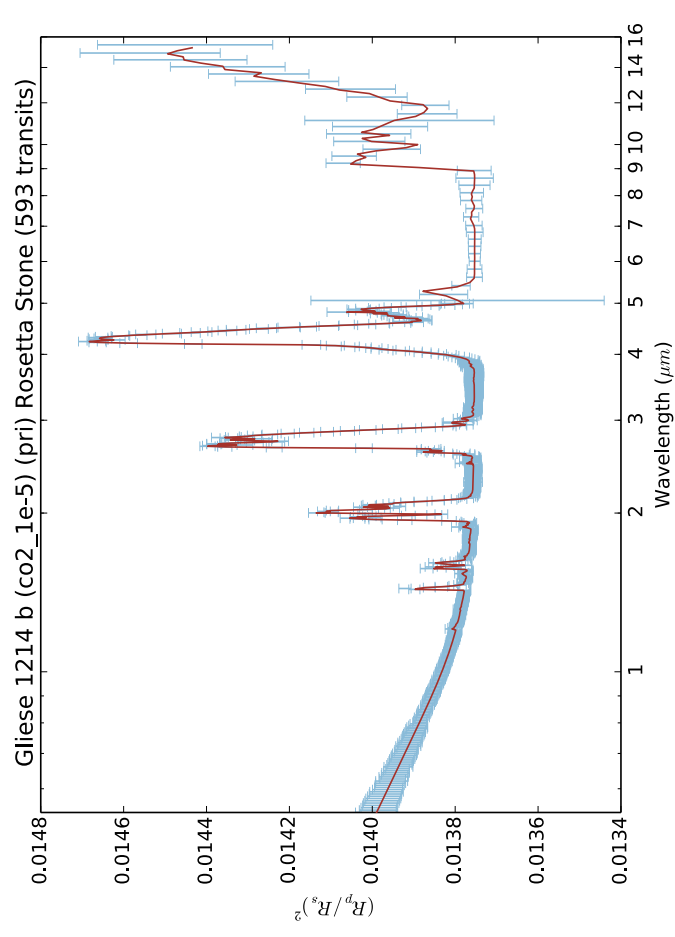
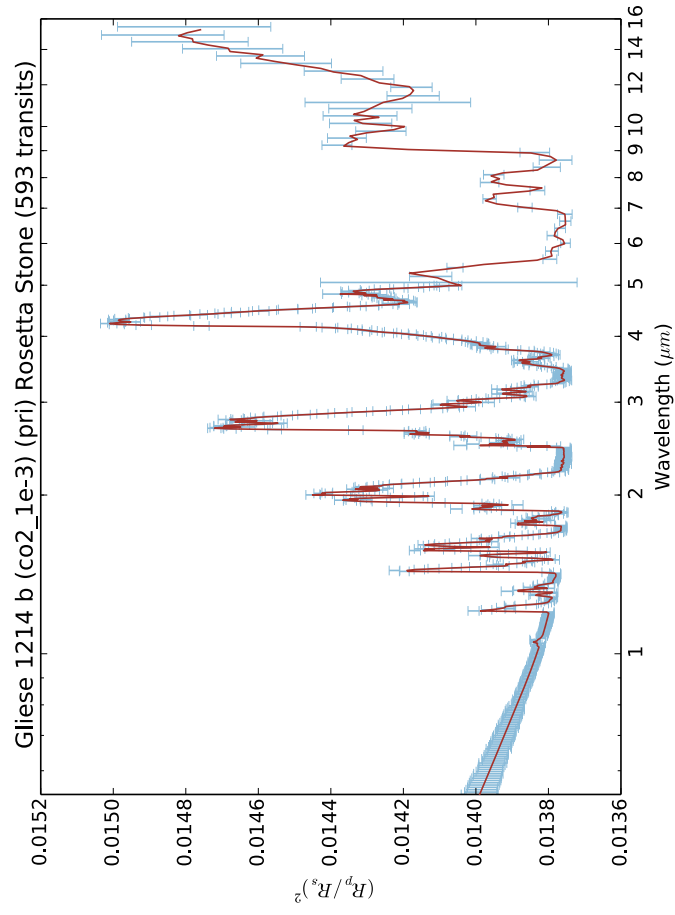
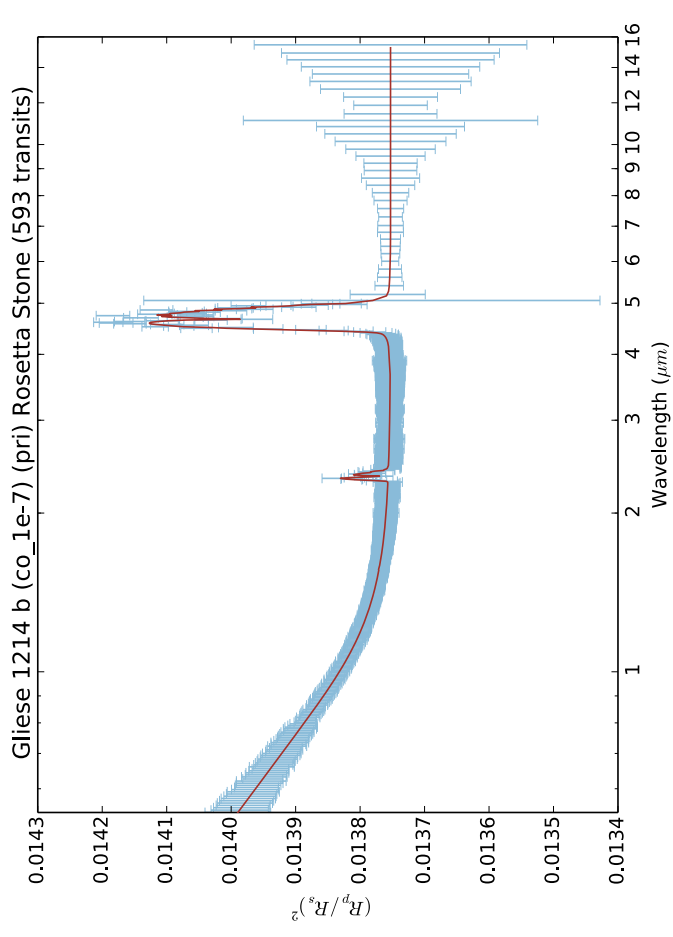
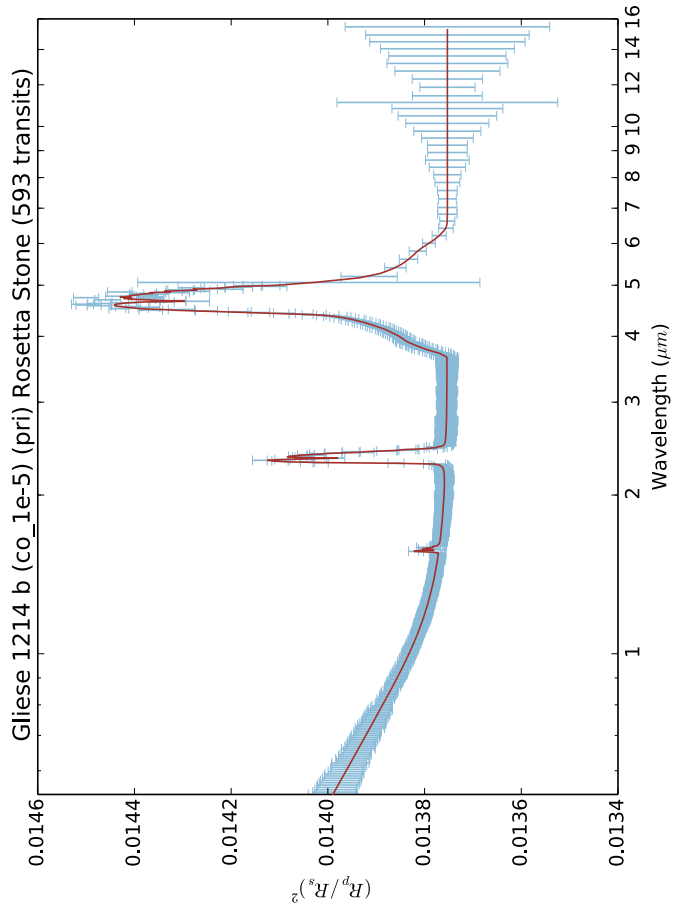


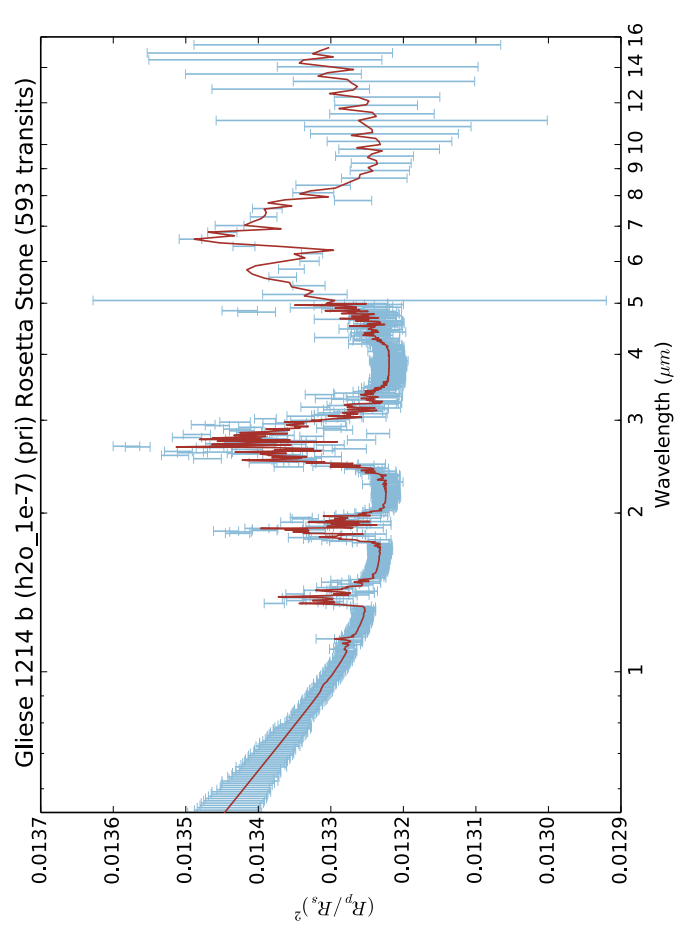
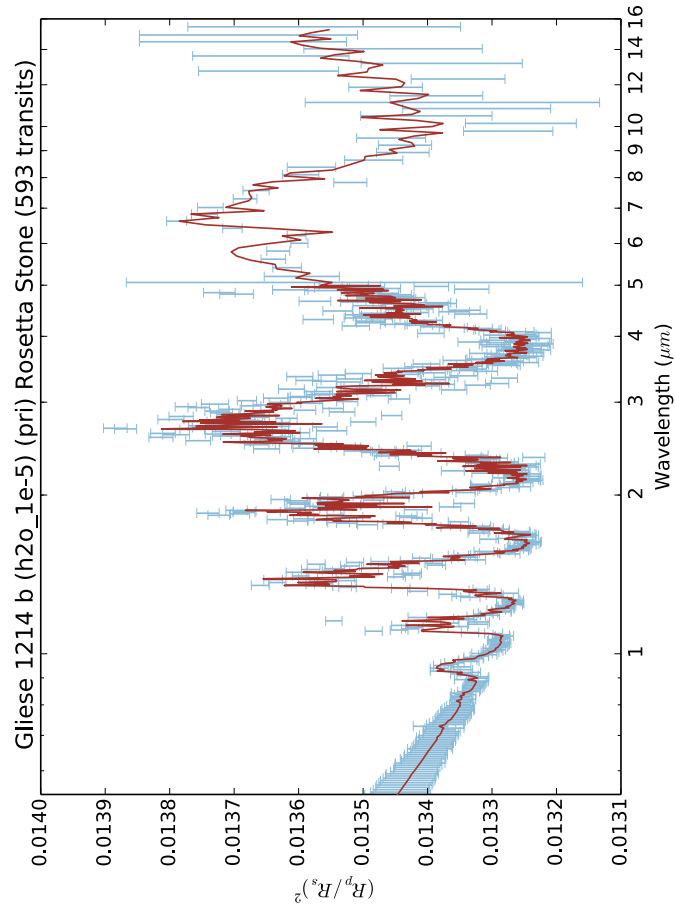
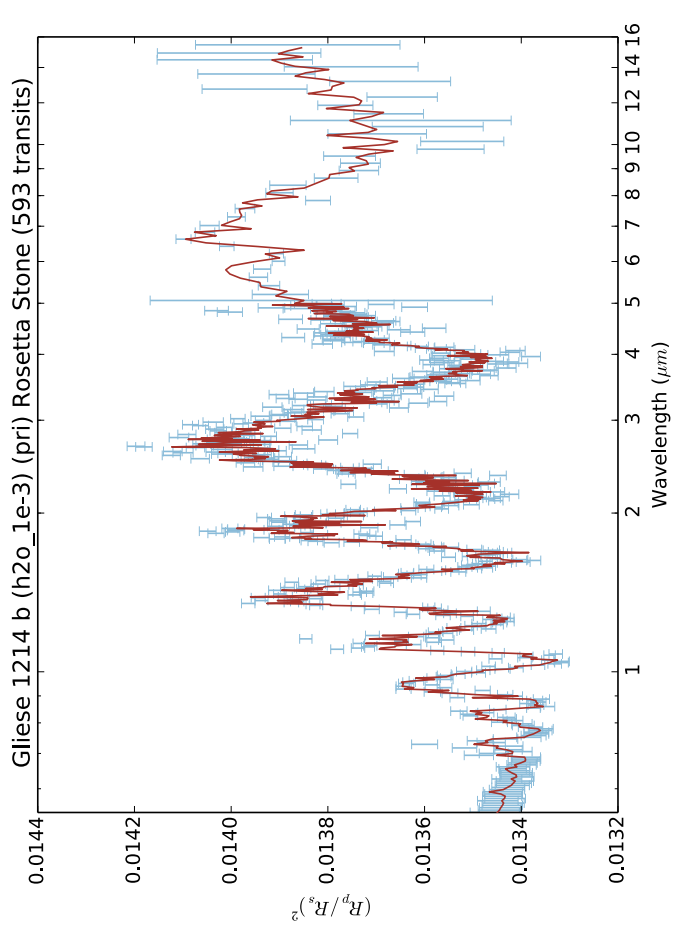
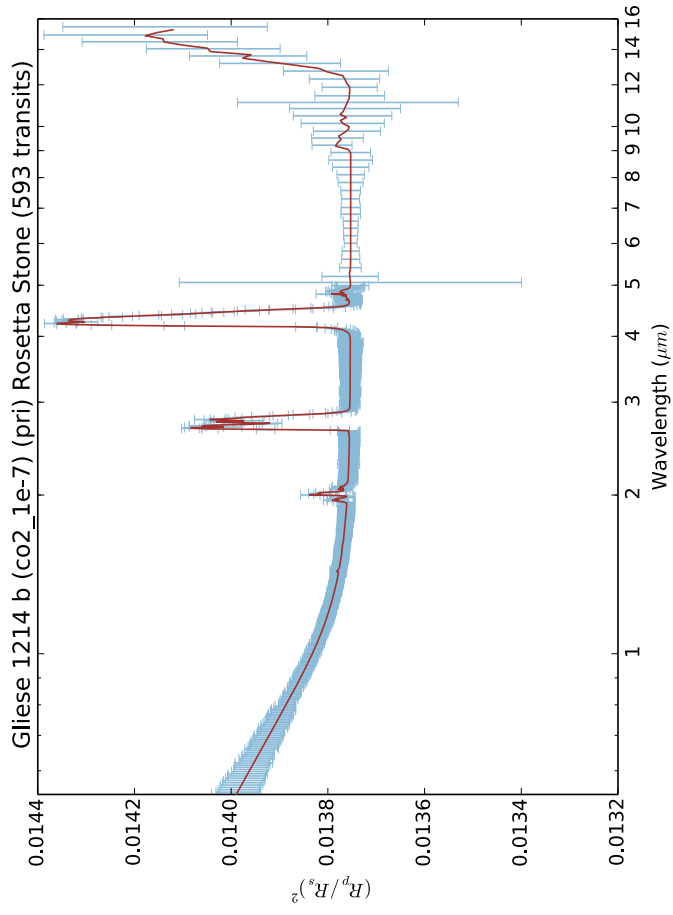


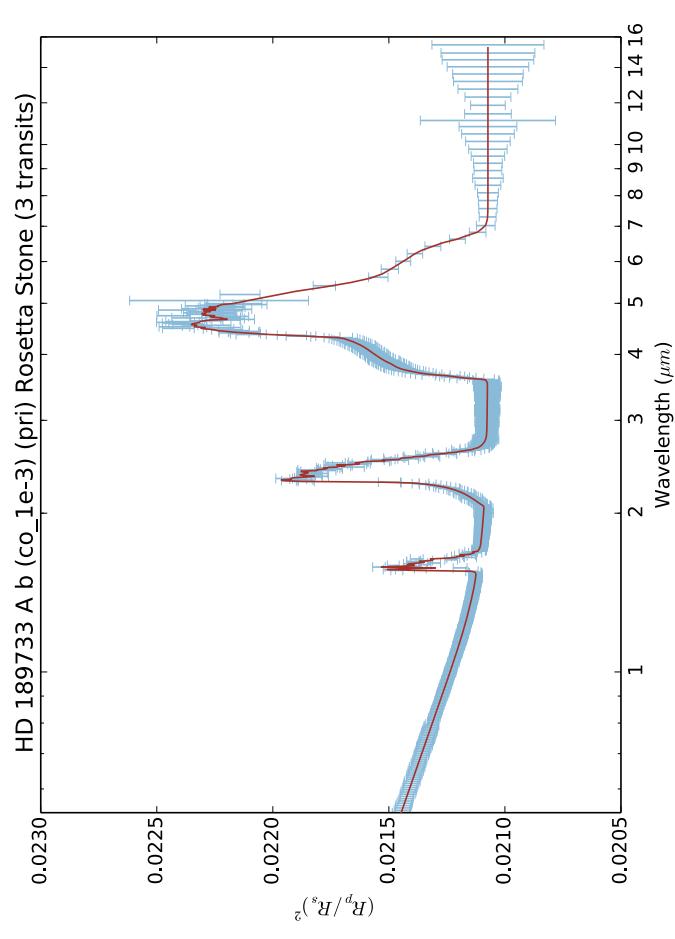
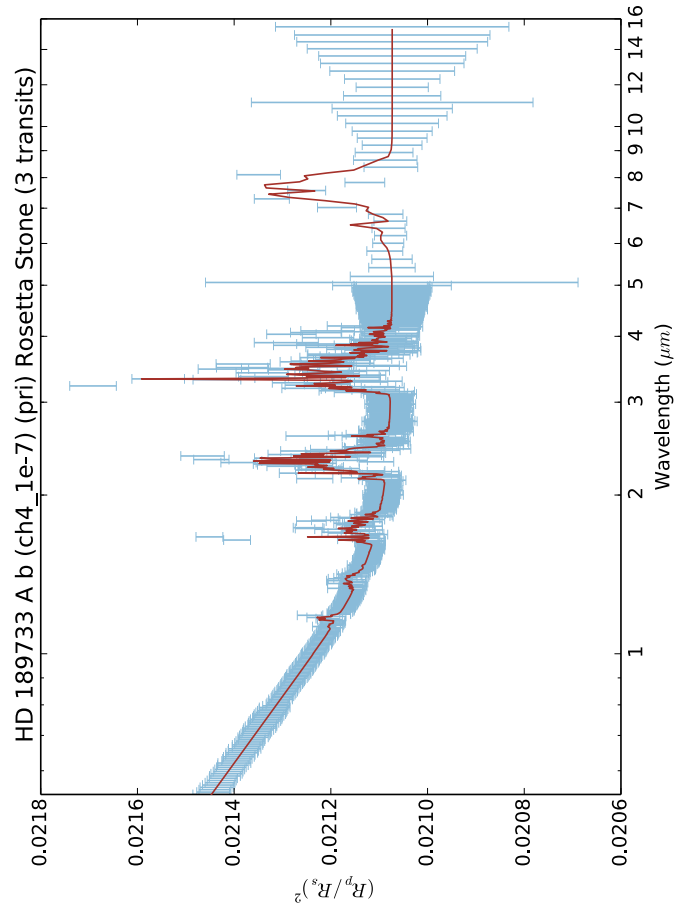
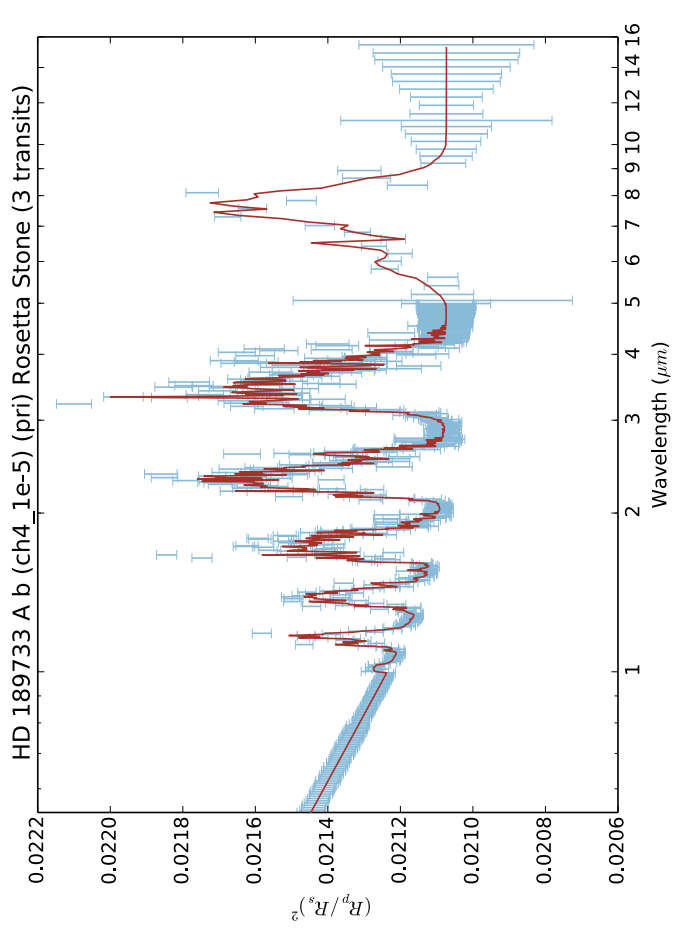
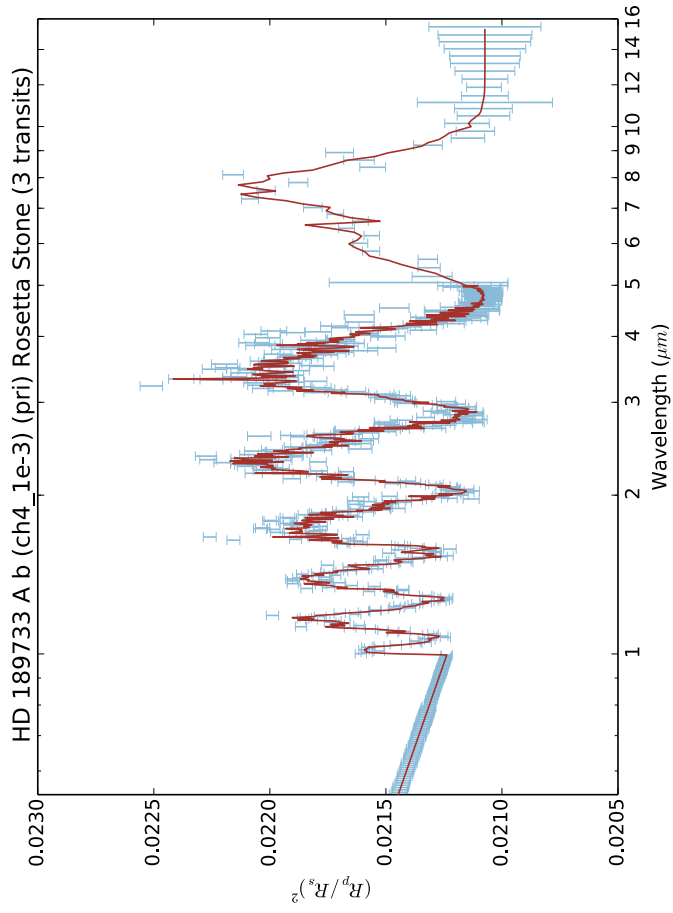


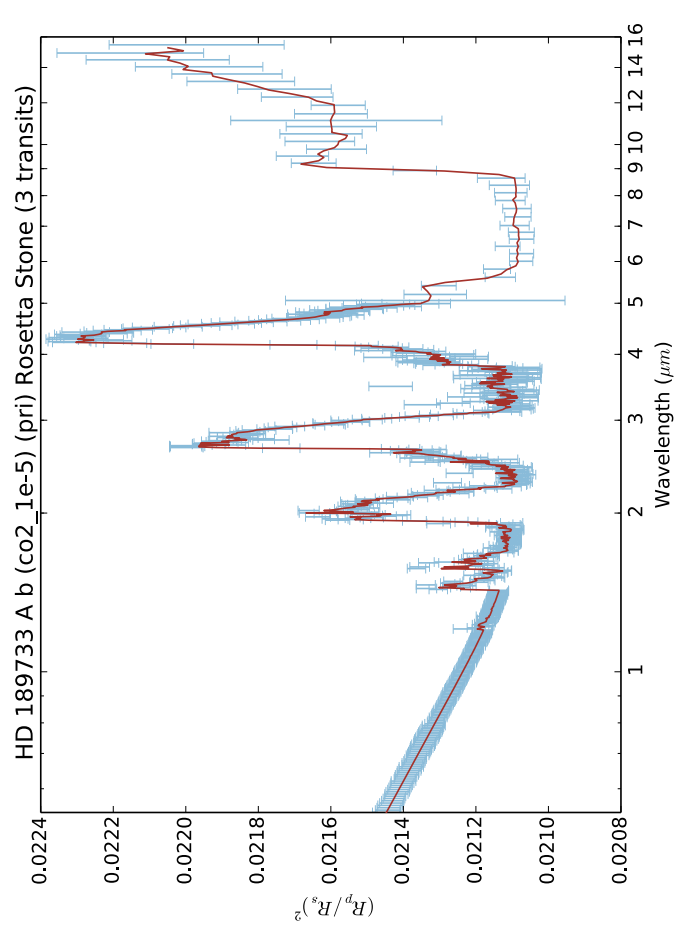
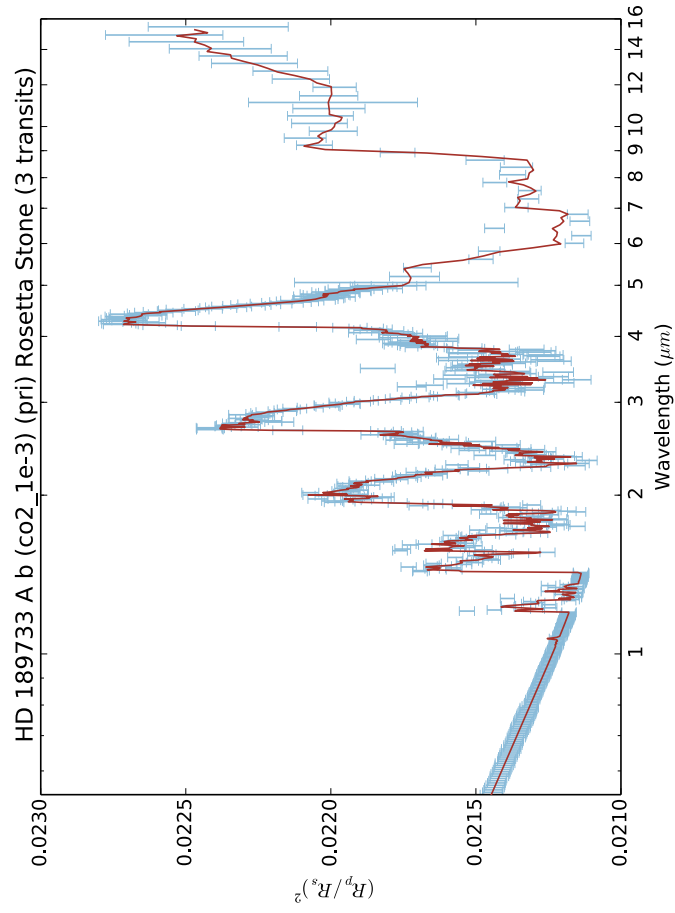
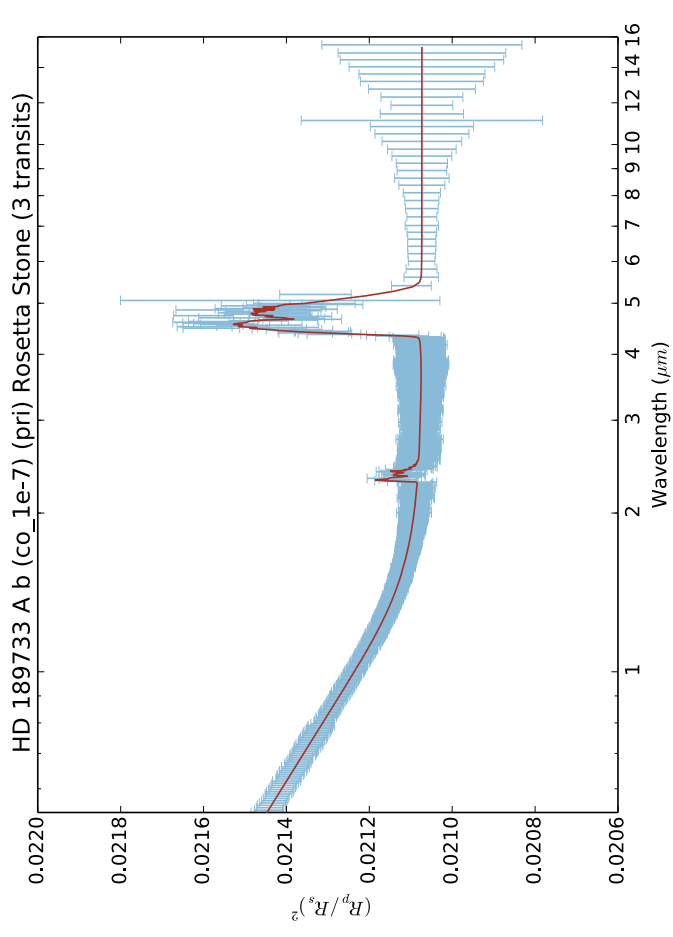
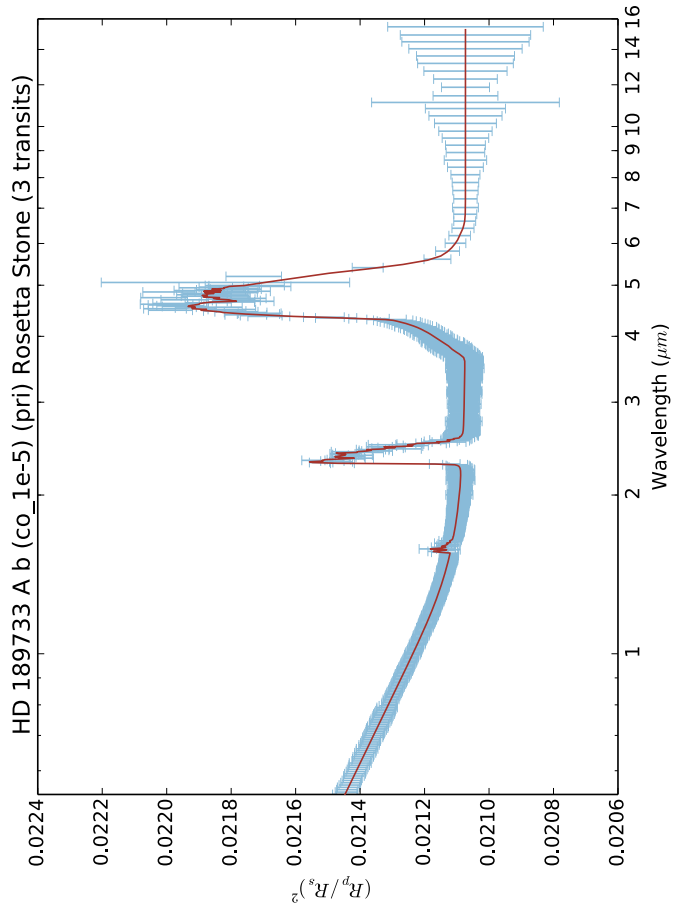




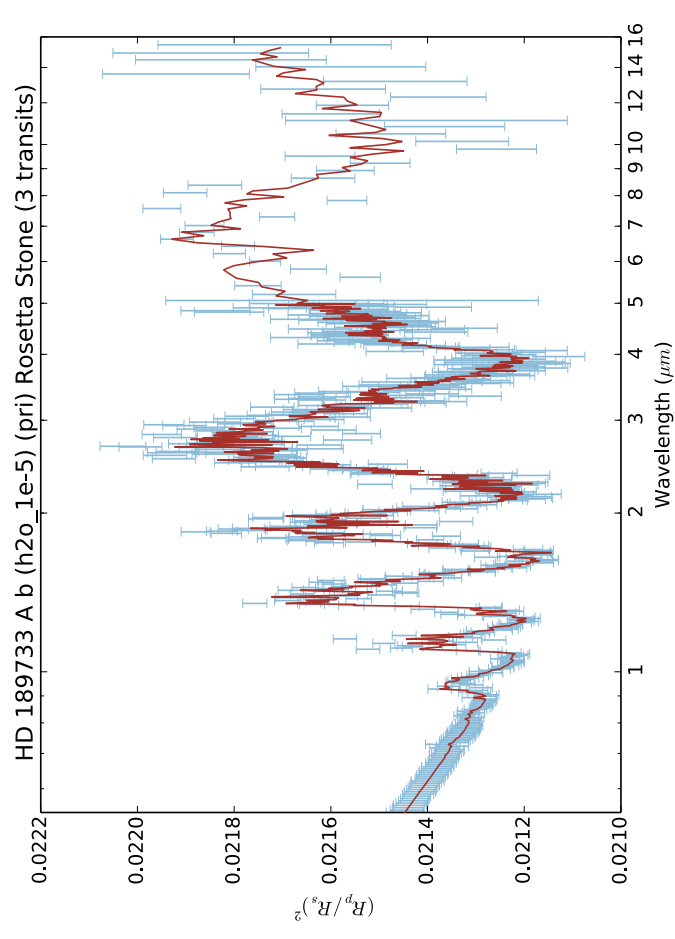
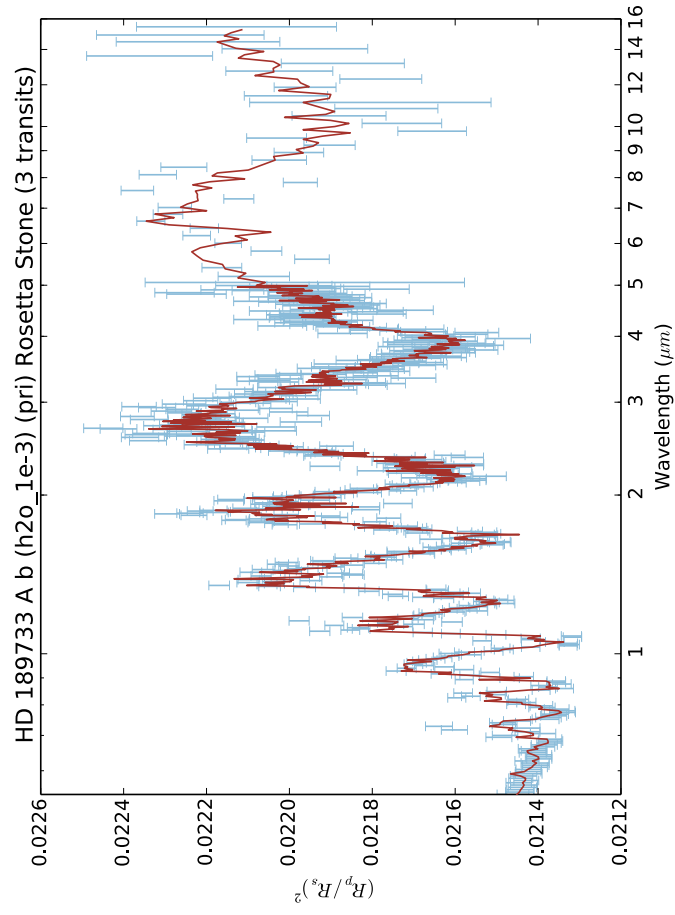
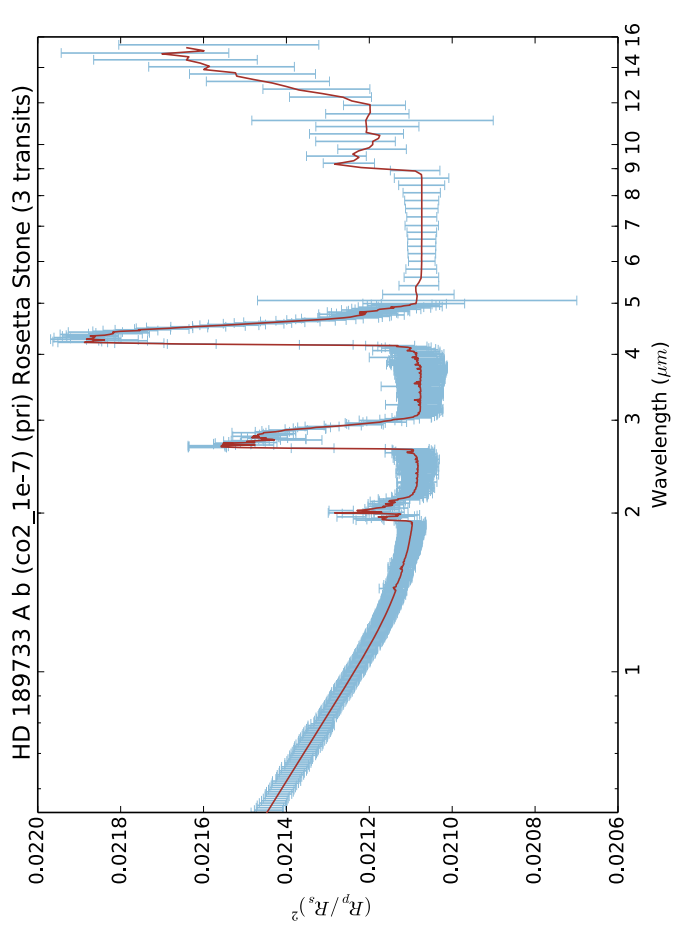
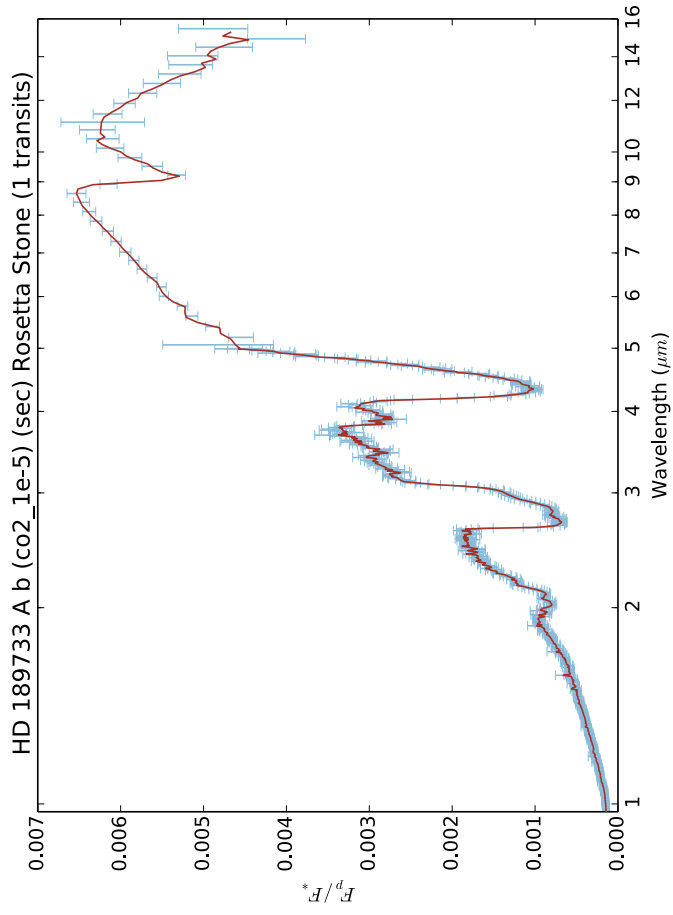


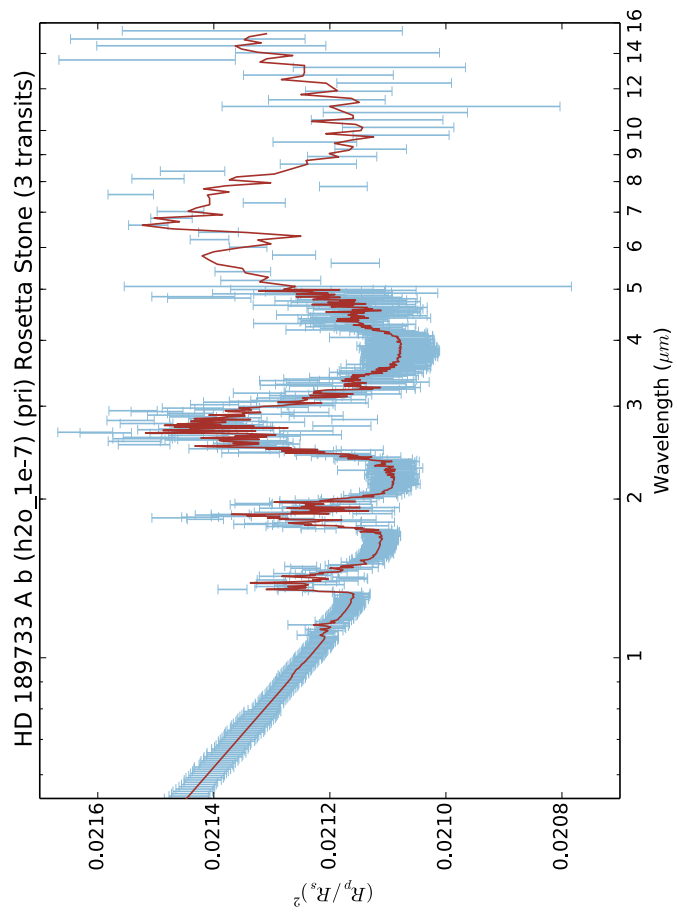










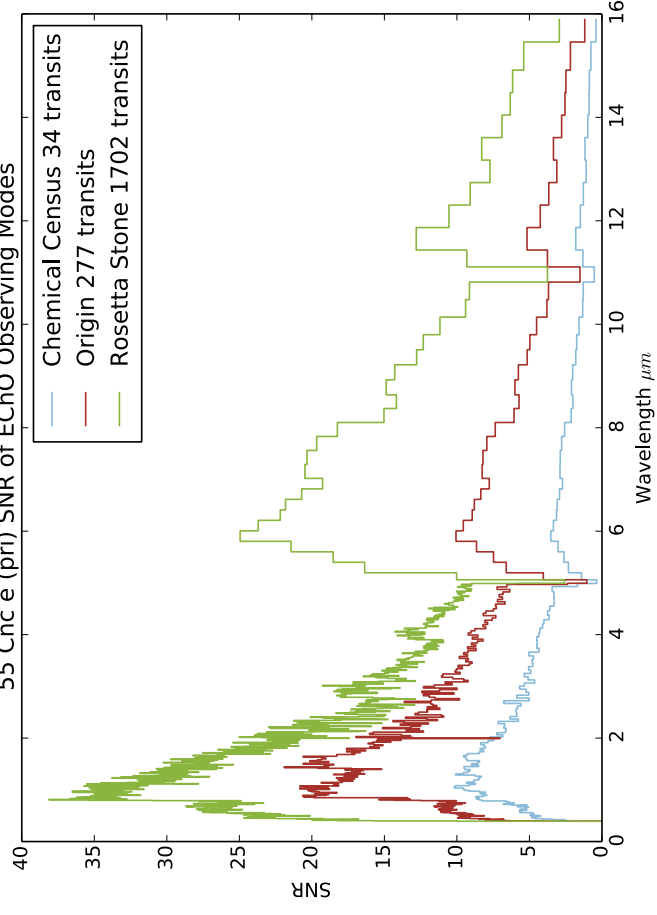




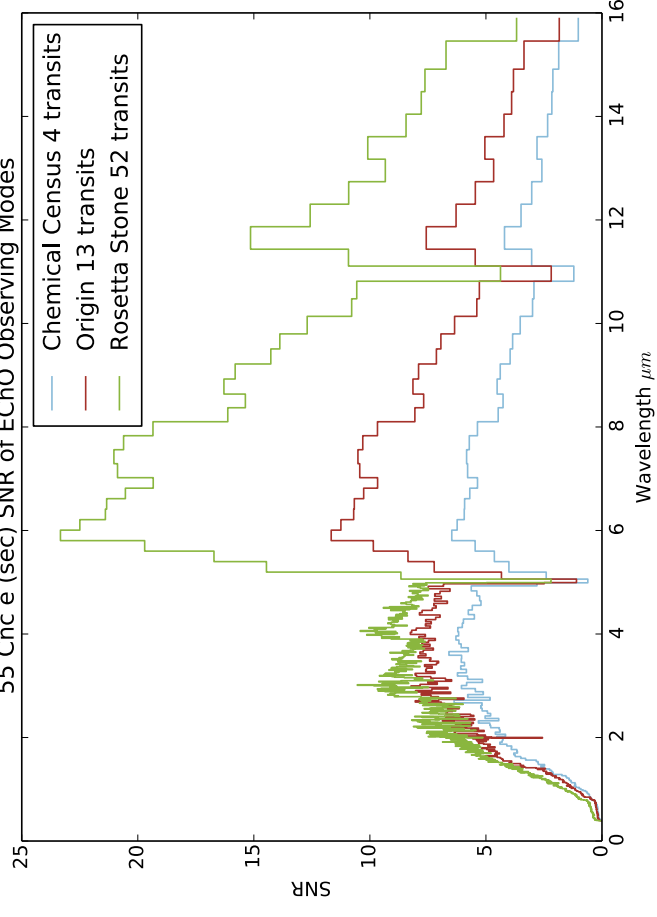
## Signal to Noise ratio per bin

**Figure 10 Signal to Noise ratio per bin – all observing modes**

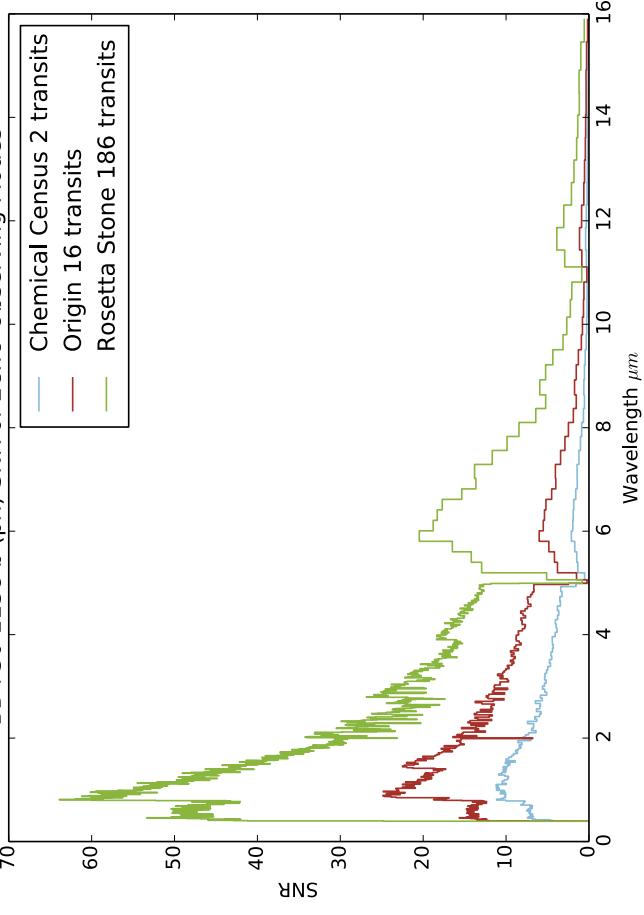
55 Cnc e (pri) SNR of EChO Observing Modes



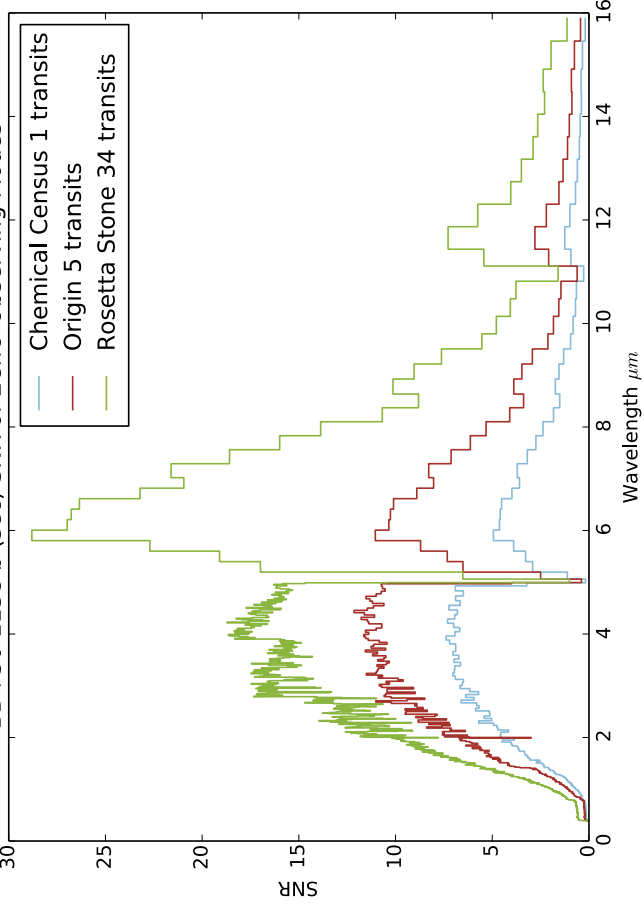
55 Cnc e (sec) SNR of EChO Observing Modes



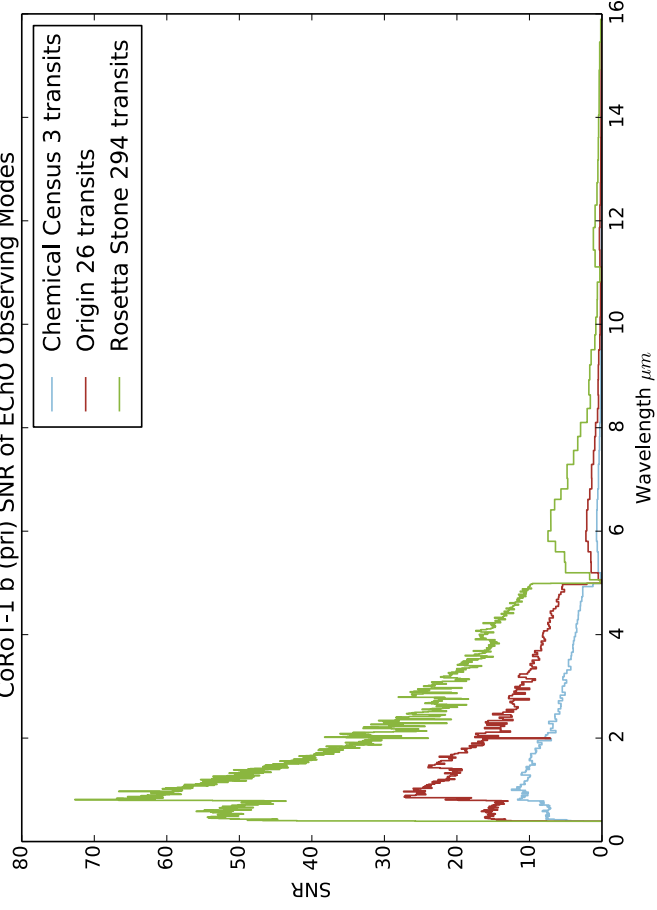
BD+30 1138 b (pri) SNR of EChO Observing Modes



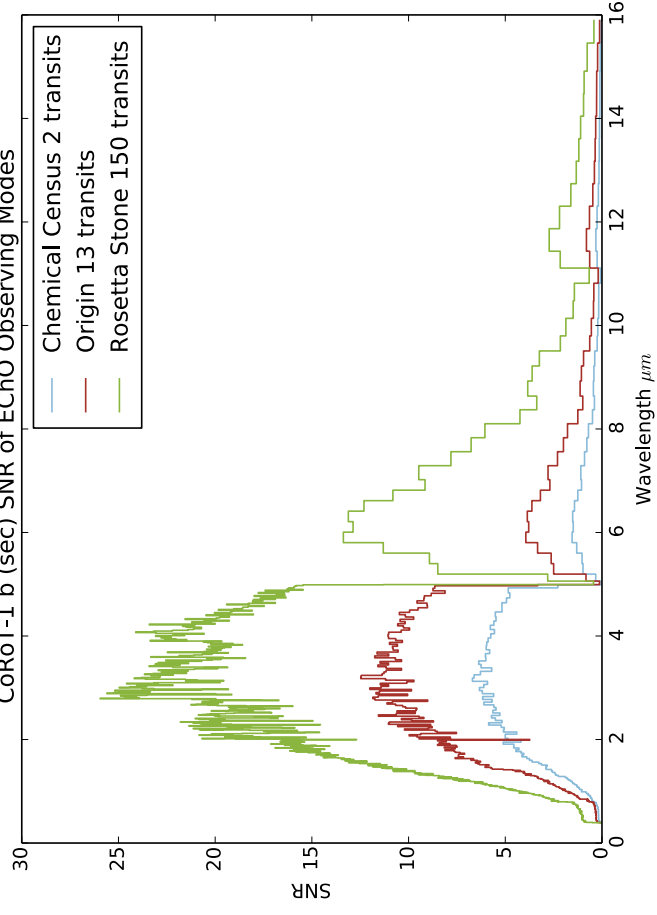
BD+30 1138 b (sec) SNR of EChO Observing Modes



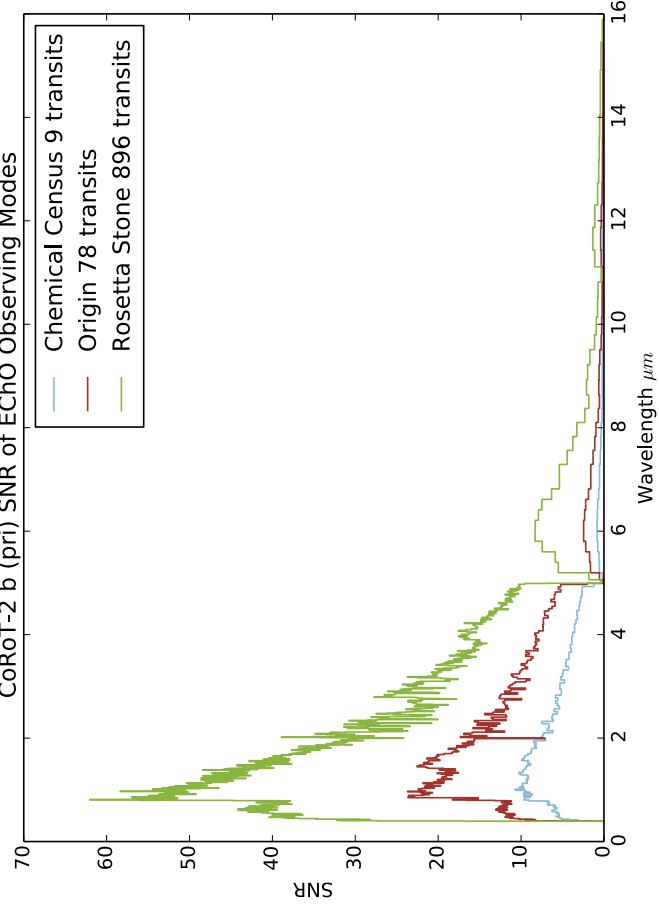
CoRoT-1 b (pri) SNR of EChO Observing Modes



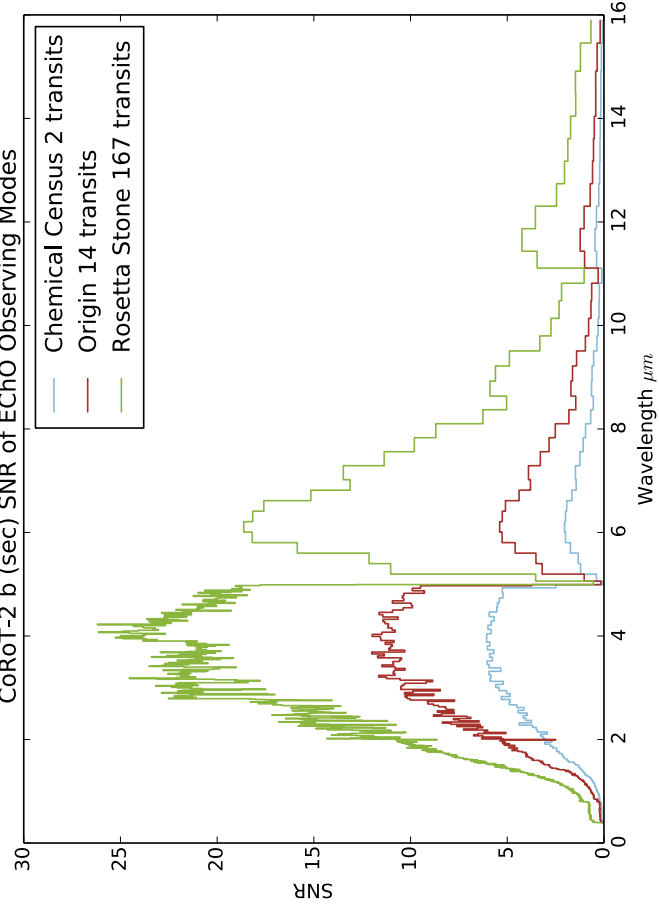
CoRoT-1 b (sec) SNR of EChO Observing Modes



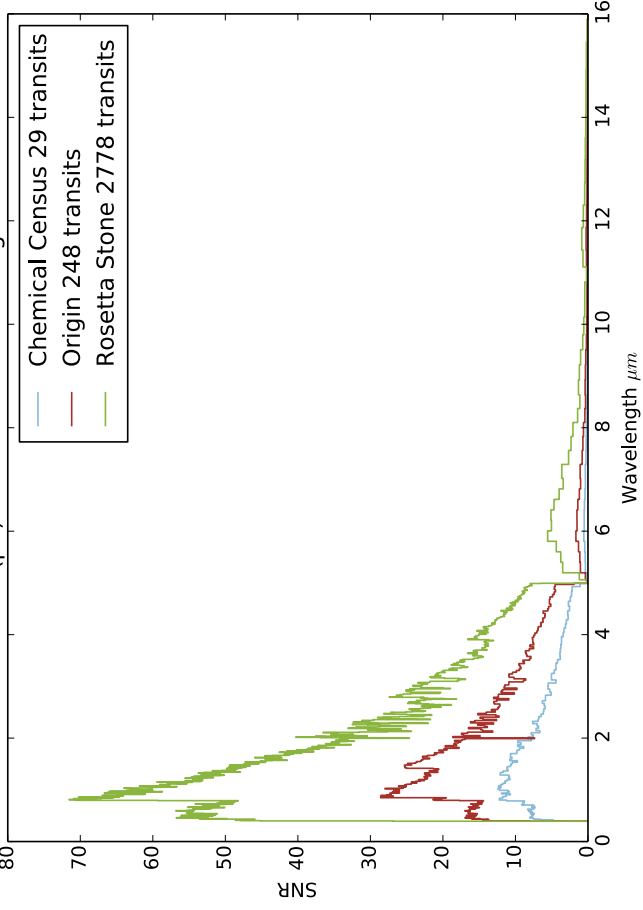
CoRoT-2 b (pri) SNR of EChO Observing Modes



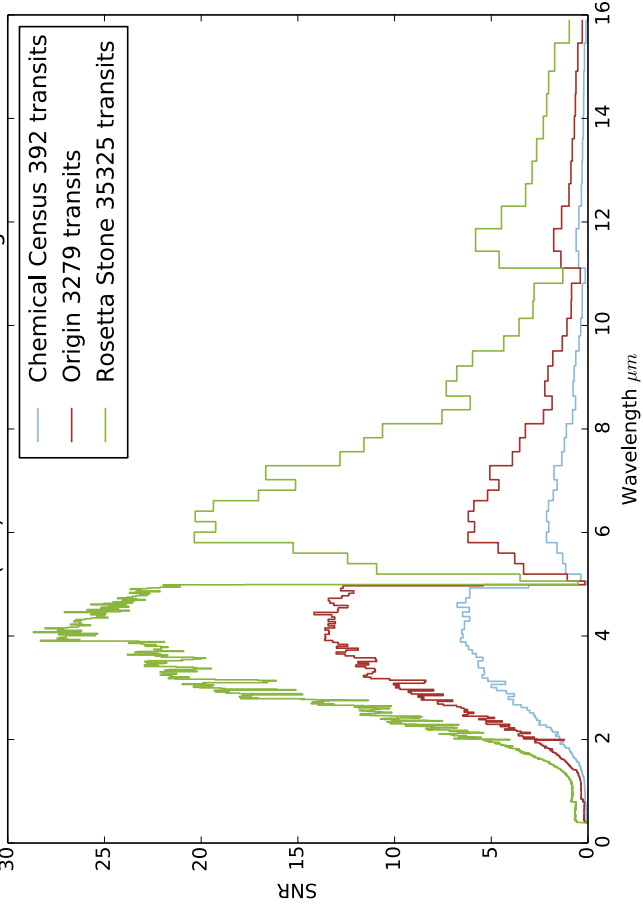
CoRoT-2 b (sec) SNR of EChO Observing Modes



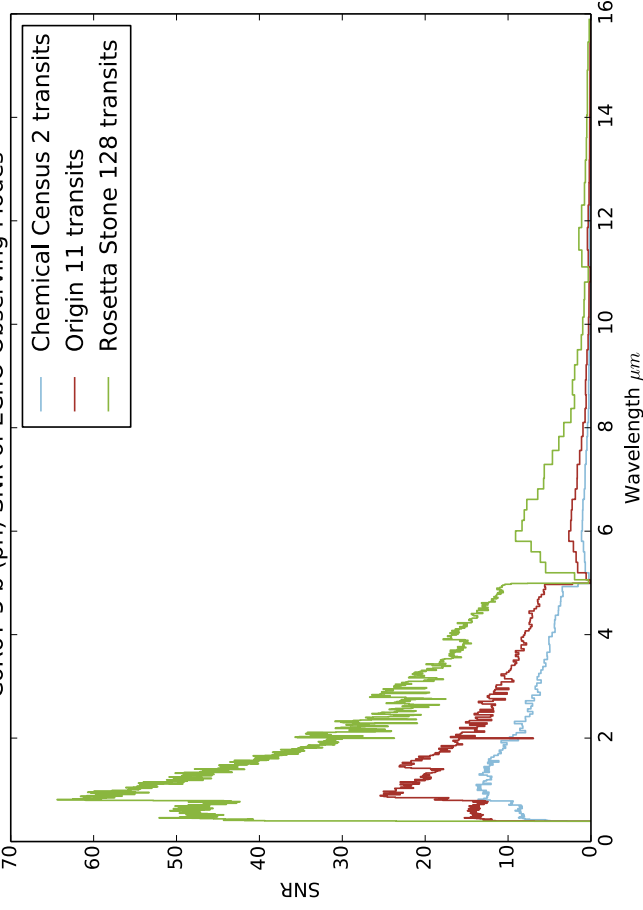
CoRoT-4 b (pri) SNR of EChO Observing Modes



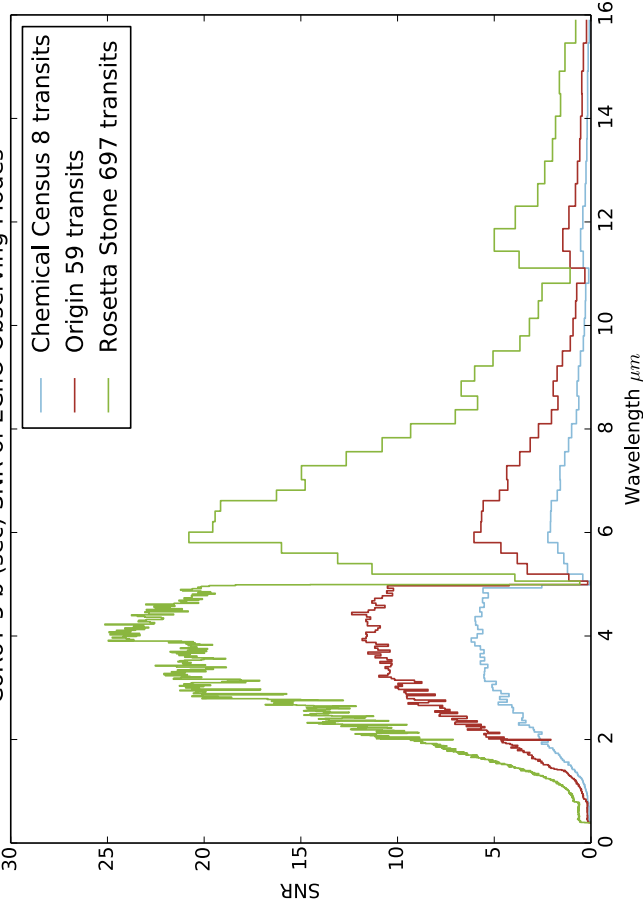
CoRoT-4 b (sec) SNR of EChO Observing Modes

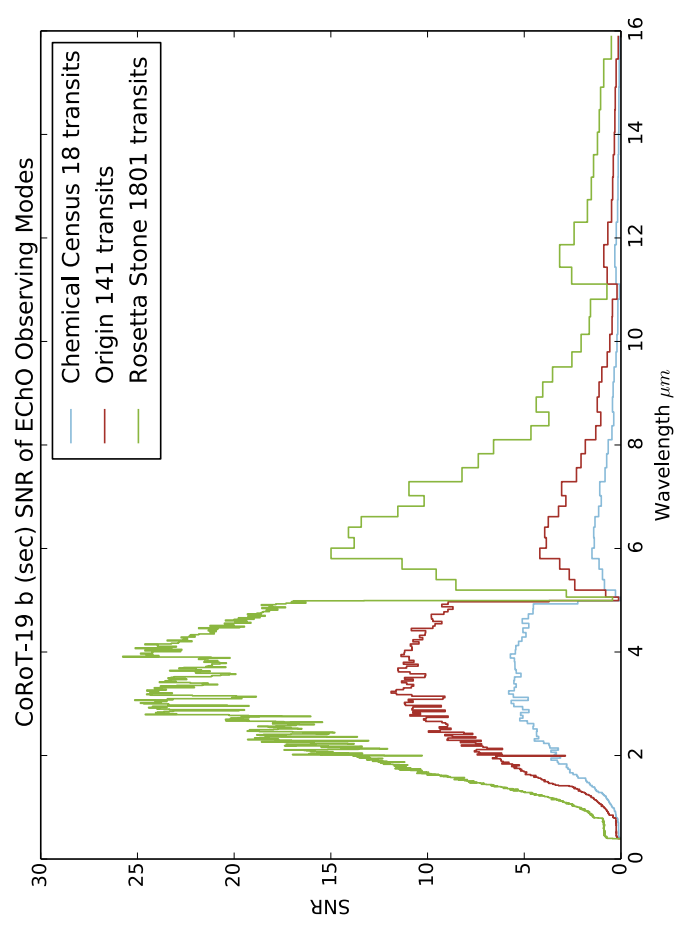
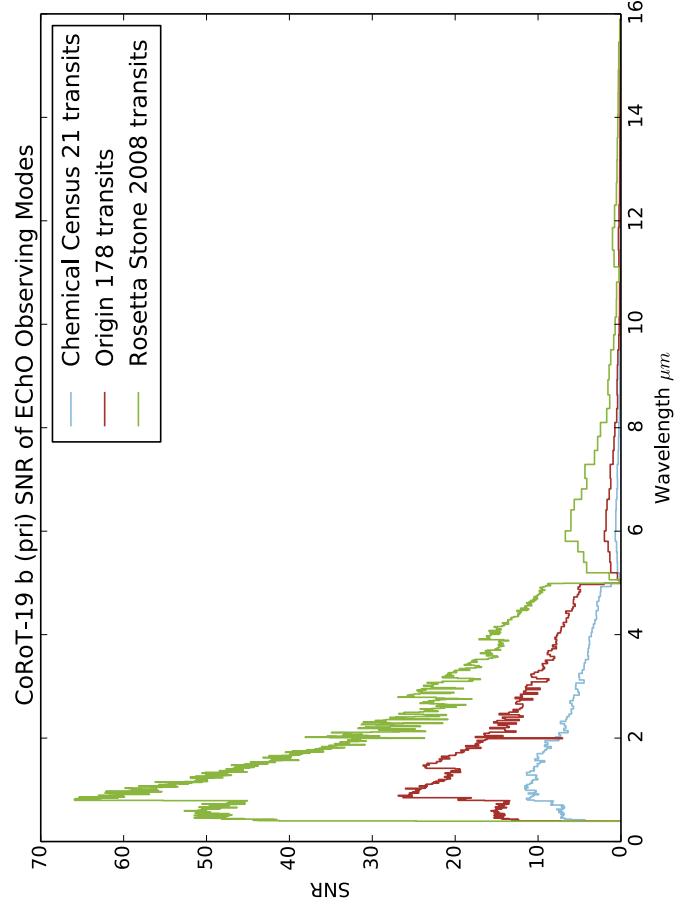
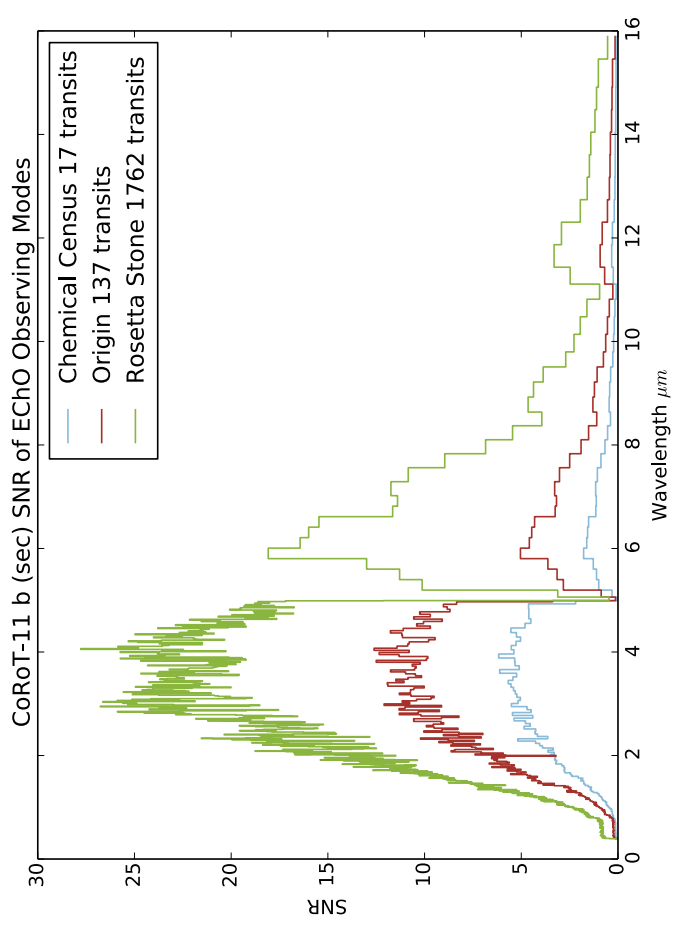
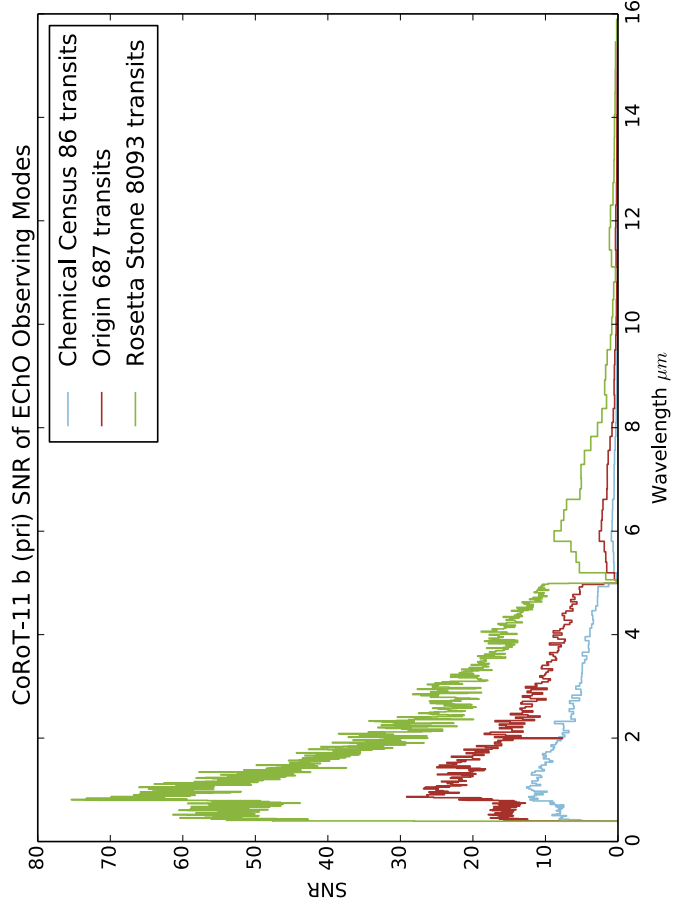


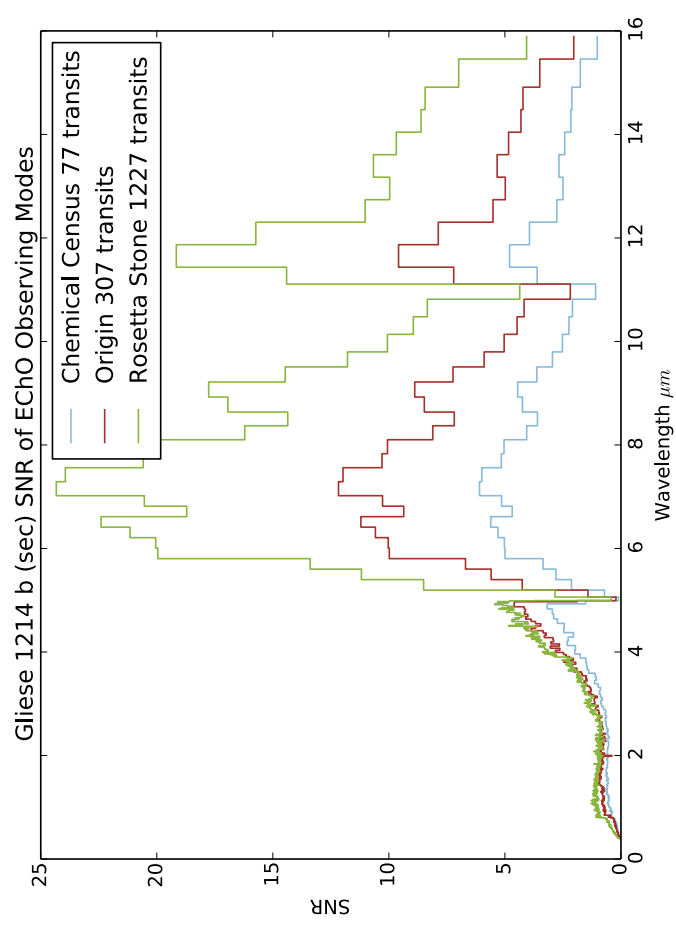
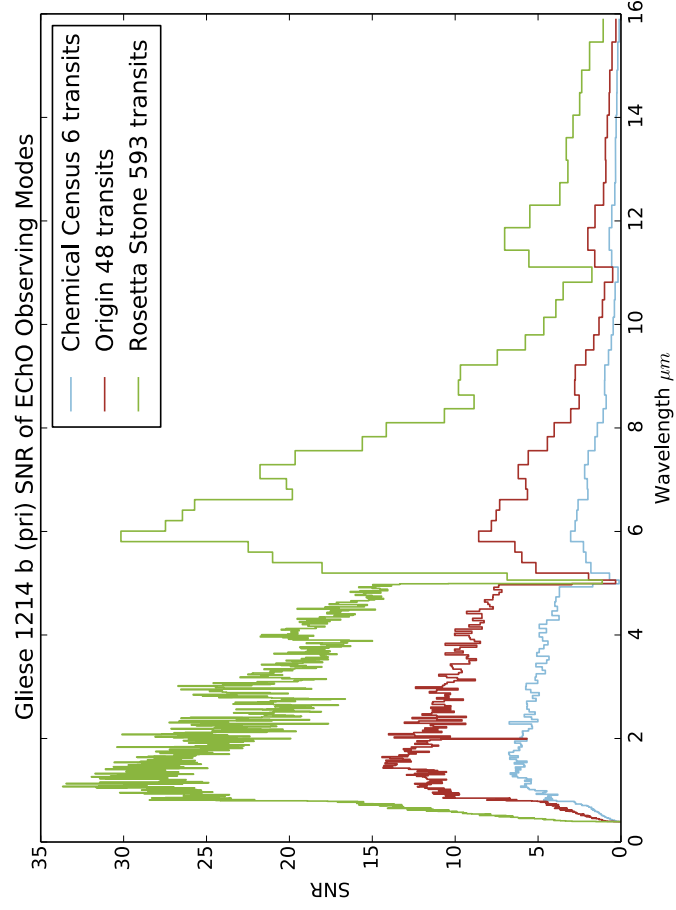
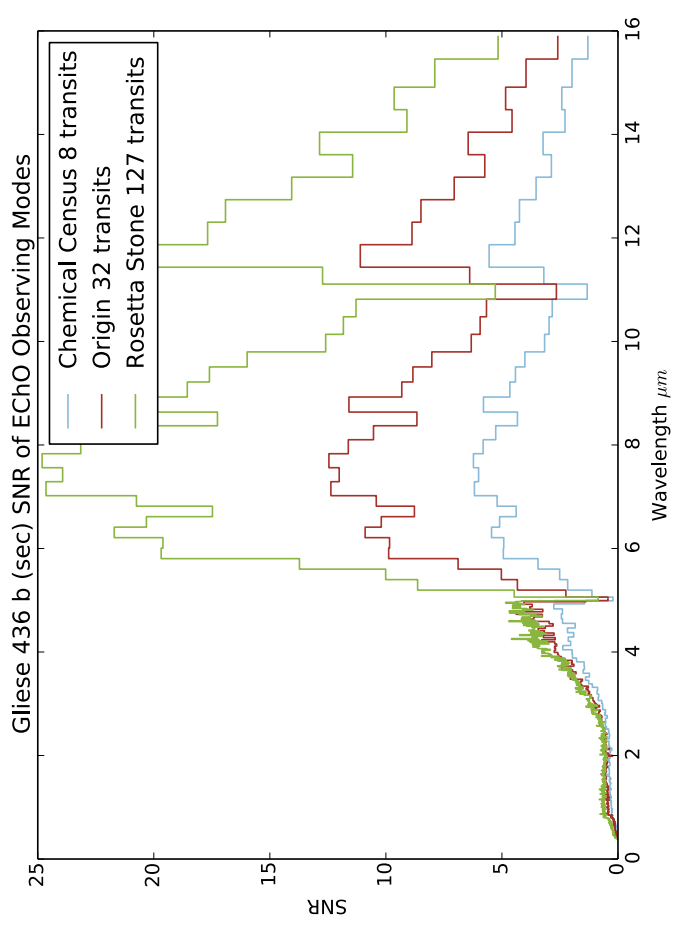
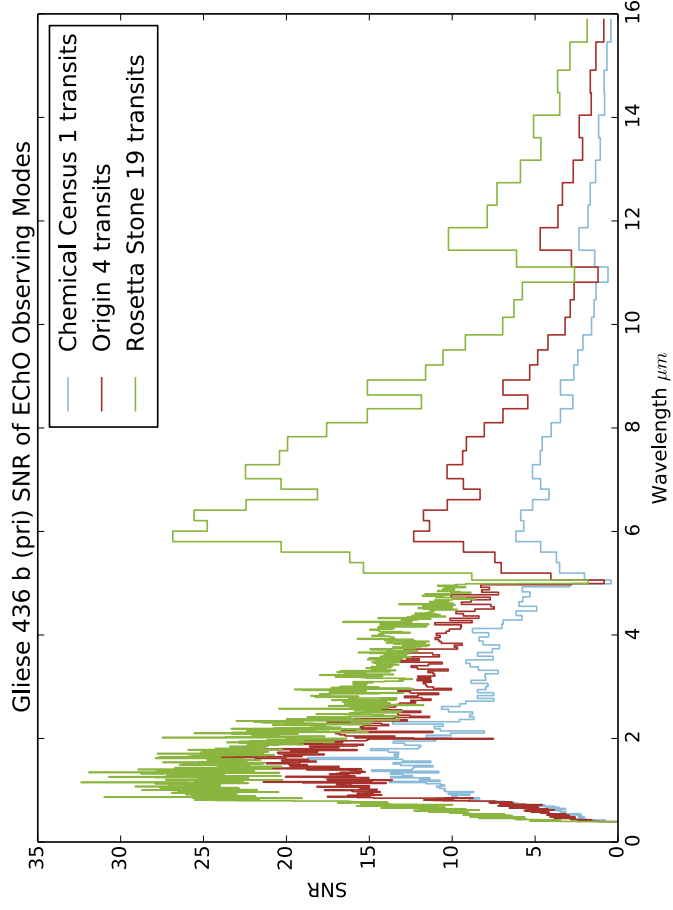
CoRoT-5 b (pri) SNR of EChO Observing Modes



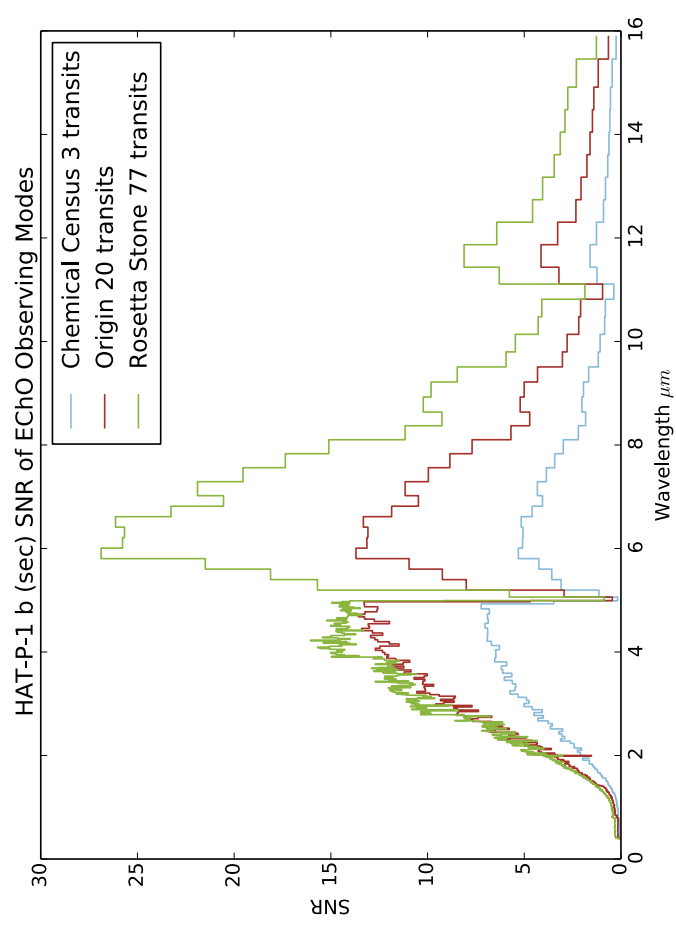
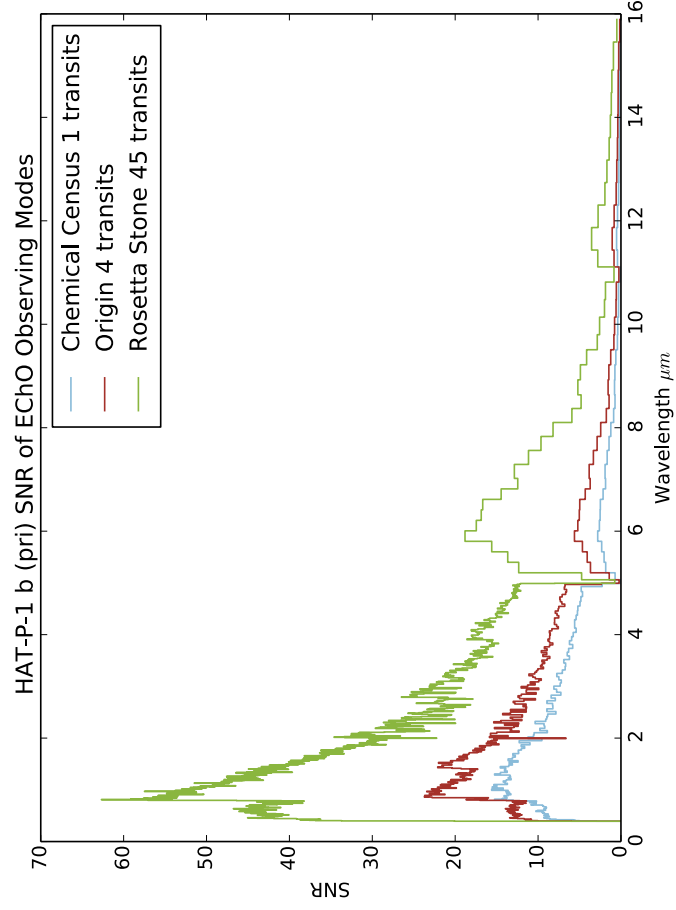
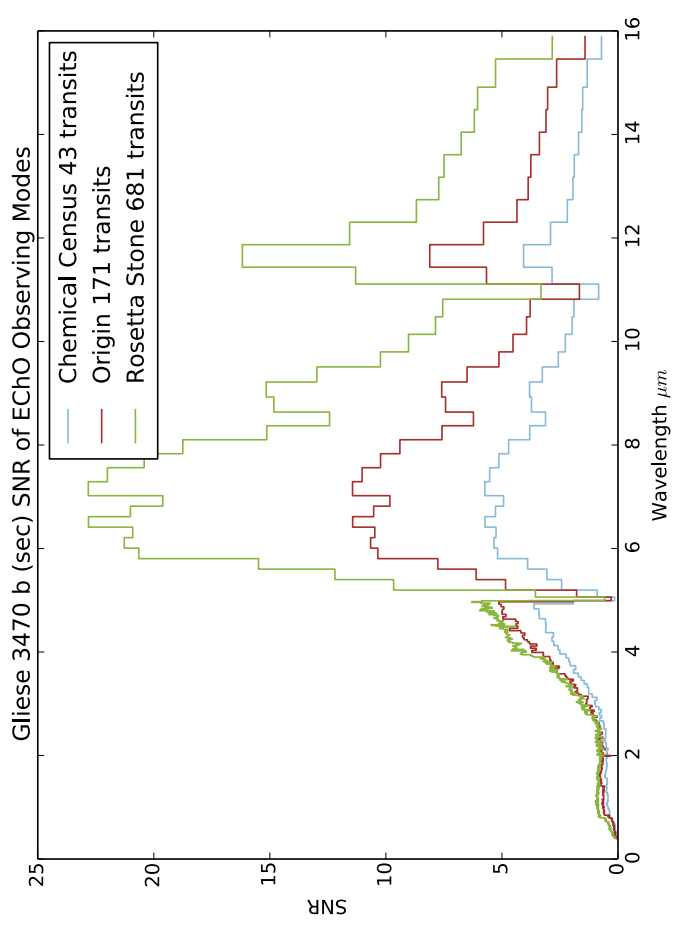
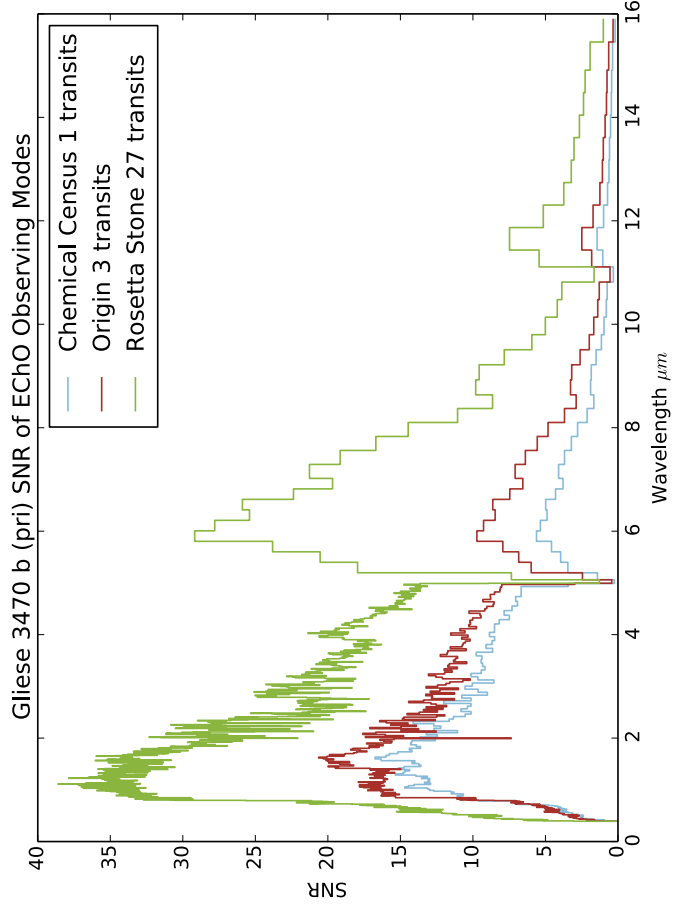
CoRoT-5 b (sec) SNR of EChO Observing Modes



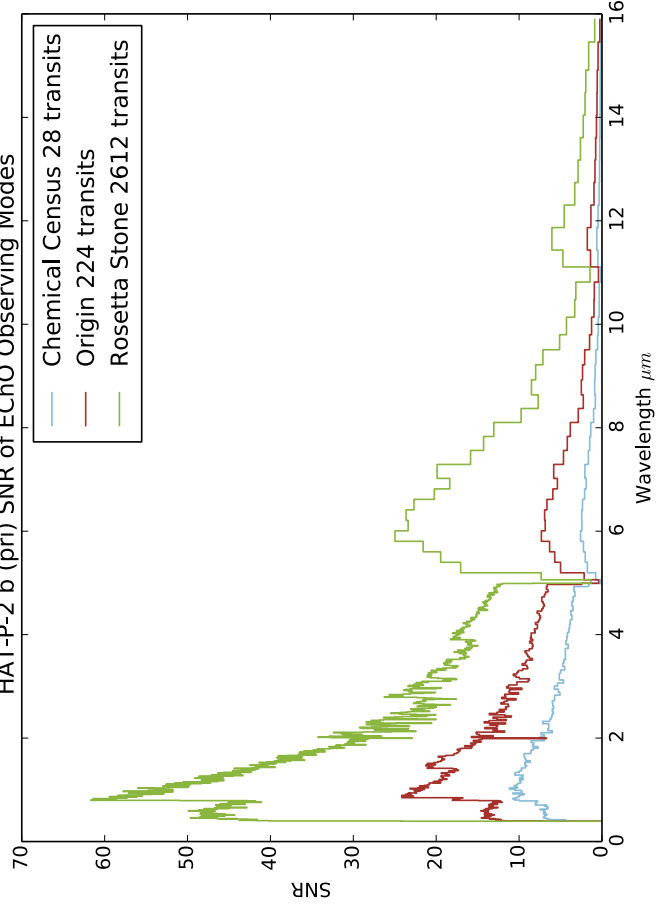




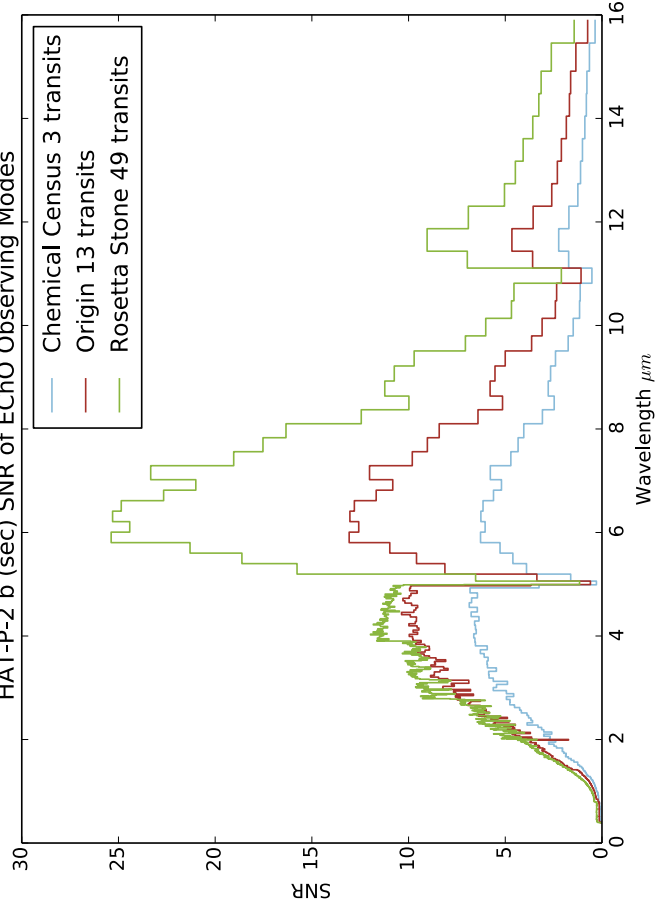




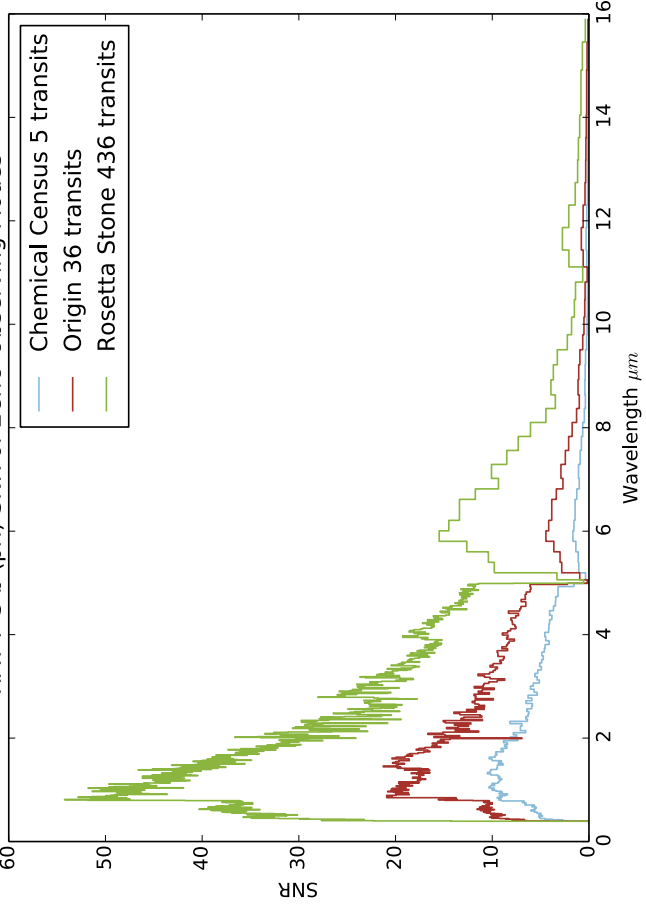
HAT-P-2 b (pri) SNR of EChO Observing Modes



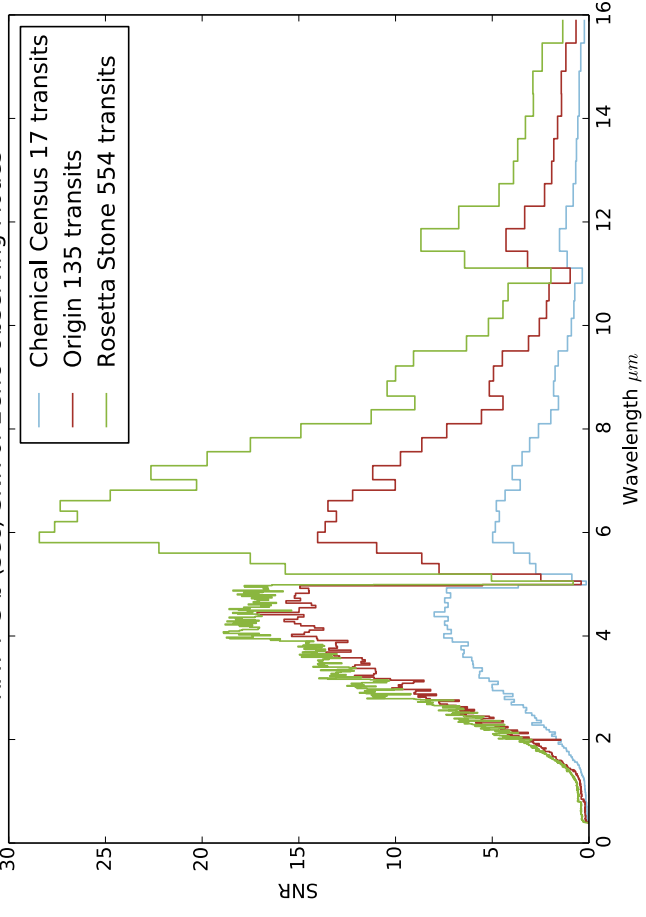
HAT-P-2 b (sec) SNR of EChO Observing Modes



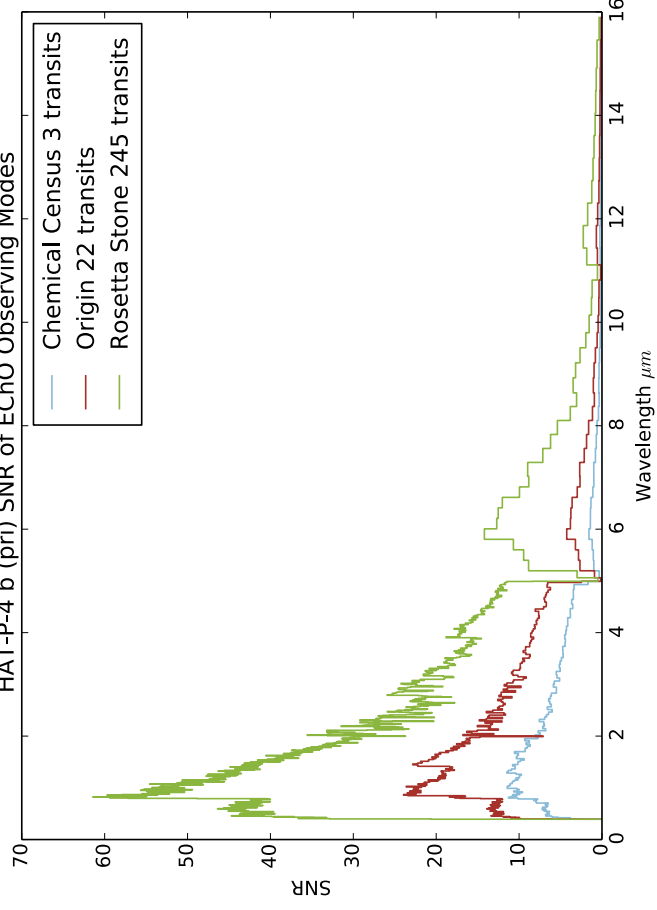
HAT-P-3 b (pri) SNR of EChO Observing Modes



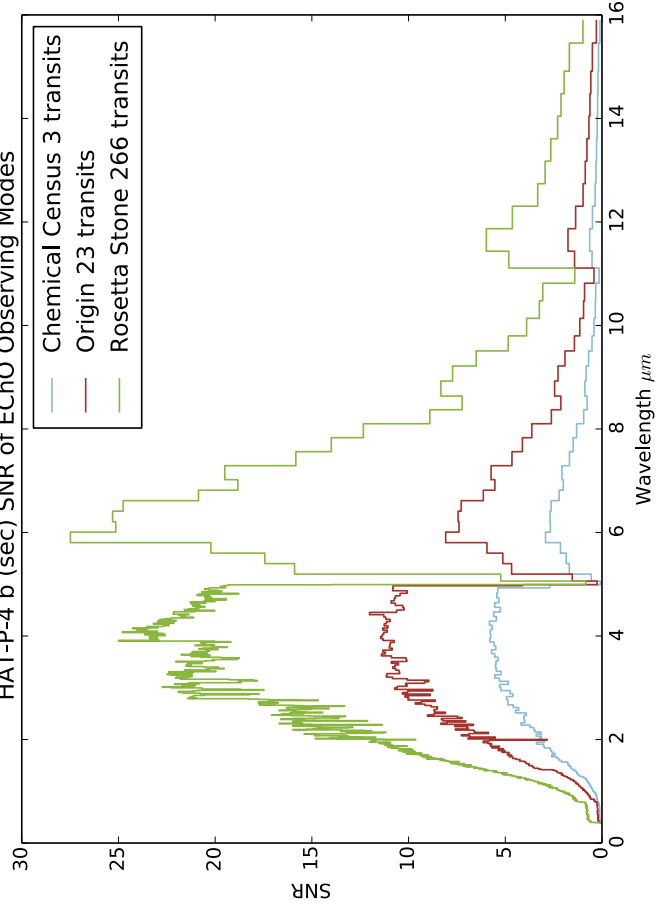
HAT-P-3 b (sec) SNR of EChO Observing Modes



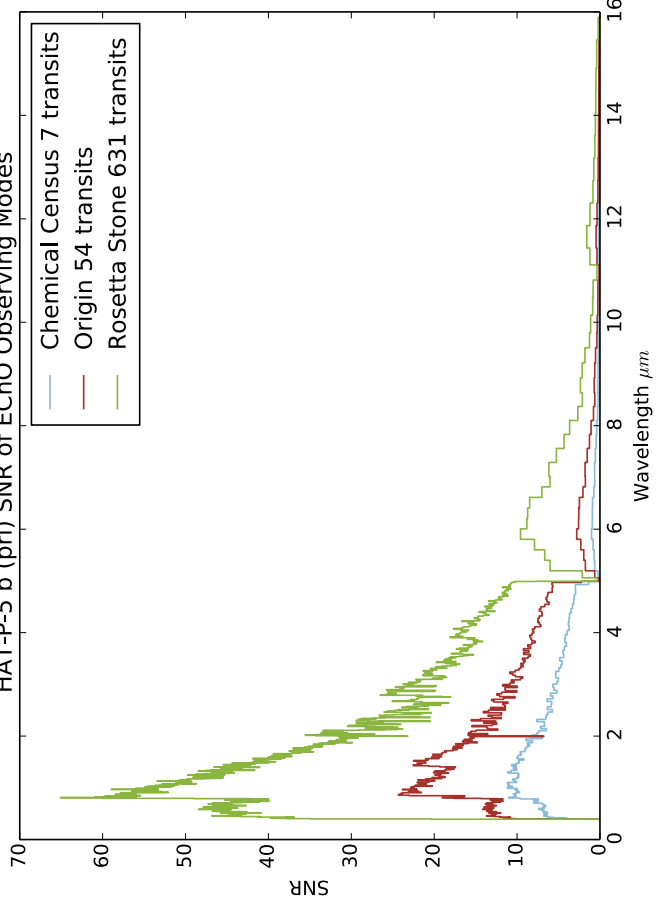
HAT-P-4 b (pri) SNR of EChO Observing Modes



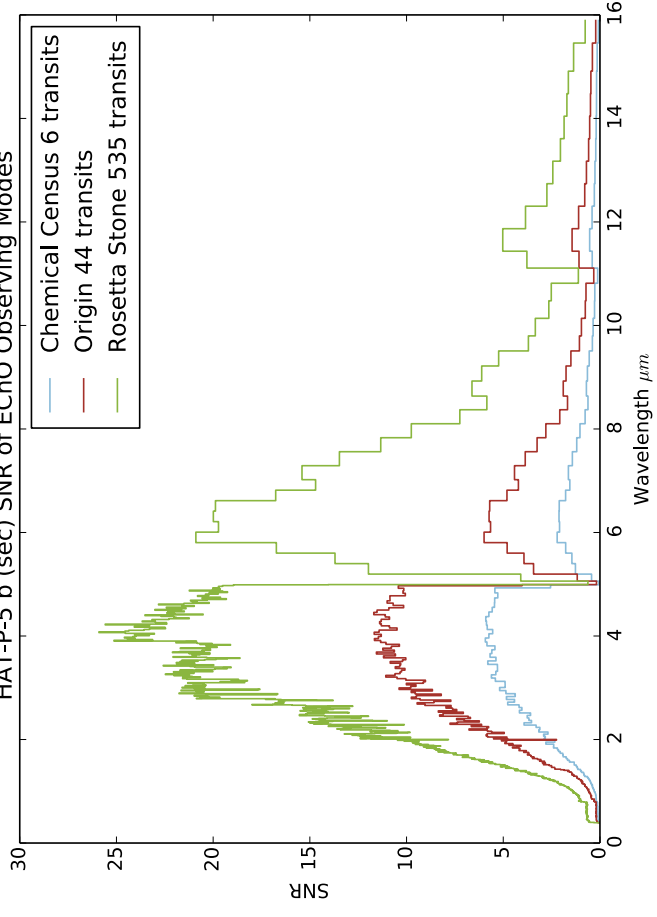
HAT-P-4 b (sec) SNR of EChO Observing Modes



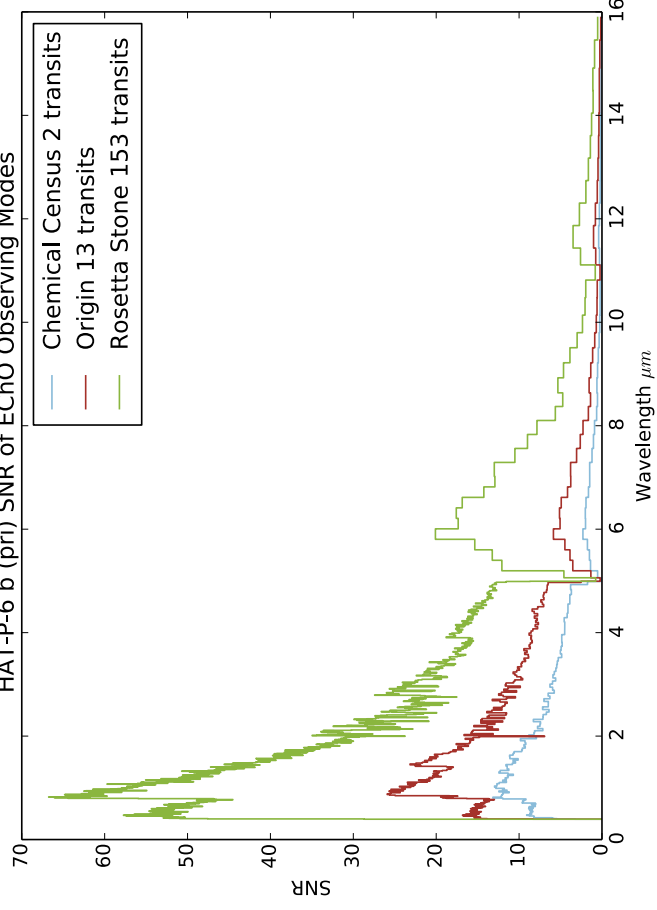
HAT-P-5 b (pri) SNR of EChO Observing Modes



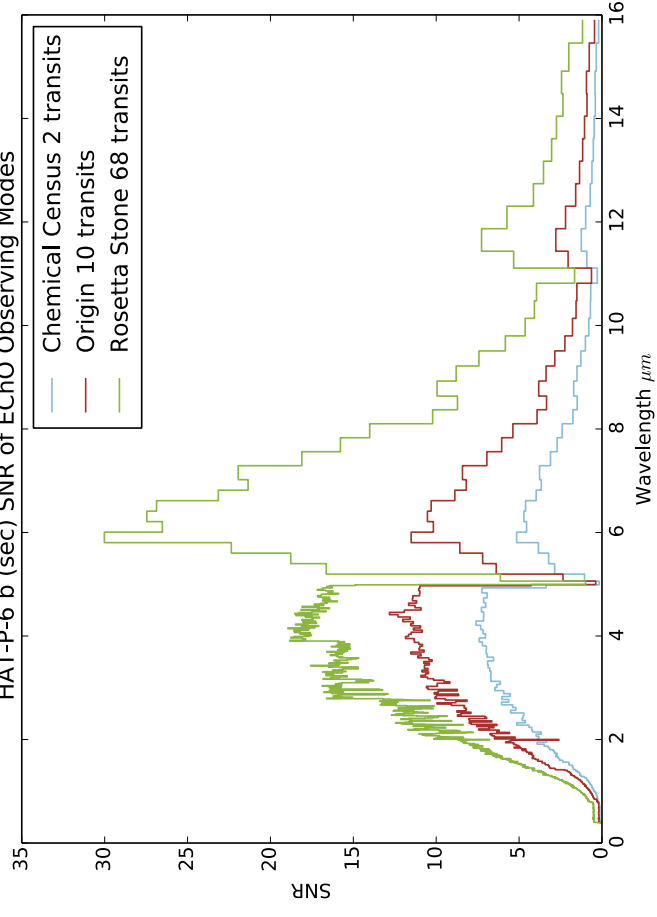
HAT-P-5 b (sec) SNR of EChO Observing Modes



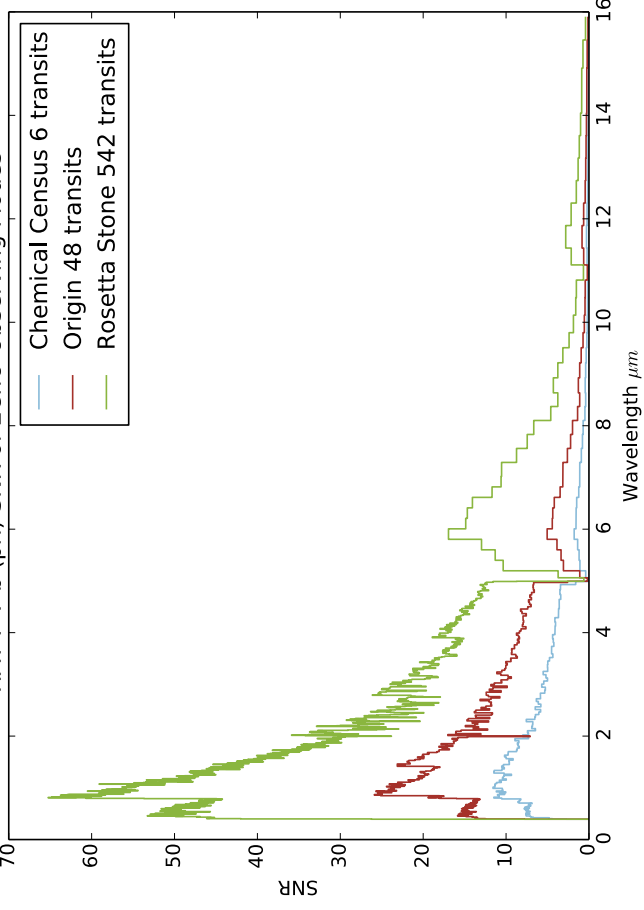
HAT-P-6 b (pri) SNR of EChO Observing Modes



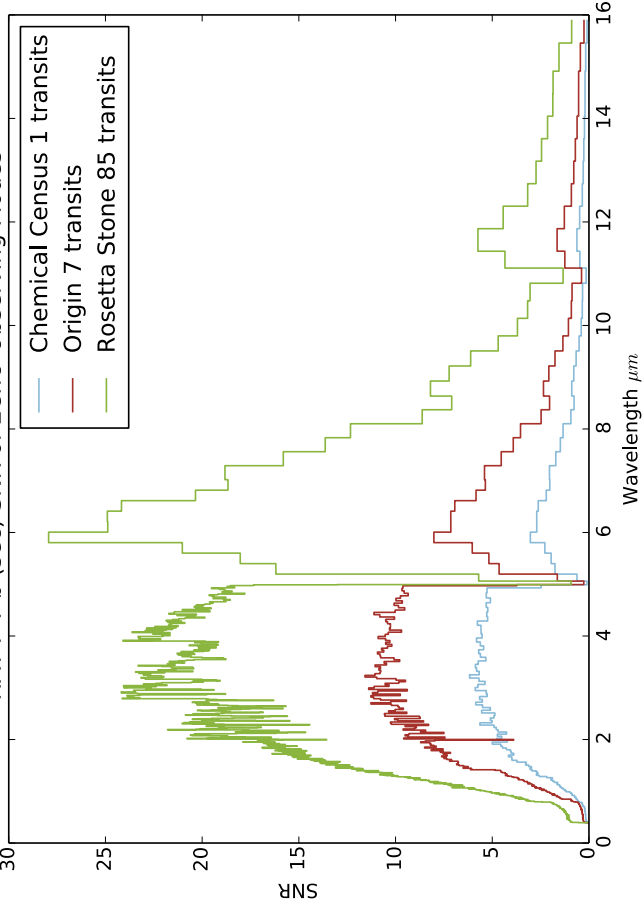
HAT-P-6 b (sec) SNR of EChO Observing Modes



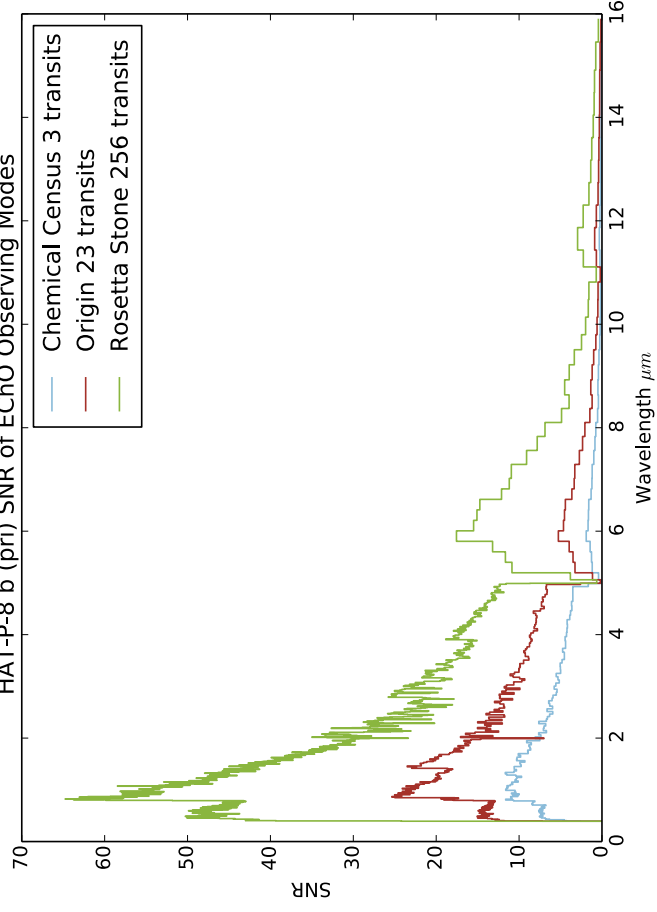
HAT-P-7 b (pri) SNR of EChO Observing Modes



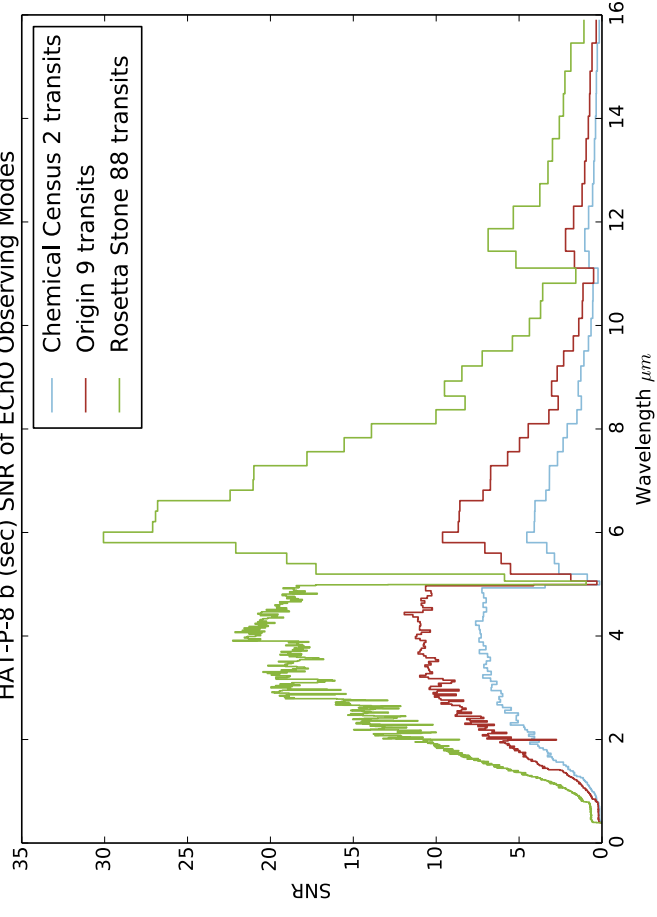
HAT-P-7 b (sec) SNR of EChO Observing Modes



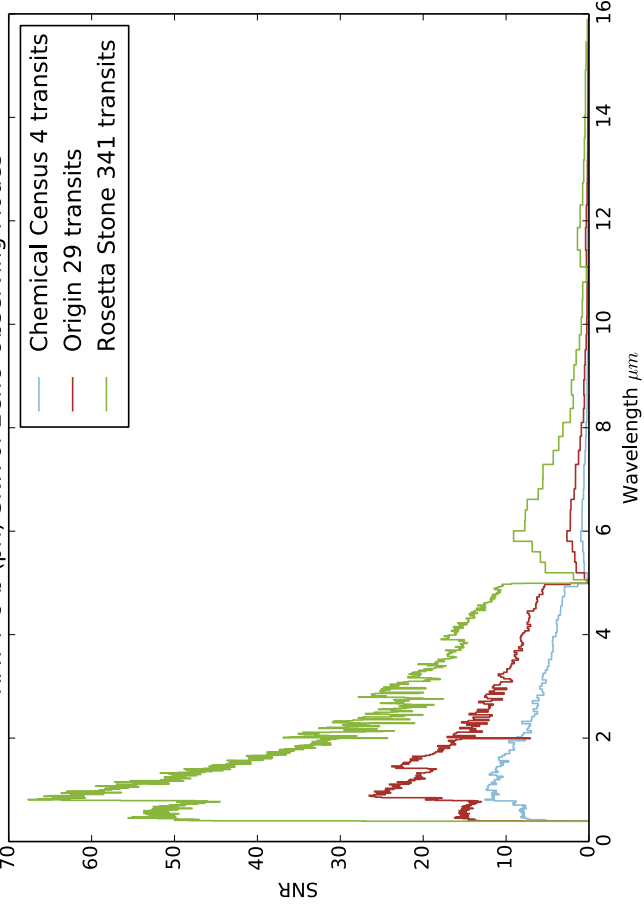
HAT-P-8 b (pri) SNR of EChO Observing Modes



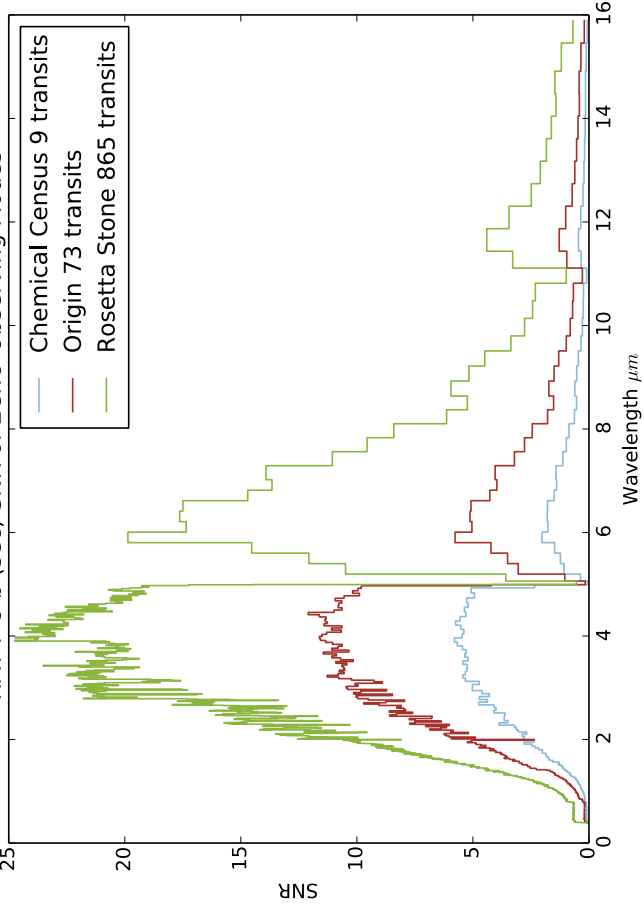
HAT-P-8 b (sec) SNR of EChO Observing Modes



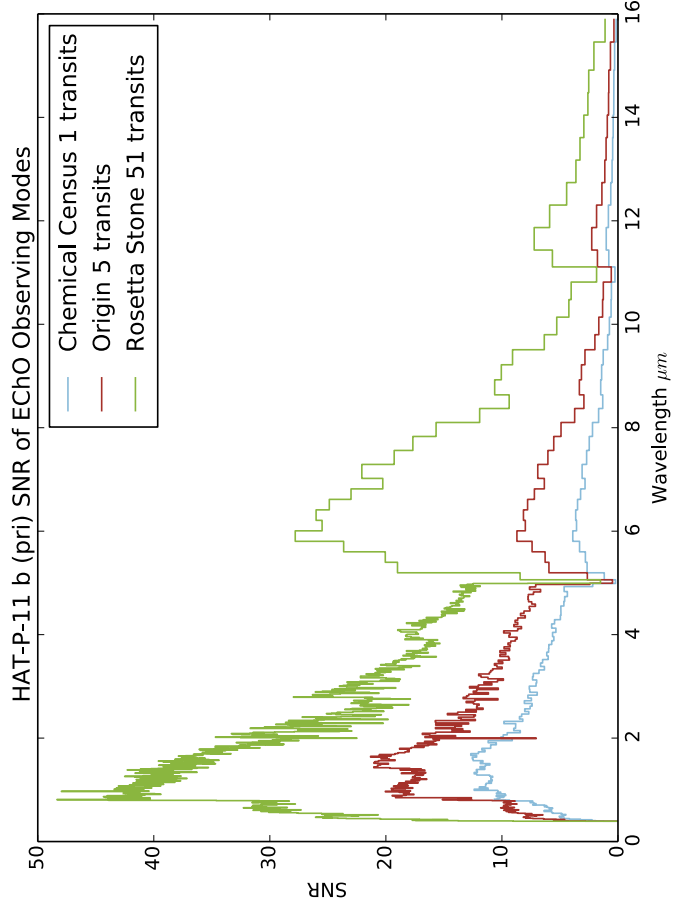
HAT-P-9 b (pri) SNR of EChO Observing Modes



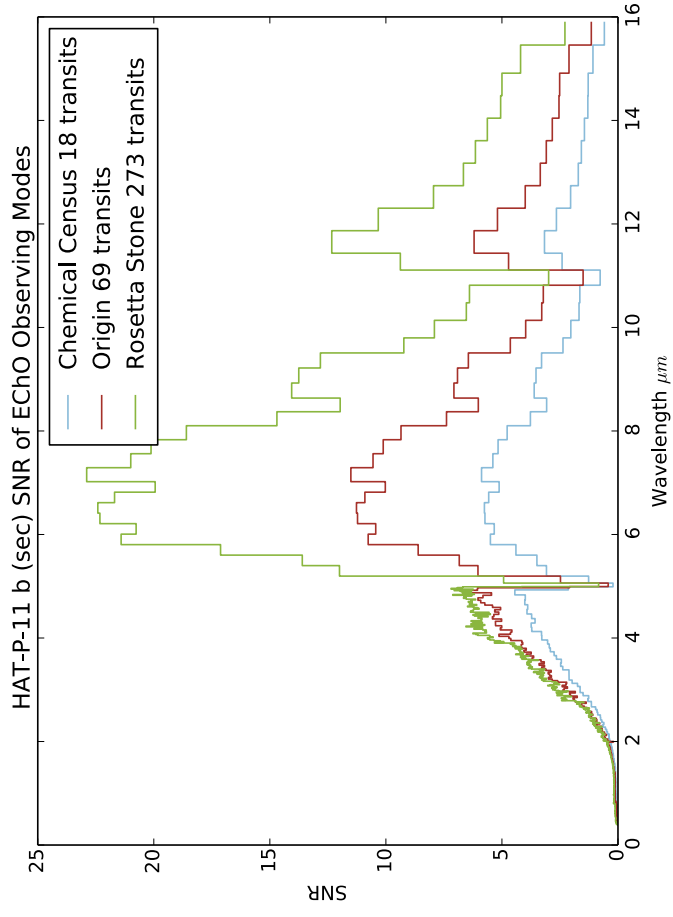
HAT-P-9 b (sec) SNR of EChO Observing Modes



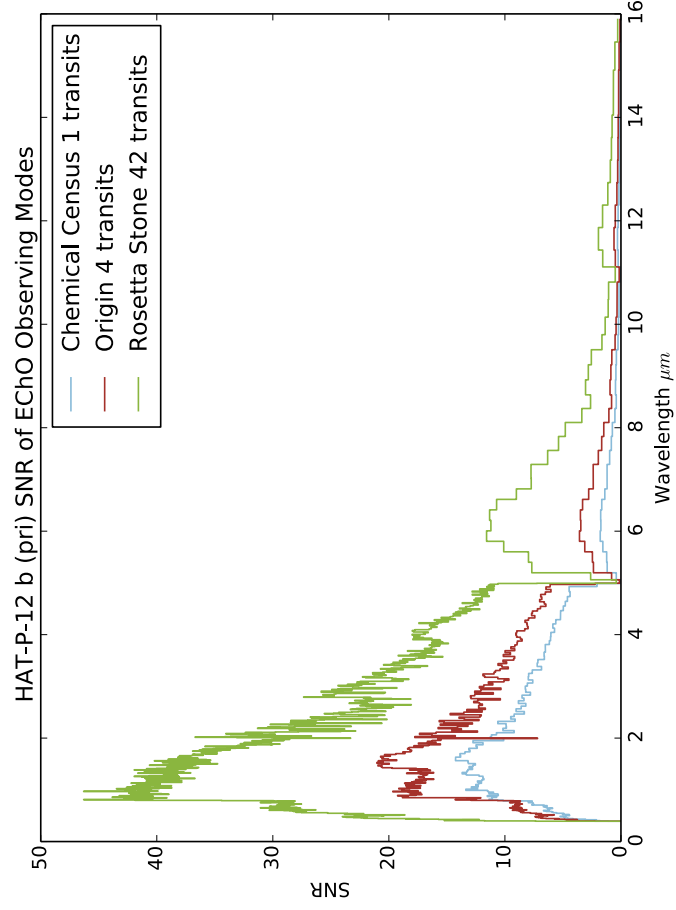
HAT-P-11 b (pri) SNR of EChO Observing Modes



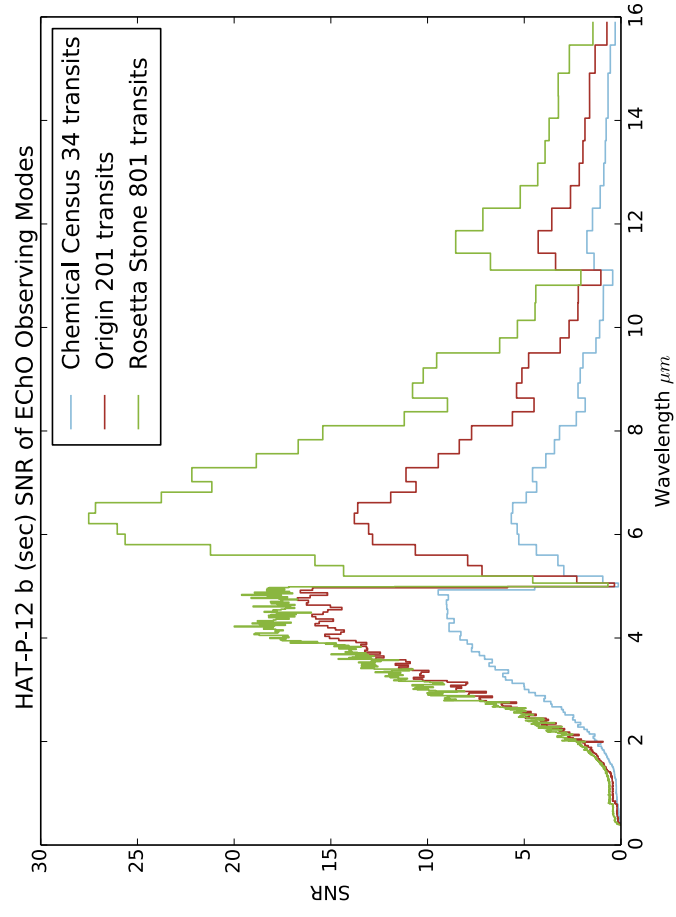
HAT-P-11 b (sec) SNR of EChO Observing Modes



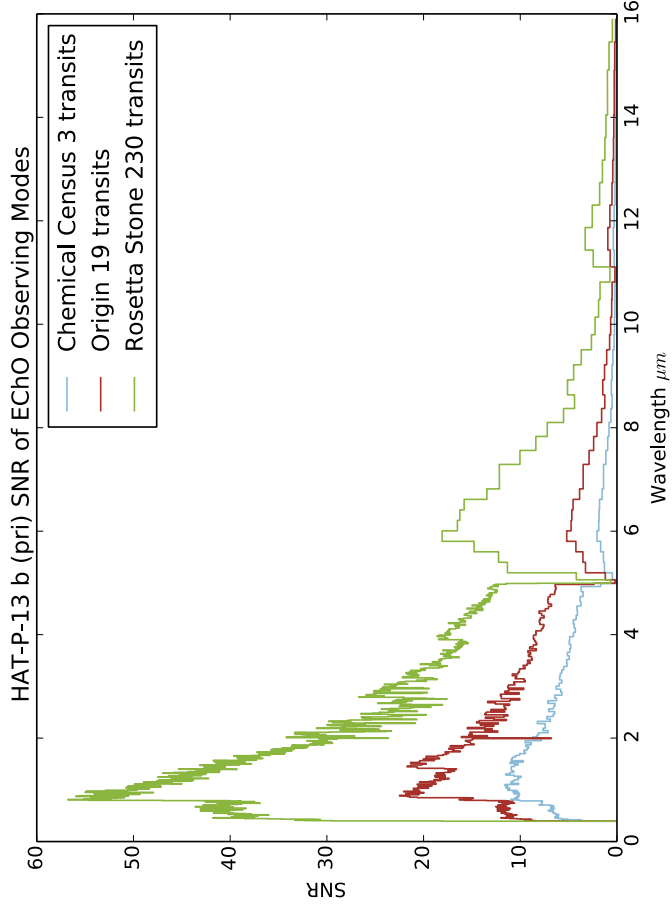
HAT-P-12 b (pri) SNR of EChO Observing Modes



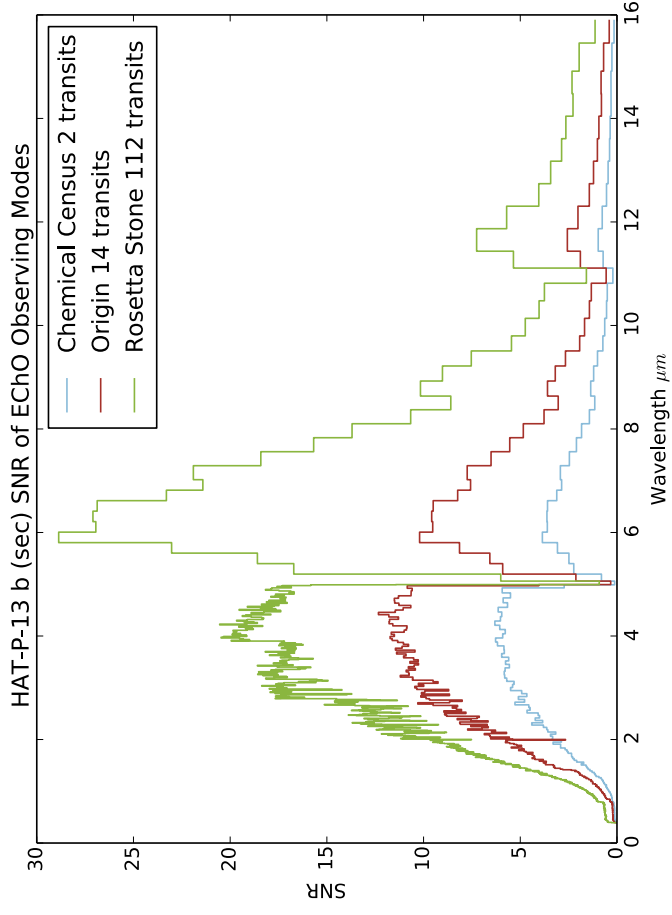
HAT-P-12 b (sec) SNR of EChO Observing Modes



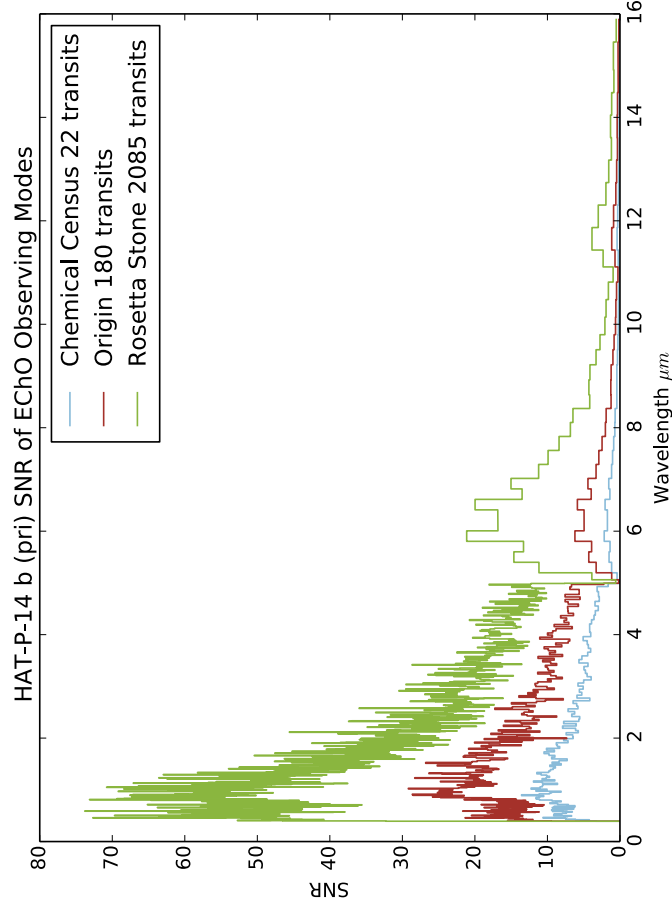
HAT-P-13 b (pri) SNR of EChO Observing Modes



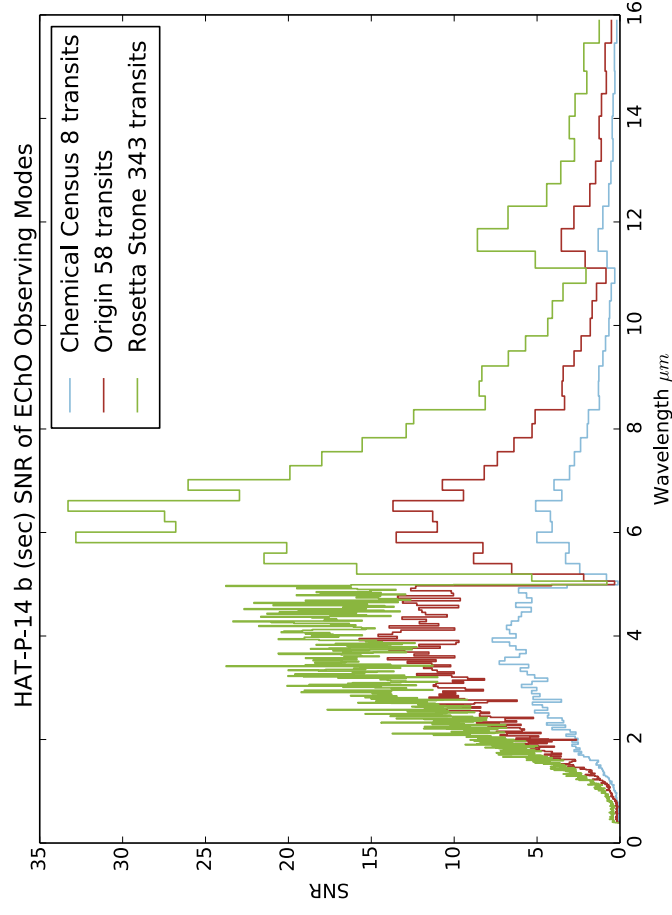
HAT-P-13 b (sec) SNR of EChO Observing Modes



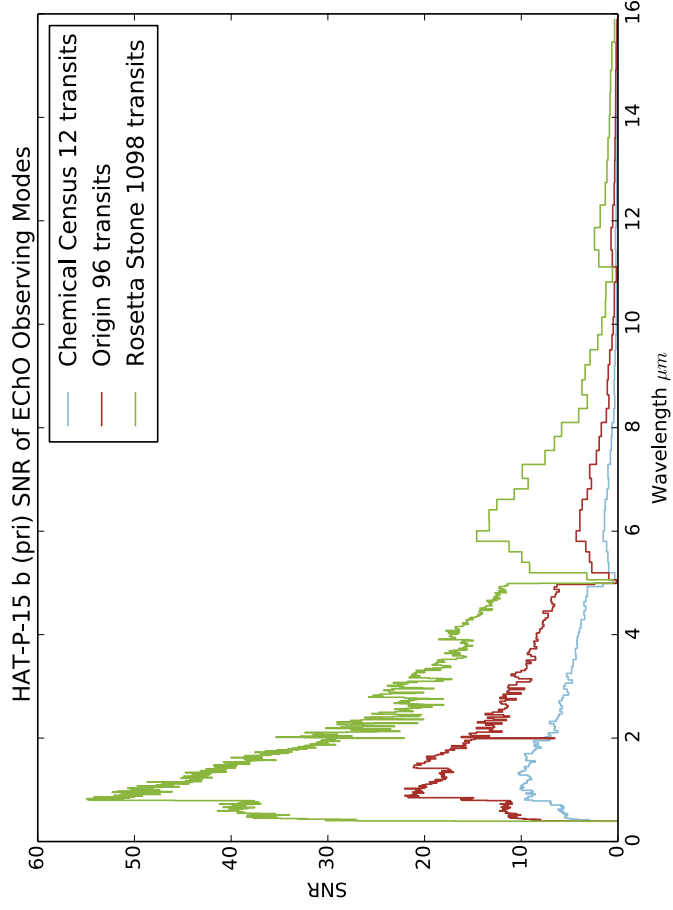
HAT-P-14 b (pri) SNR of EChO Observing Modes



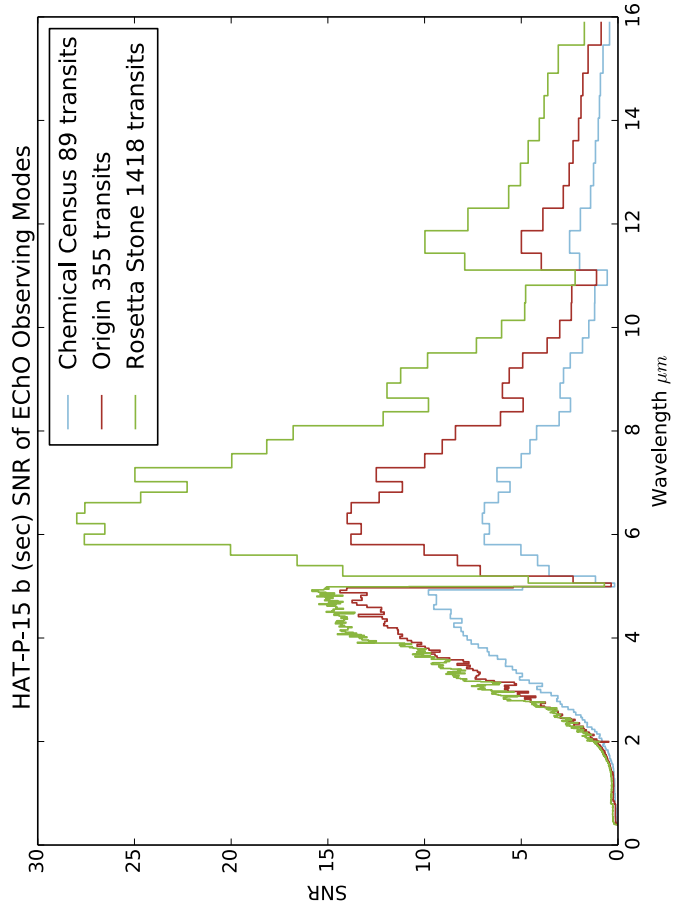
HAT-P-14 b (sec) SNR of EChO Observing Modes



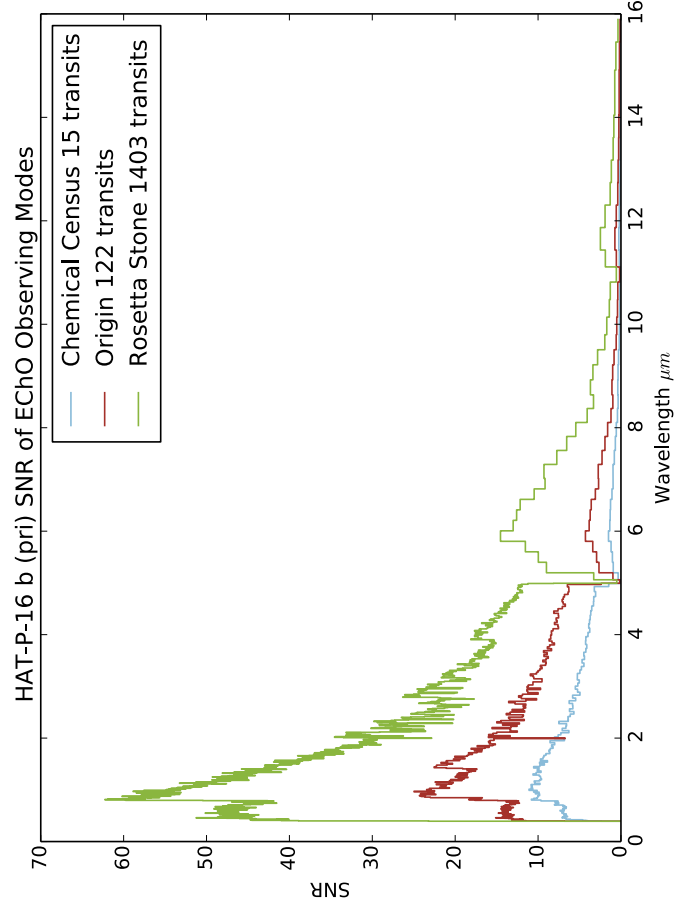
HAT-P-15 b (pri) SNR of EChO Observing Modes



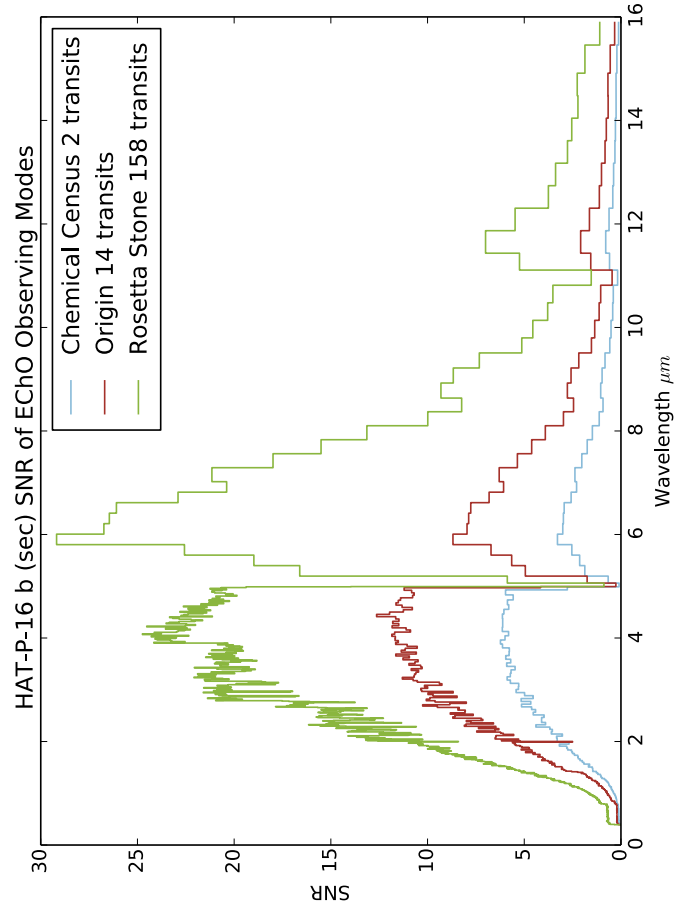
HAT-P-15 b (sec) SNR of EChO Observing Modes



HAT-P-16 b (pri) SNR of EChO Observing Modes

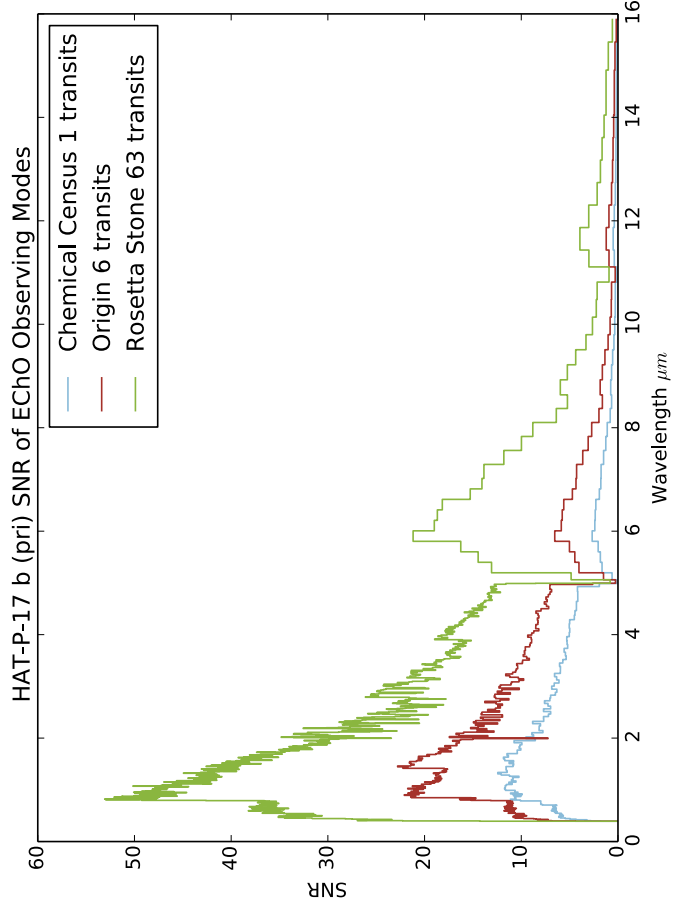


HAT-P-16 b (sec) SNR of EChO Observing Modes

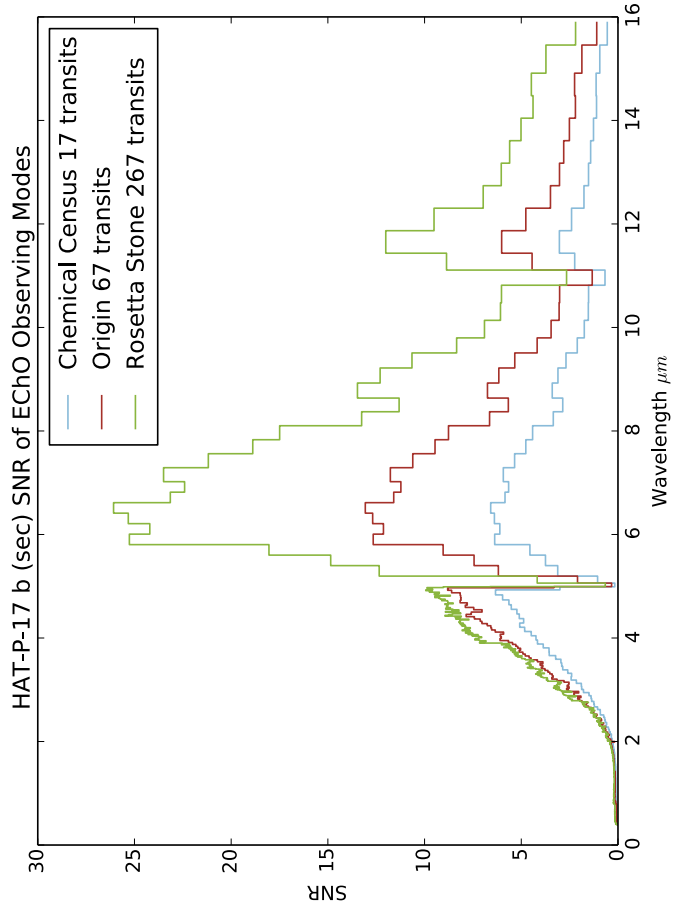




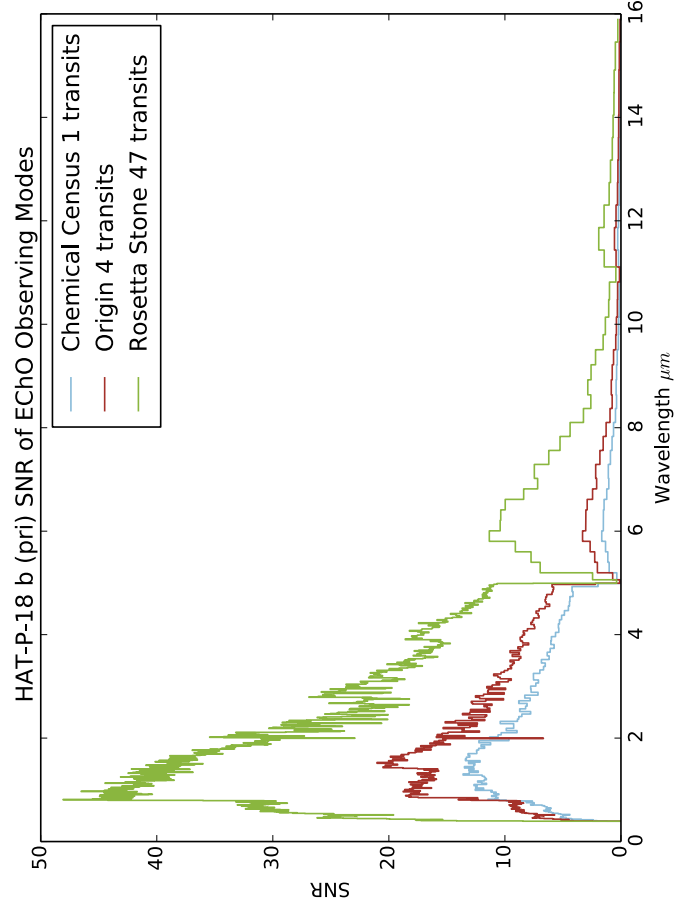
HAT-P-17 b (pri) SNR of EChO Observing Modes



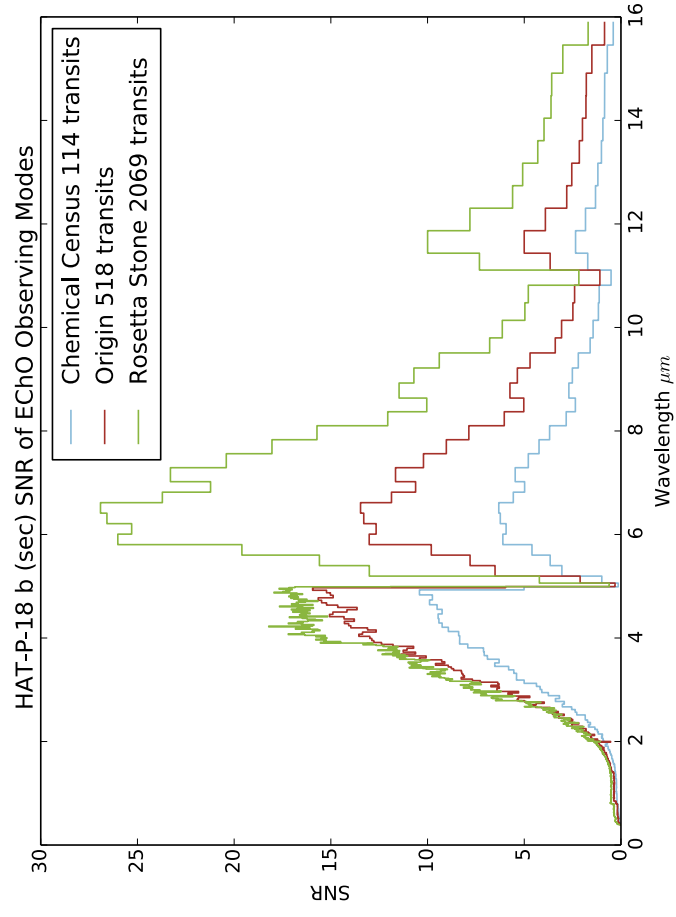
HAT-P-17 b (sec) SNR of EChO Observing Modes



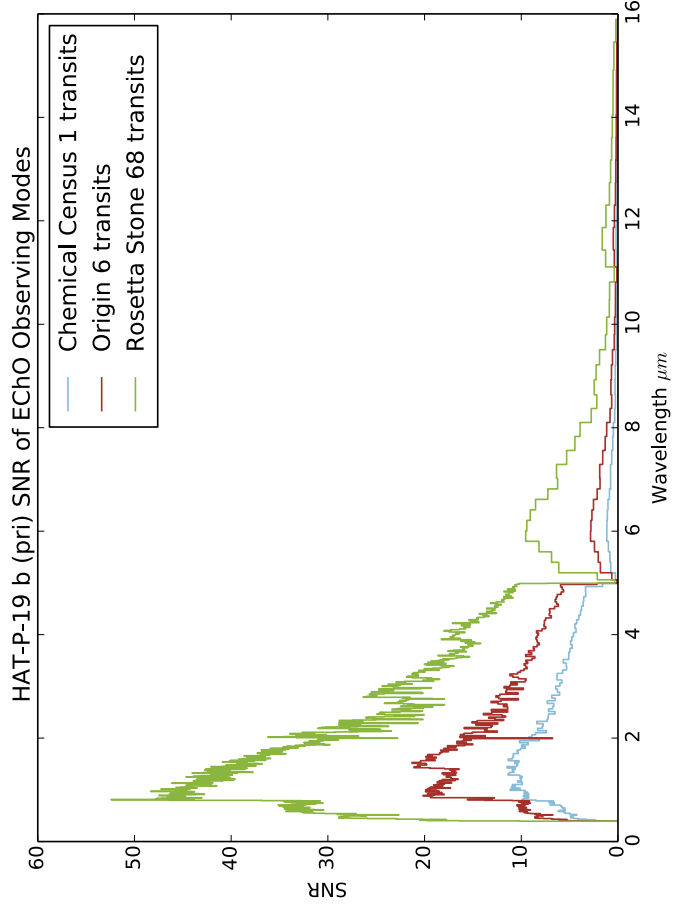
HAT-P-18 b (pri) SNR of EChO Observing Modes



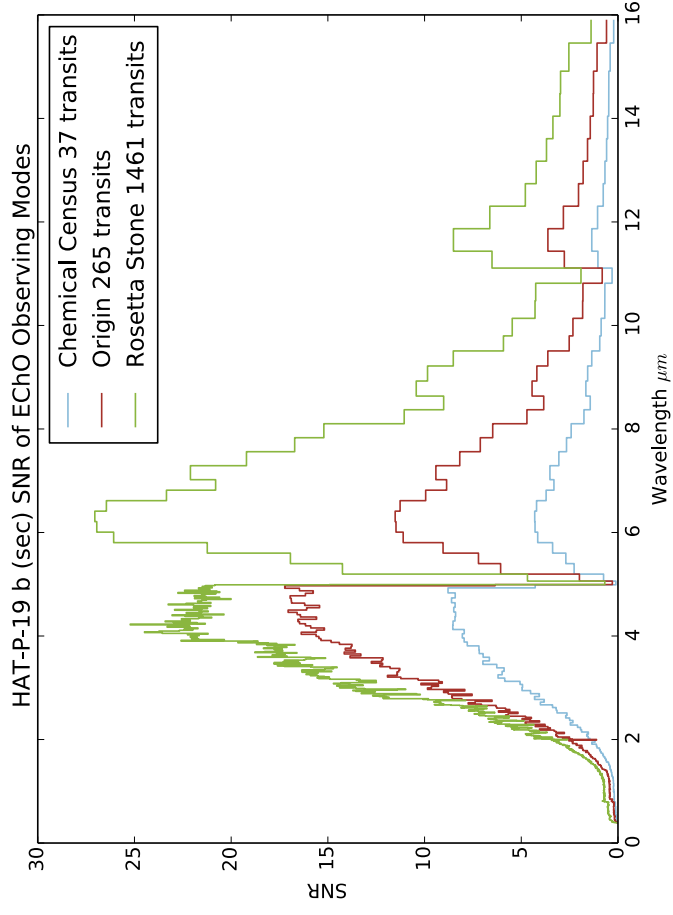
HAT-P-18 b (sec) SNR of EChO Observing Modes



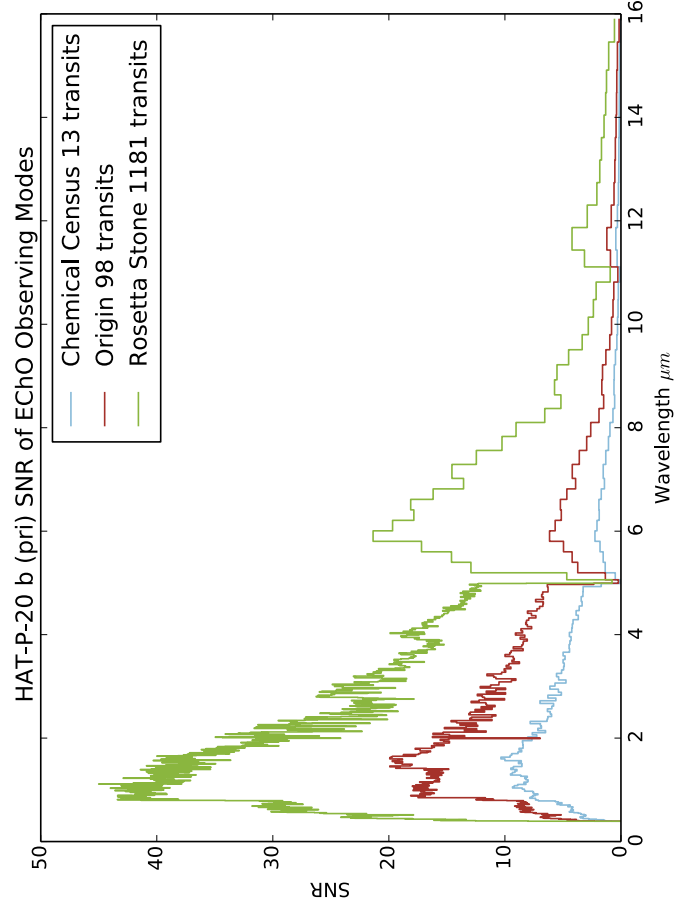
HAT-P-19 b (pri) SNR of EChO Observing Modes



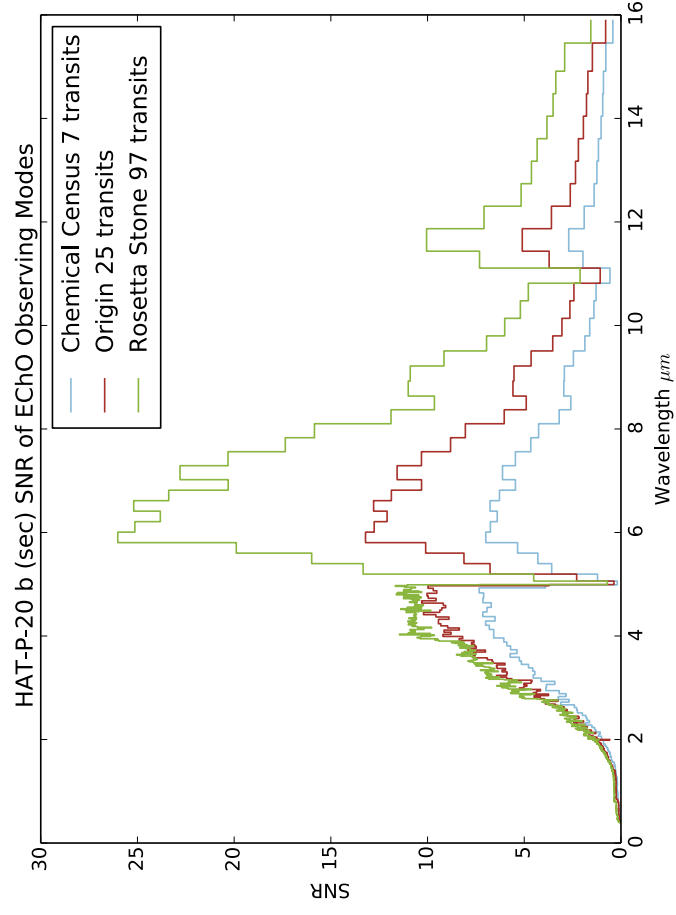
HAT-P-19 b (sec) SNR of EChO Observing Modes



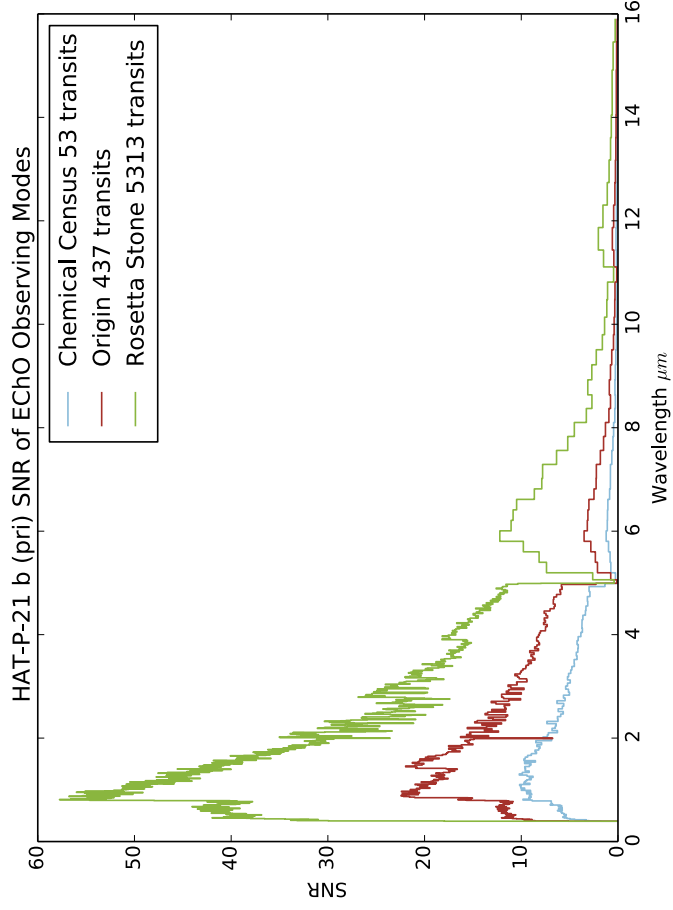
HAT-P-20 b (pri) SNR of EChO Observing Modes



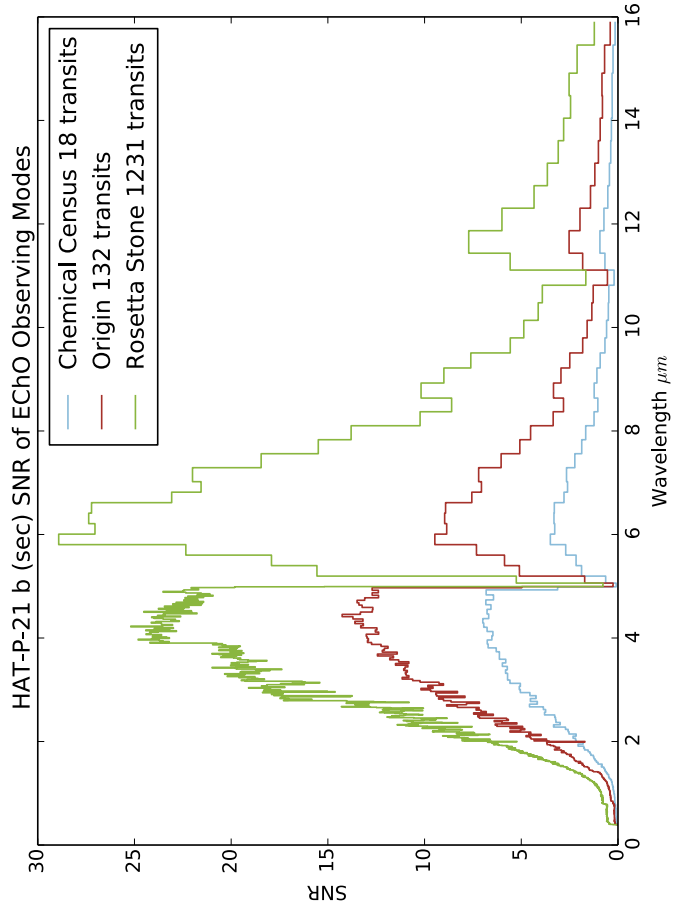
HAT-P-20 b (sec) SNR of EChO Observing Modes



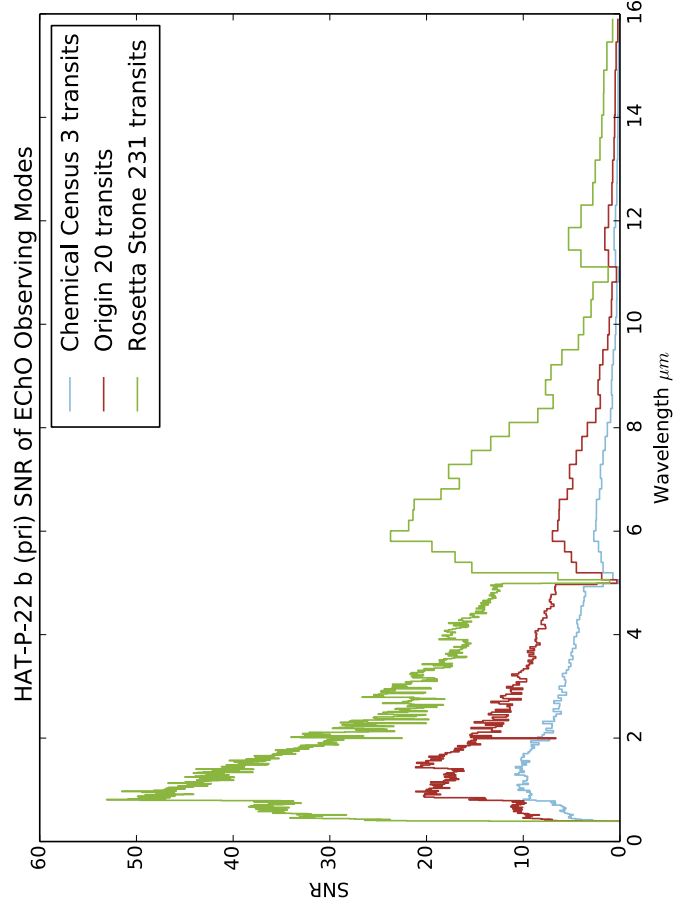
HAT-P-21 b (pri) SNR of EChO Observing Modes



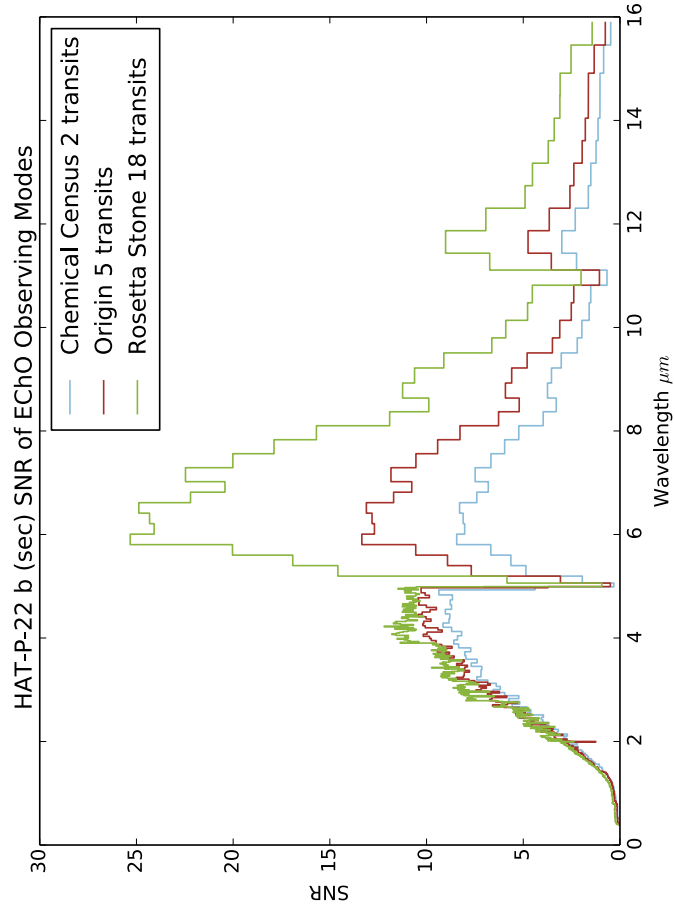
HAT-P-21 b (sec) SNR of EChO Observing Modes



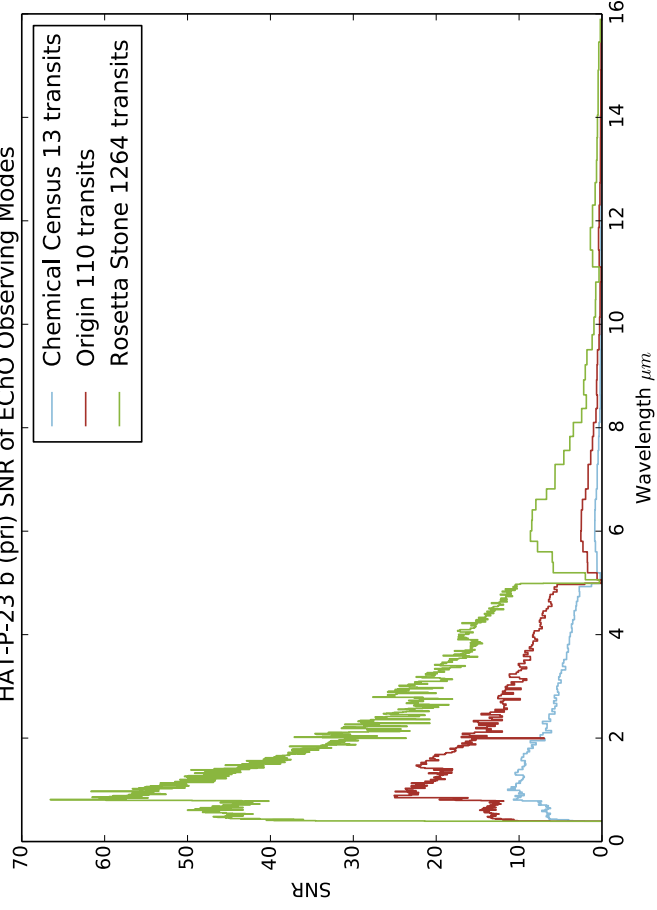
HAT-P-22 b (pri) SNR of EChO Observing Modes



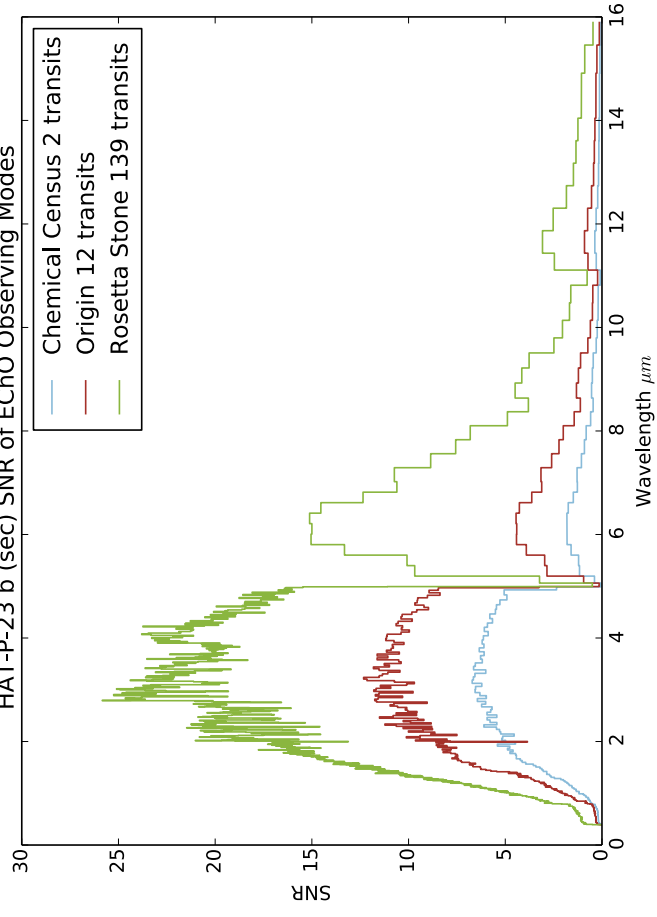
HAT-P-22 b (sec) SNR of EChO Observing Modes



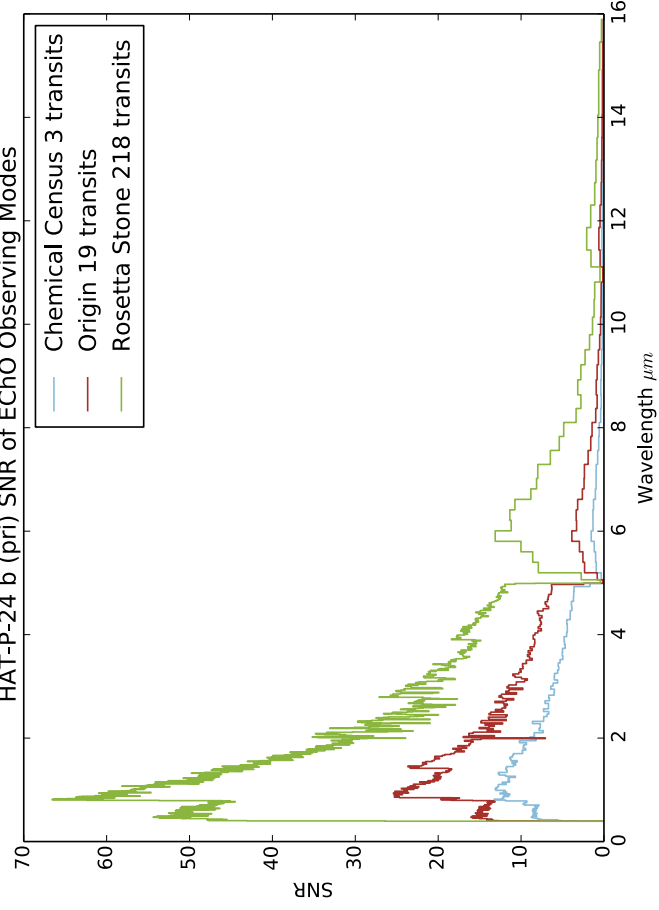
HAT-P-23 b (pri) SNR of EChO Observing Modes



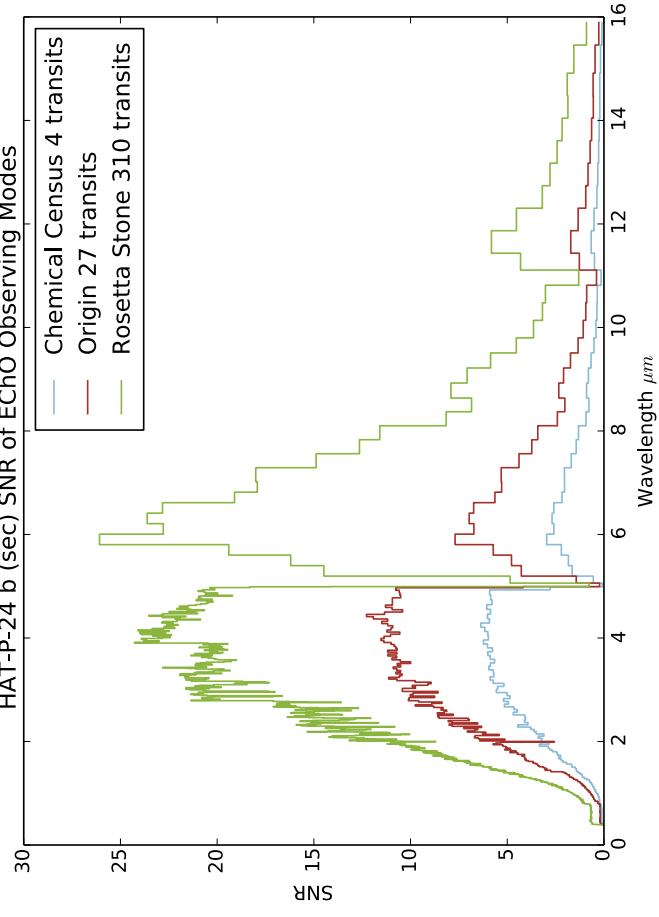
HAT-P-23 b (sec) SNR of EChO Observing Modes



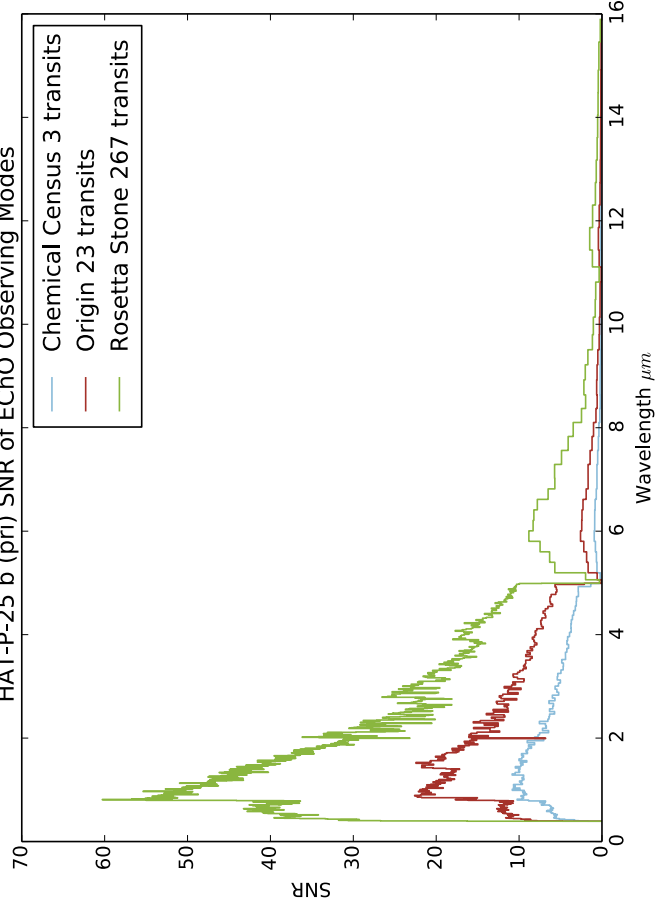
HAT-P-24 b (pri) SNR of EChO Observing Modes



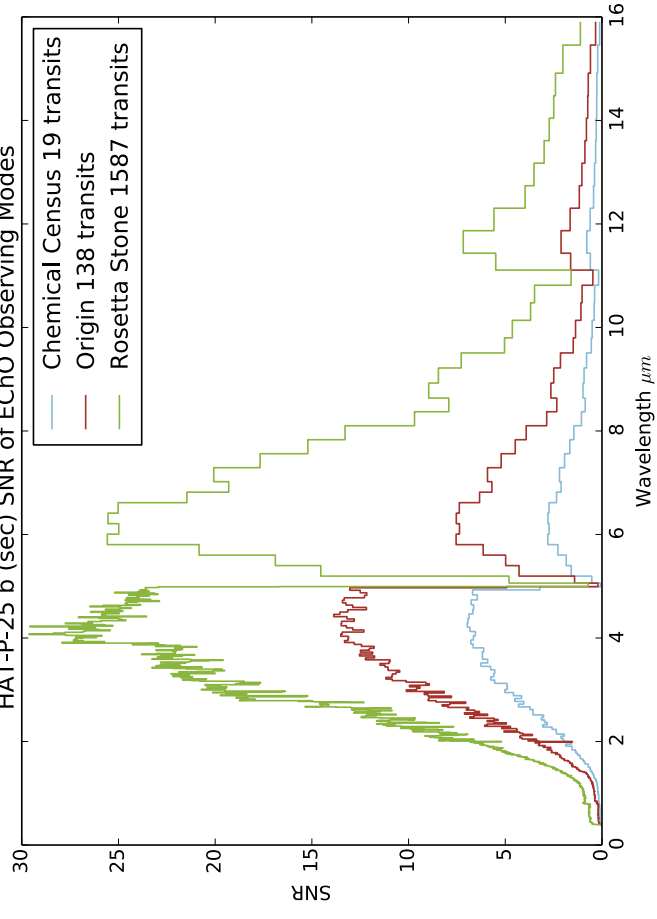
HAT-P-24 b (sec) SNR of EChO Observing Modes



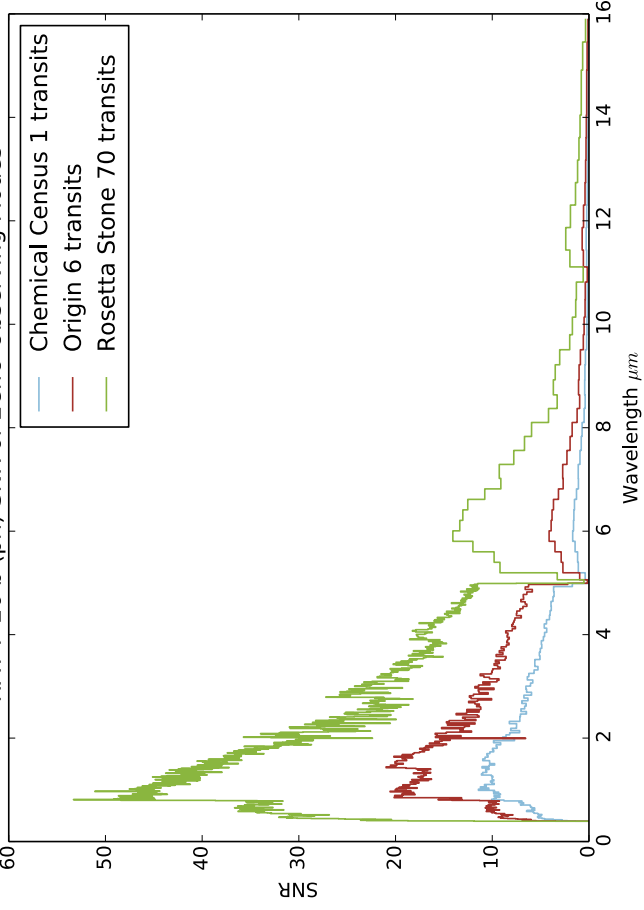
HAT-P-25 b (pri) SNR of EChO Observing Modes



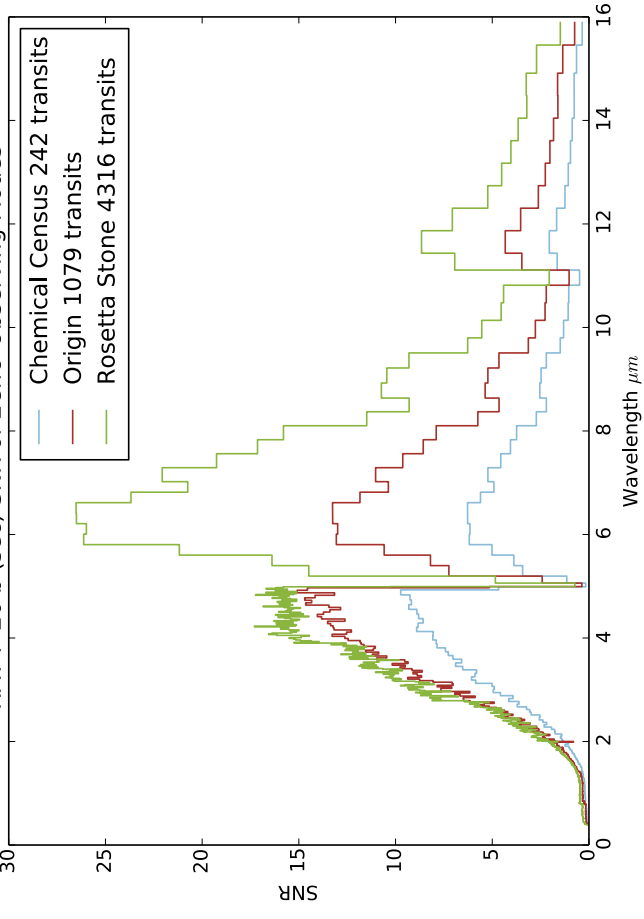
HAT-P-25 b (sec) SNR of EChO Observing Modes



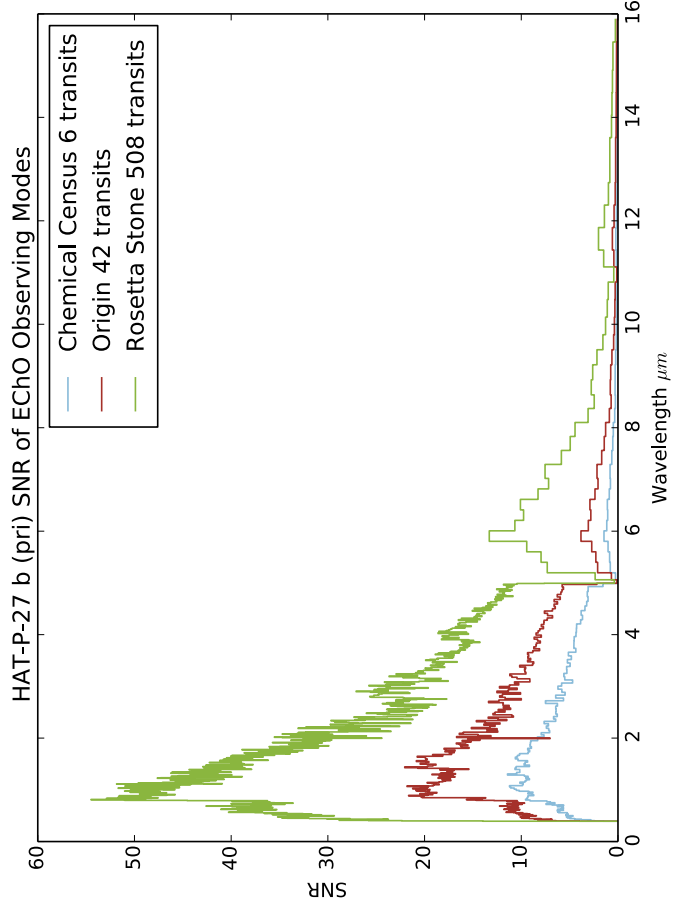
HAT-P-26 b (pri) SNR of EChO Observing Modes



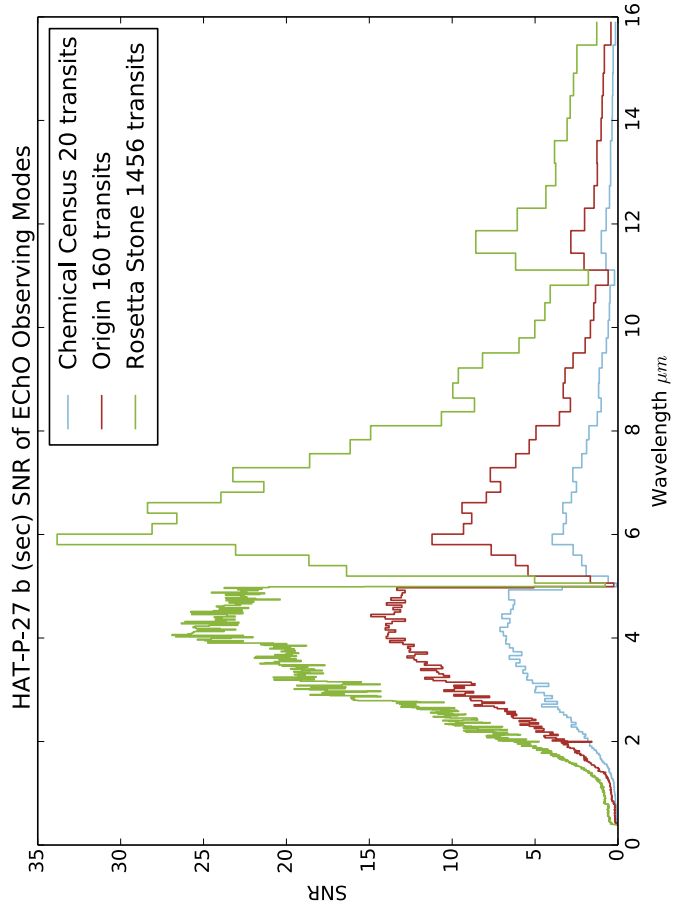
HAT-P-26 b (sec) SNR of EChO Observing Modes



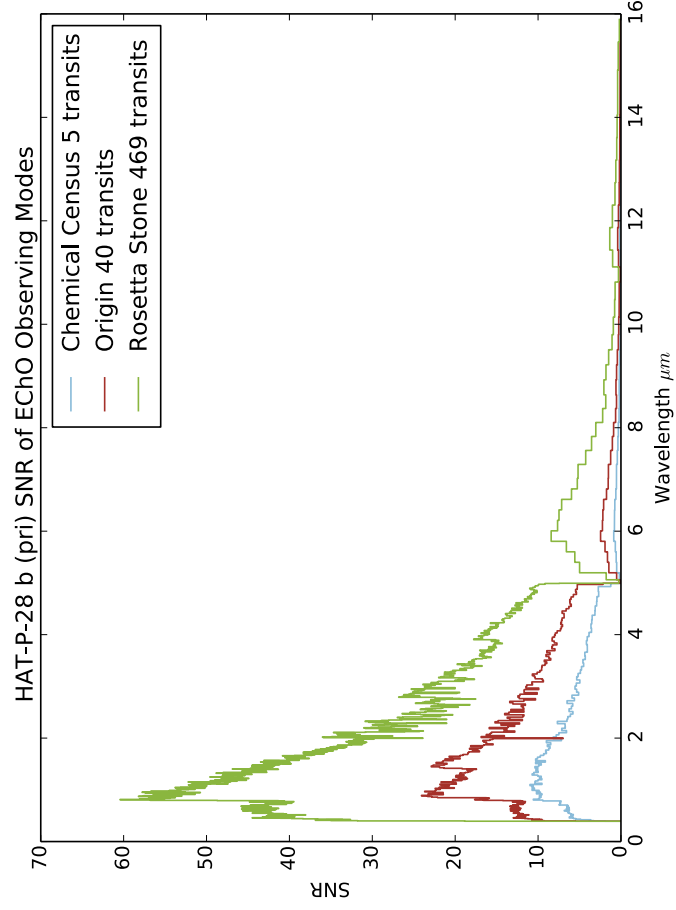
HAT-P-27 b (pri) SNR of EChO Observing Modes



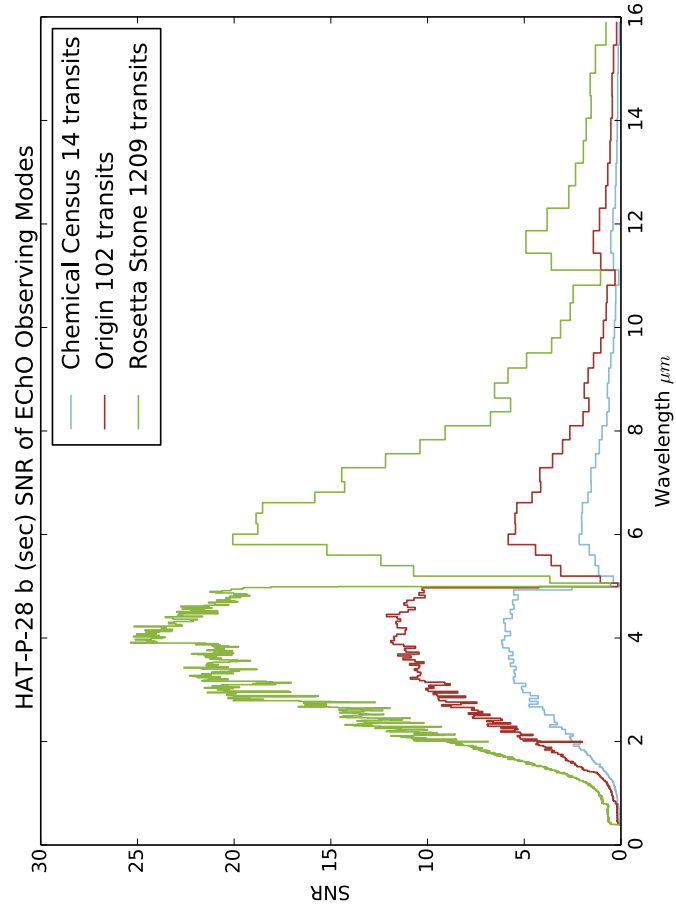
HAT-P-27 b (sec) SNR of EChO Observing Modes



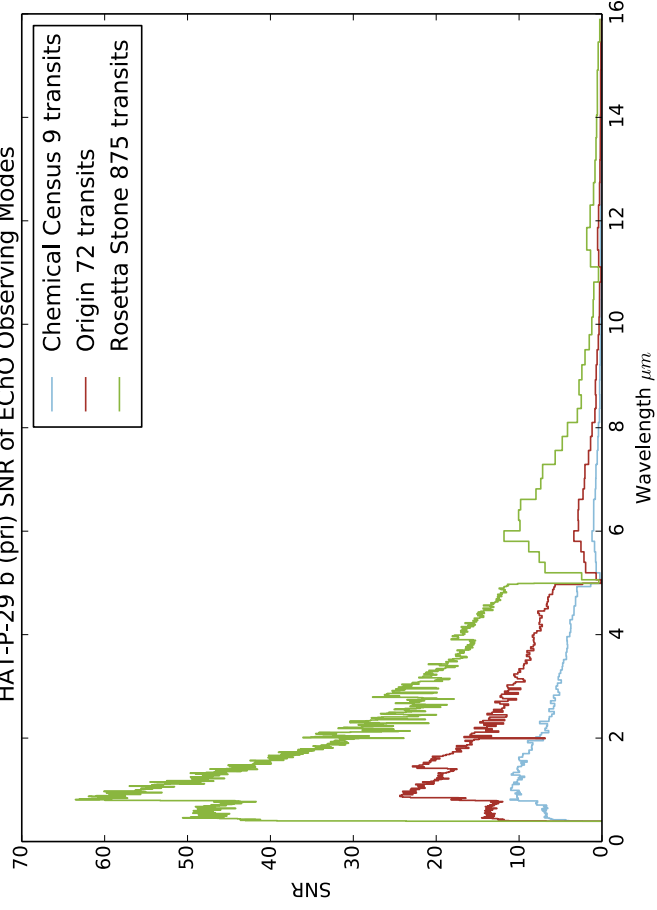
HAT-P-28 b (pri) SNR of EChO Observing Modes



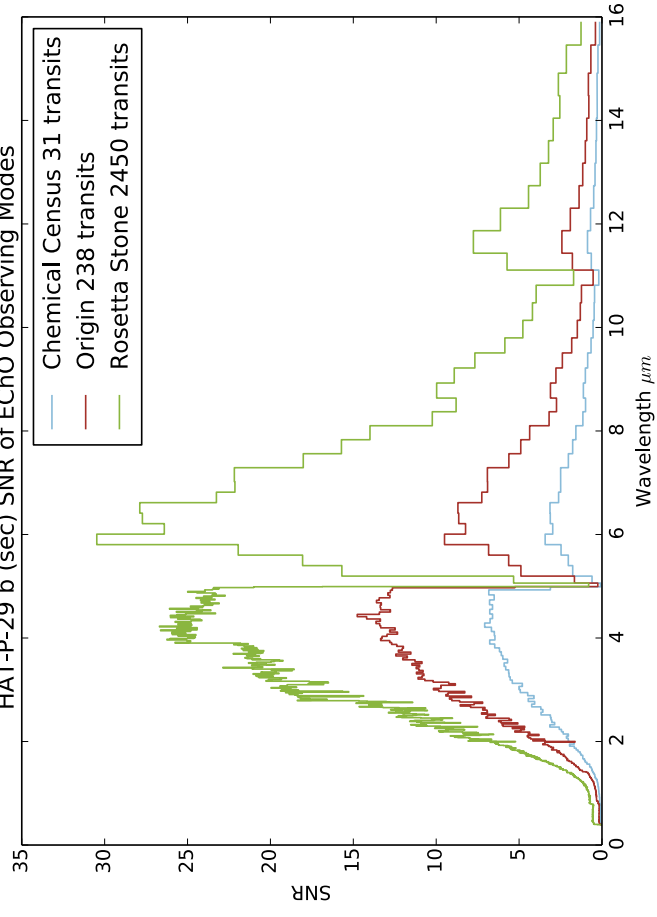
HAT-P-28 b (sec) SNR of EChO Observing Modes



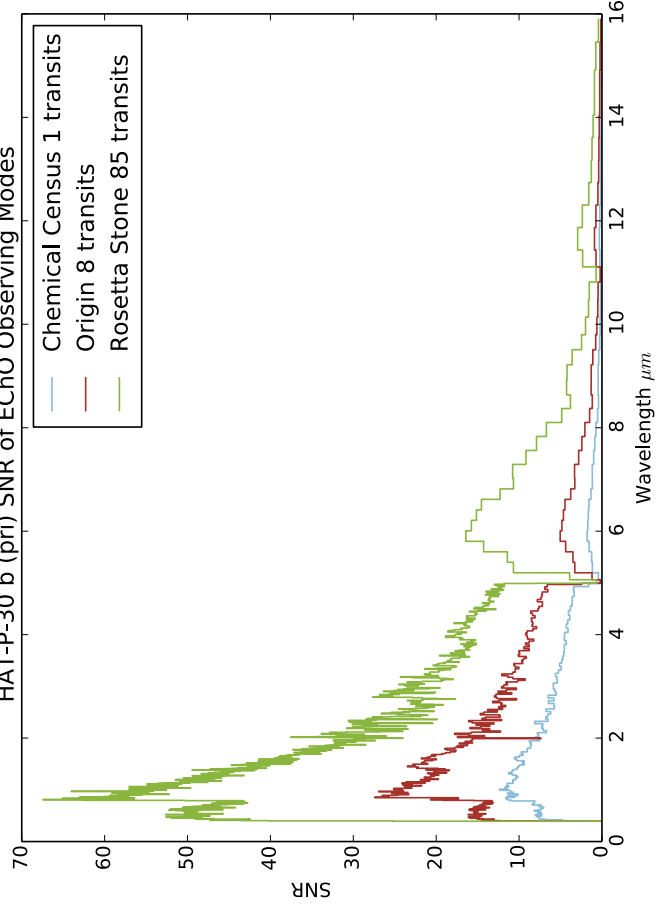
HAT-P-29 b (pri) SNR of EChO Observing Modes



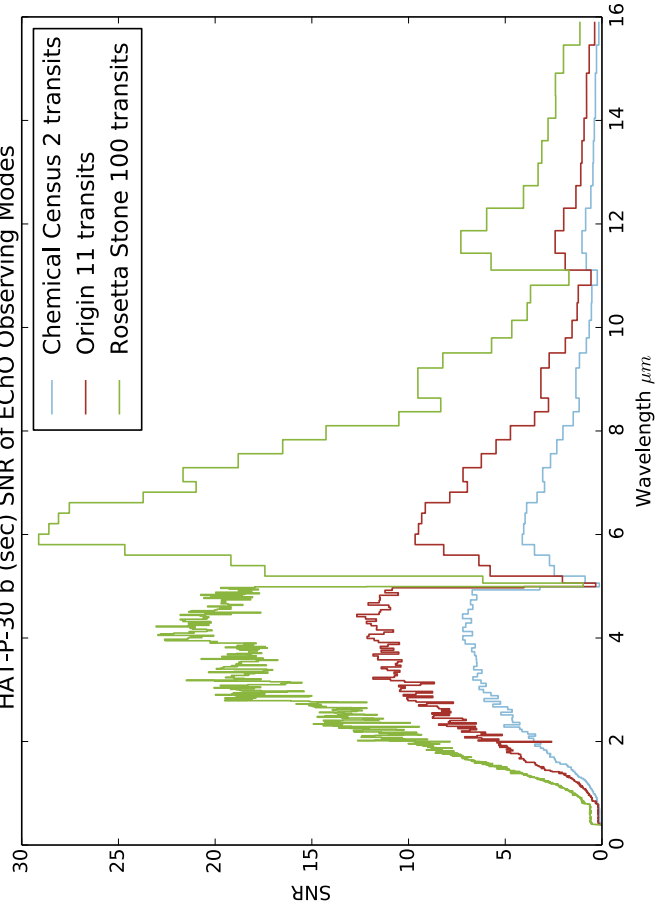
HAT-P-29 b (sec) SNR of EChO Observing Modes

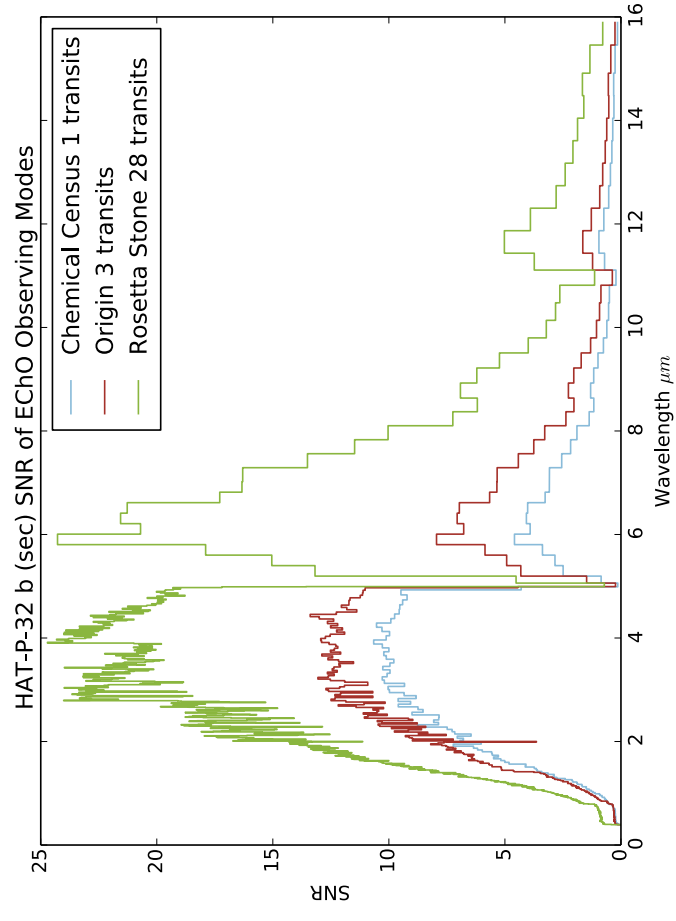
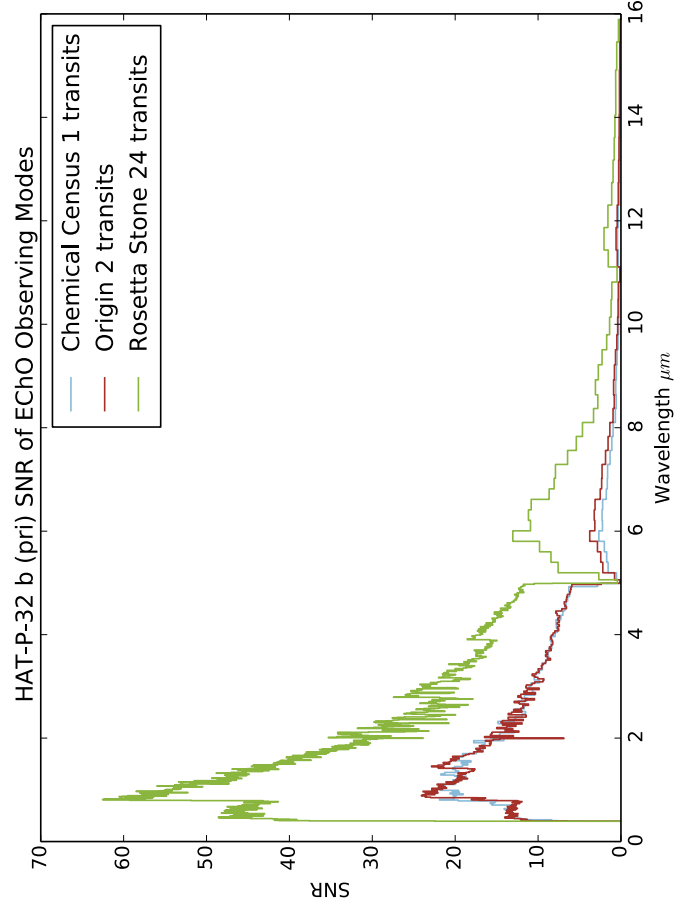
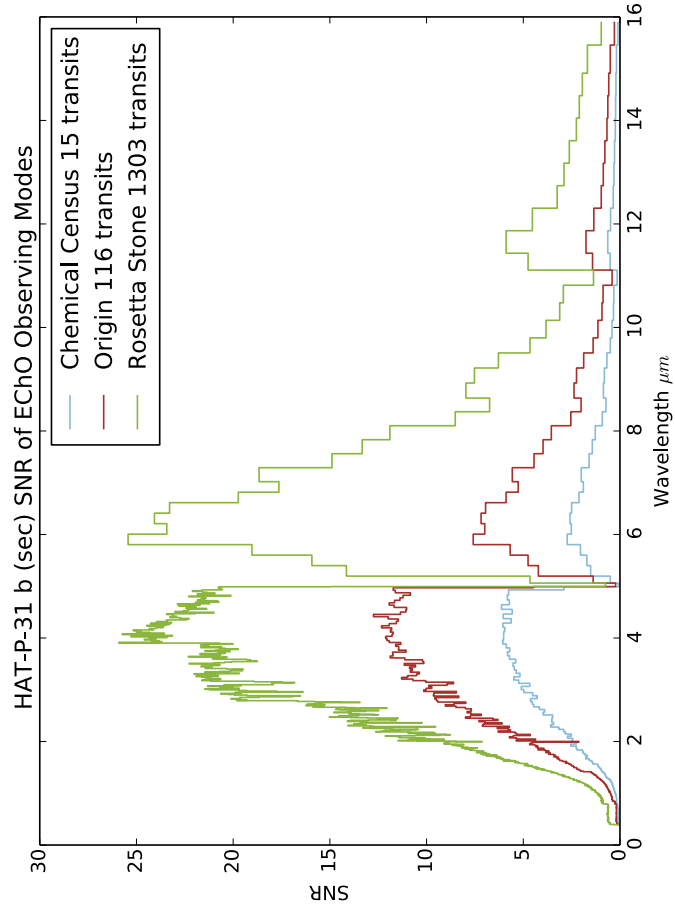
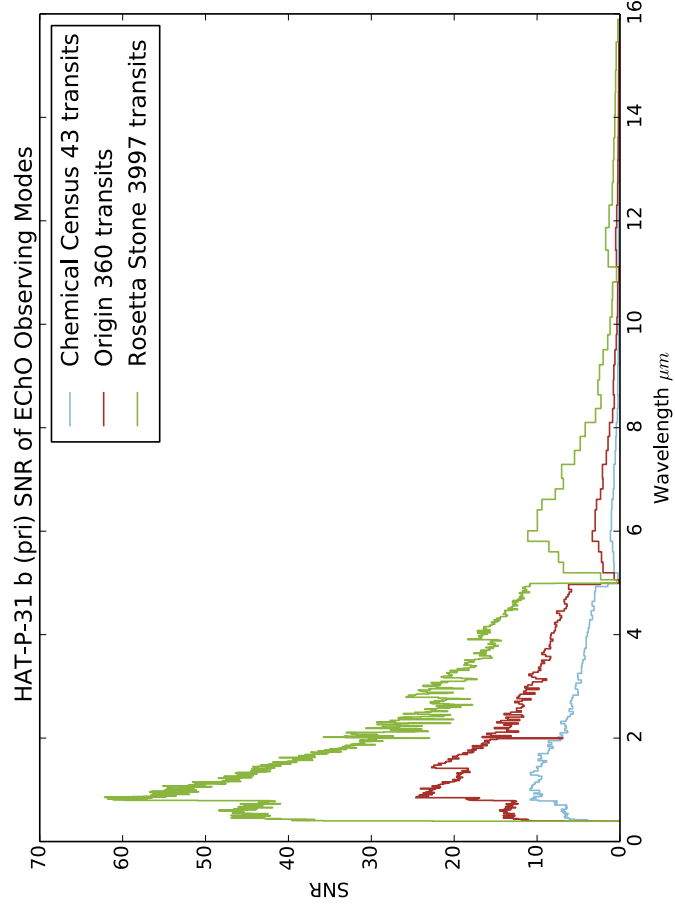


HAT-P-30 b (pri) SNR of EChO Observing Modes



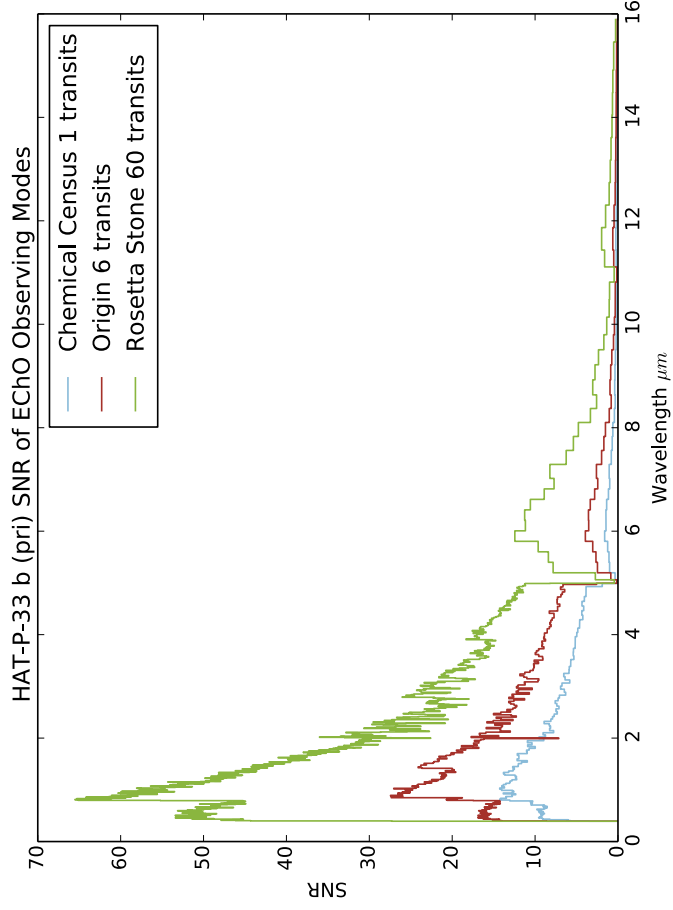
HAT-P-30 b (sec) SNR of EChO Observing Modes



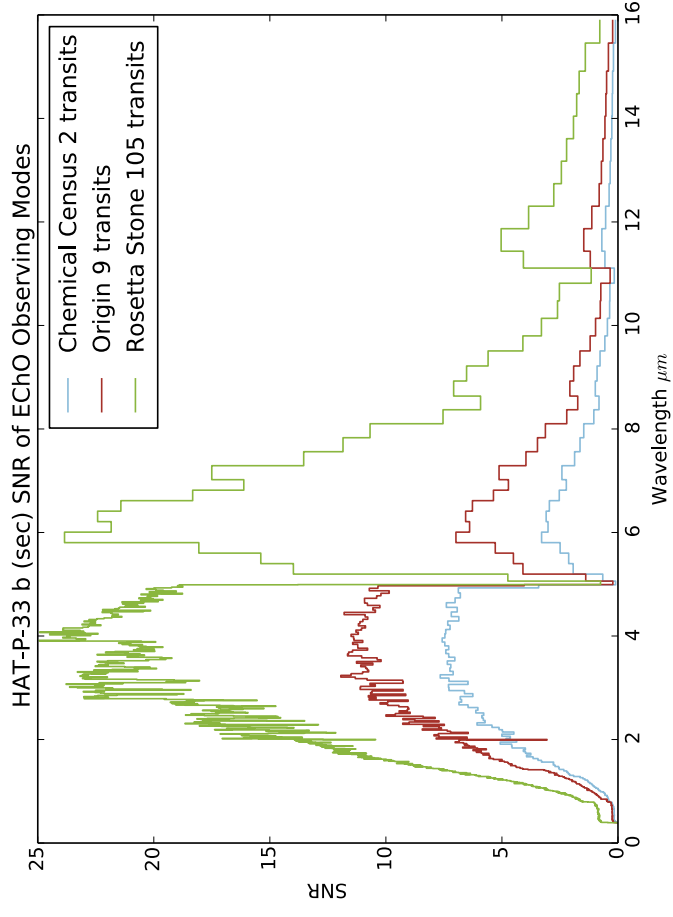




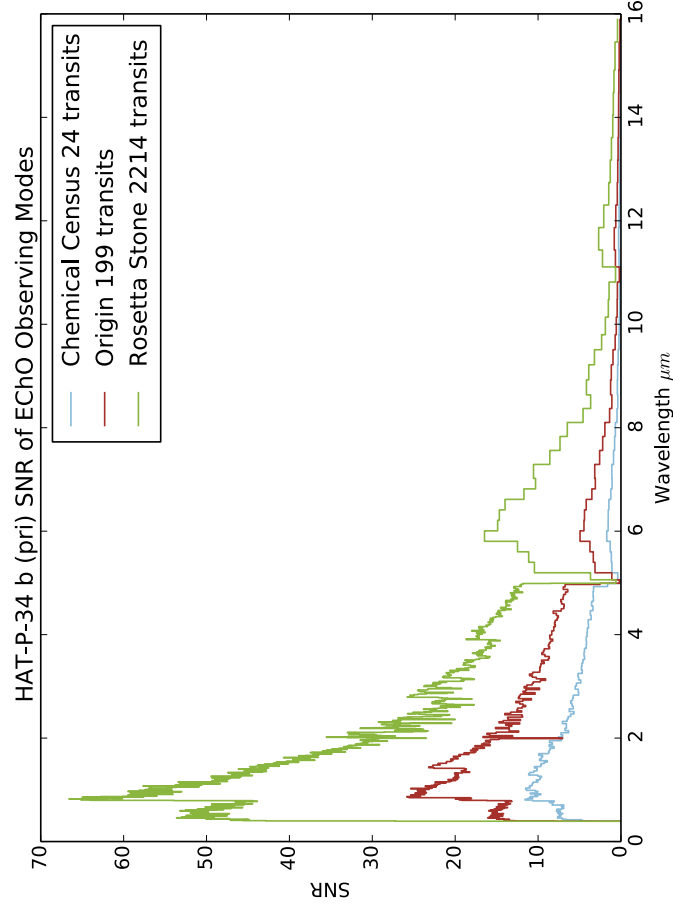
HAT-P-33 b (pri) SNR of EChO Observing Modes



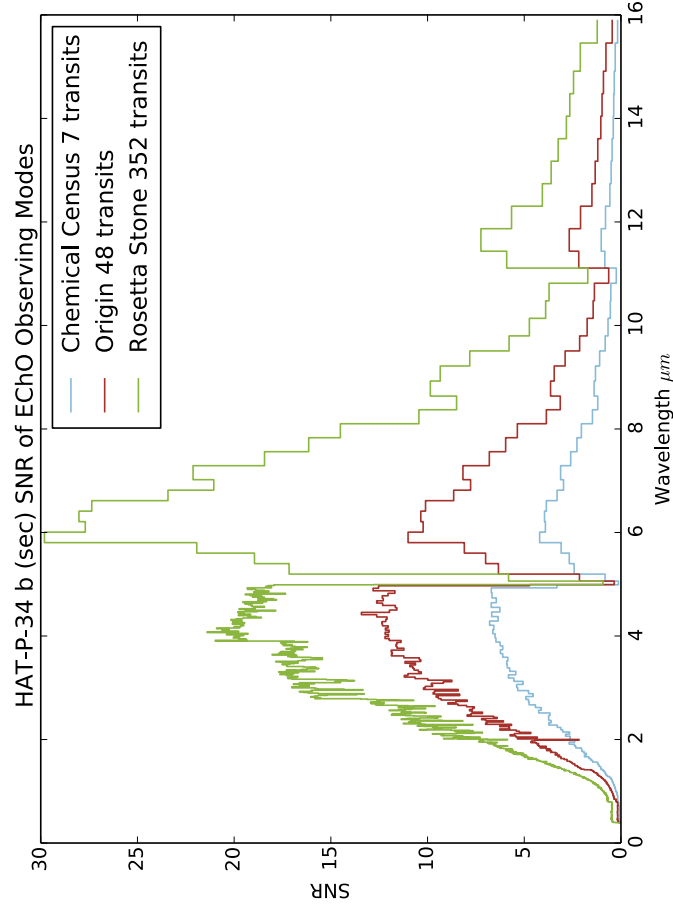
HAT-P-33 b (sec) SNR of EChO Observing Modes



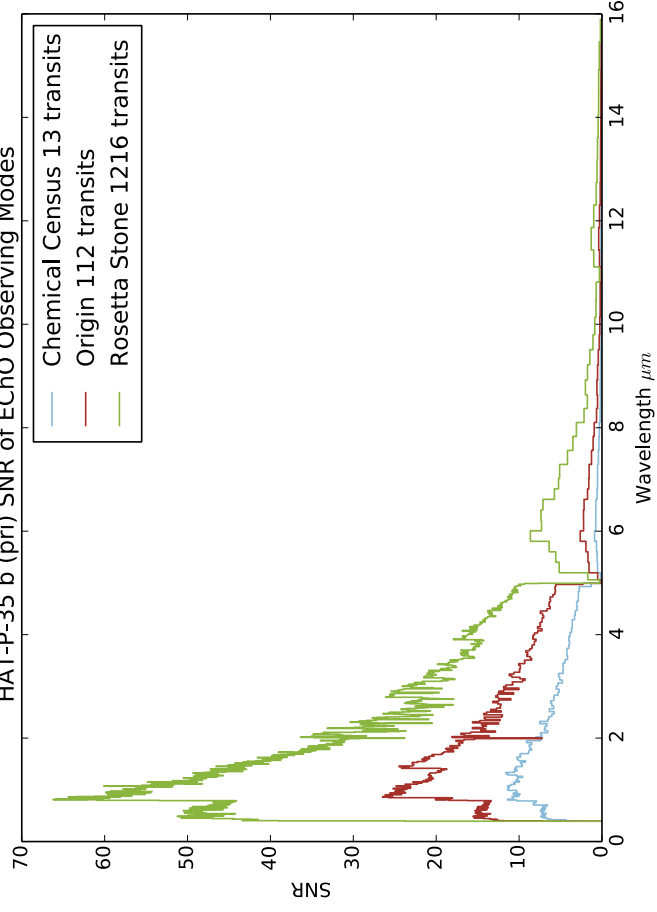
HAT-P-34 b (pri) SNR of EChO Observing Modes



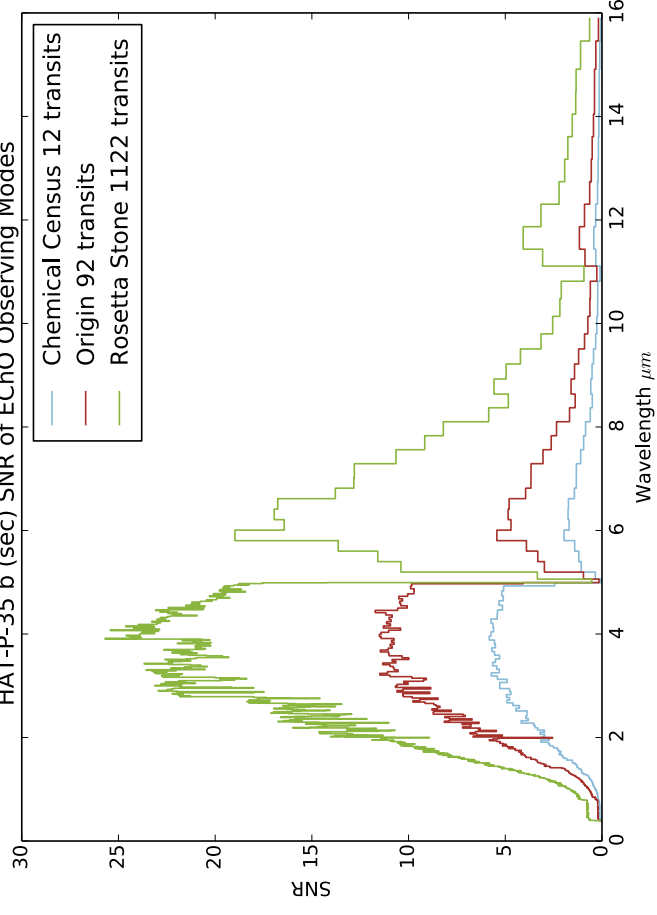
HAT-P-34 b (sec) SNR of EChO Observing Modes



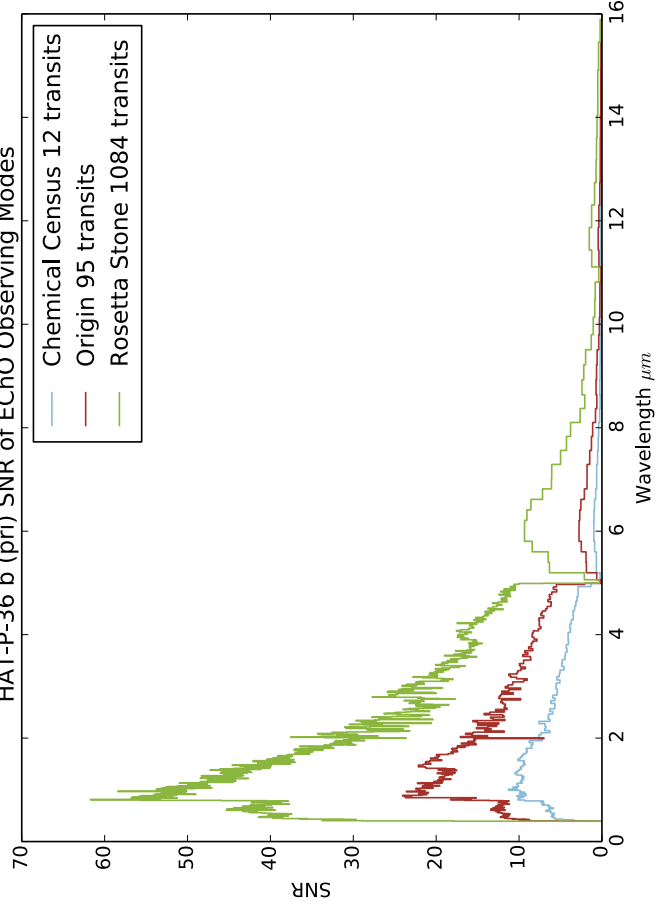
HAT-P-35 b (pri) SNR of EChO Observing Modes



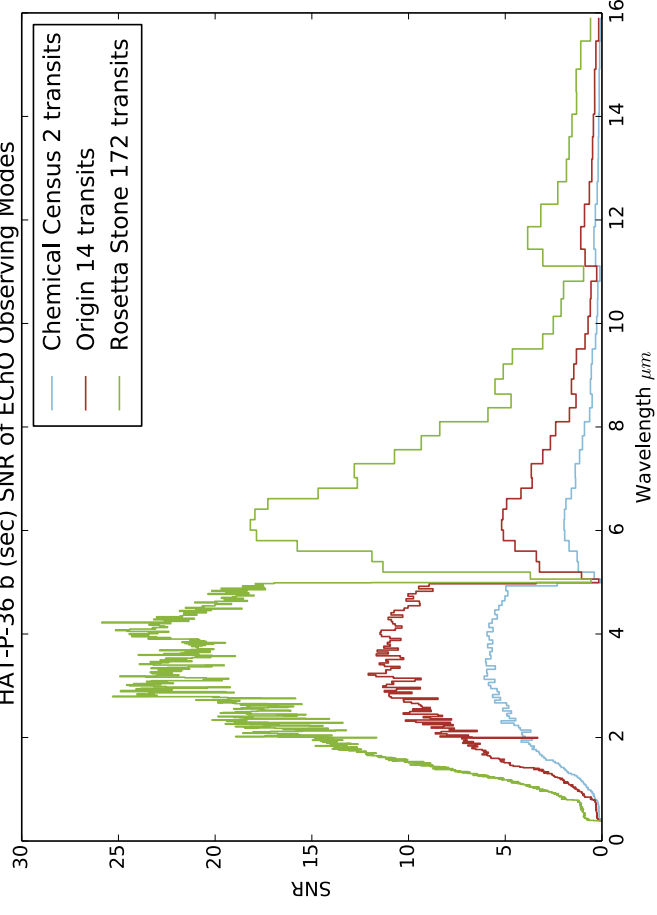
HAT-P-35 b (sec) SNR of EChO Observing Modes



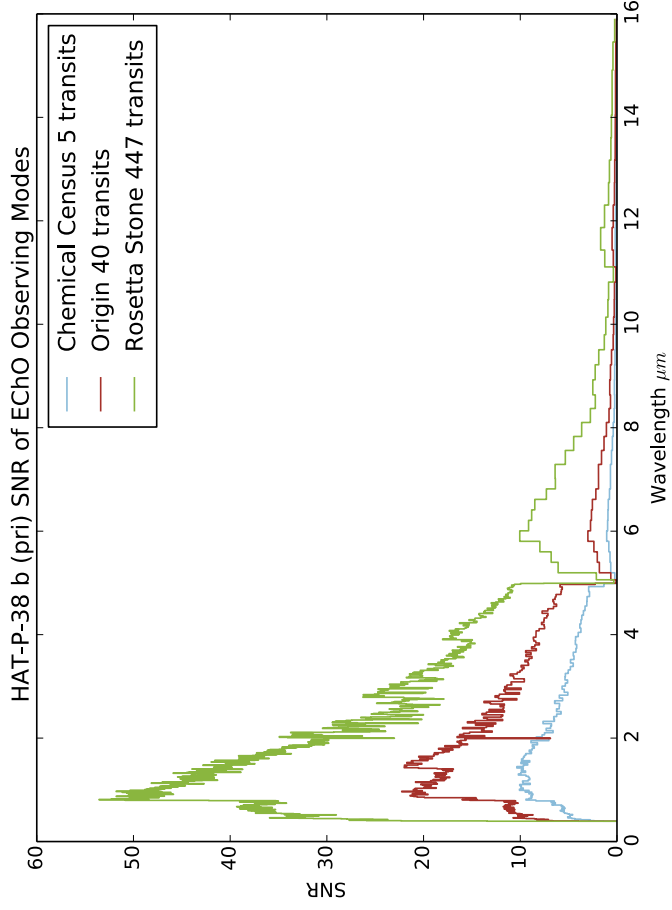
HAT-P-36 b (pri) SNR of EChO Observing Modes



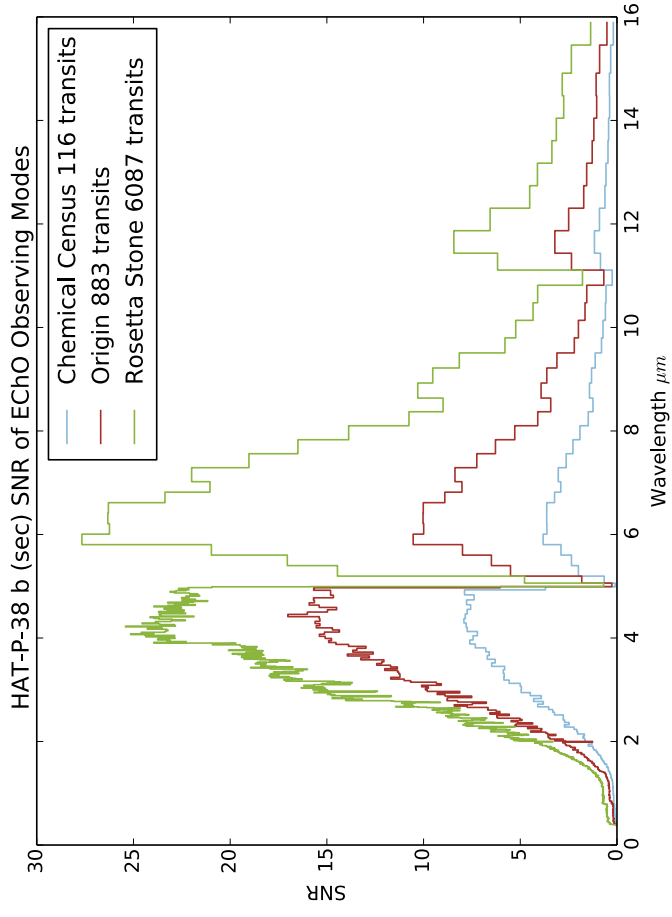
HAT-P-36 b (sec) SNR of EChO Observing Modes



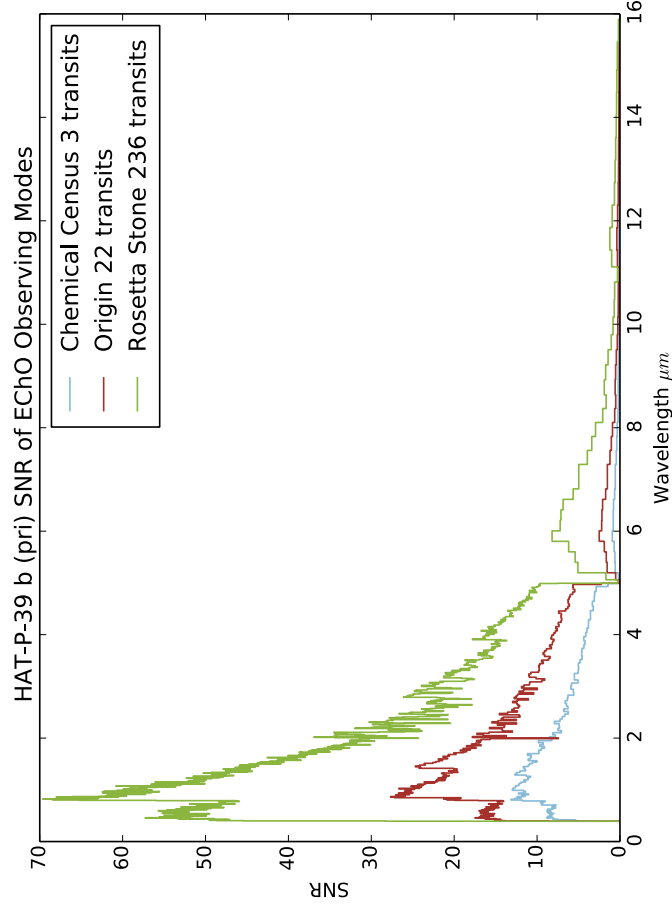
HAT-P-38 b (pri) SNR of EChO Observing Modes



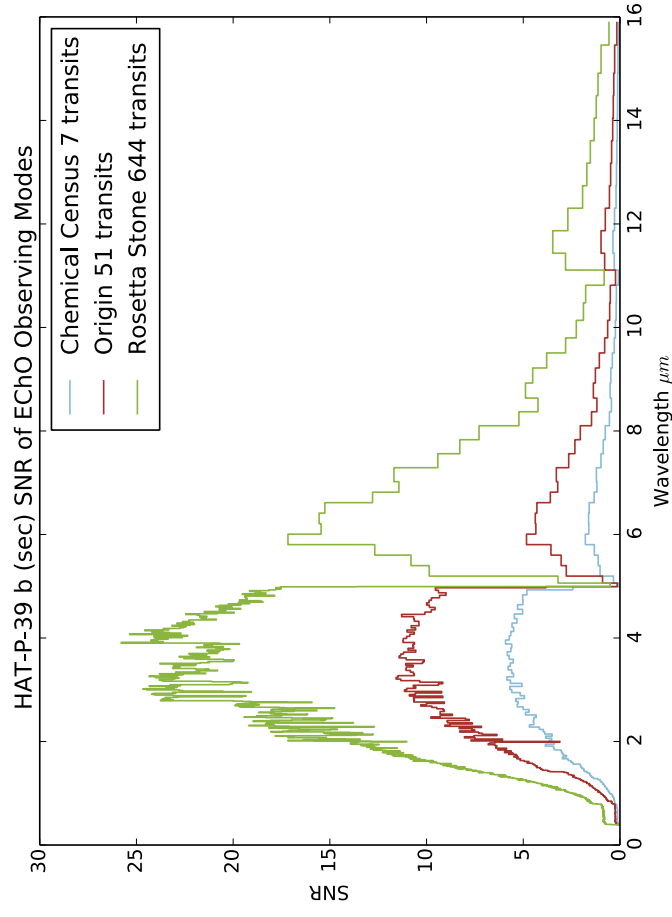
HAT-P-38 b (sec) SNR of EChO Observing Modes

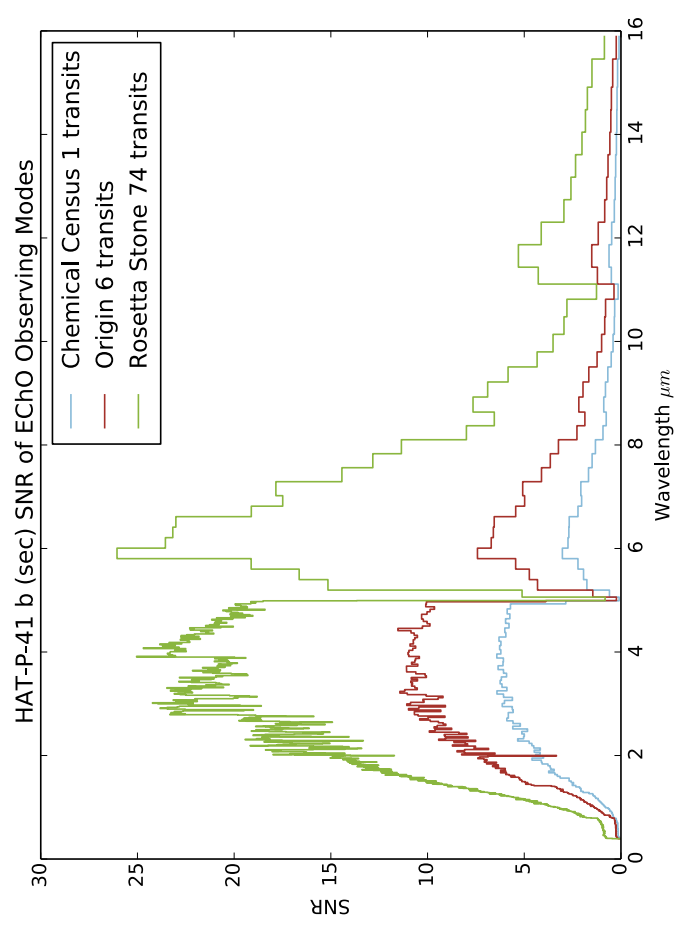
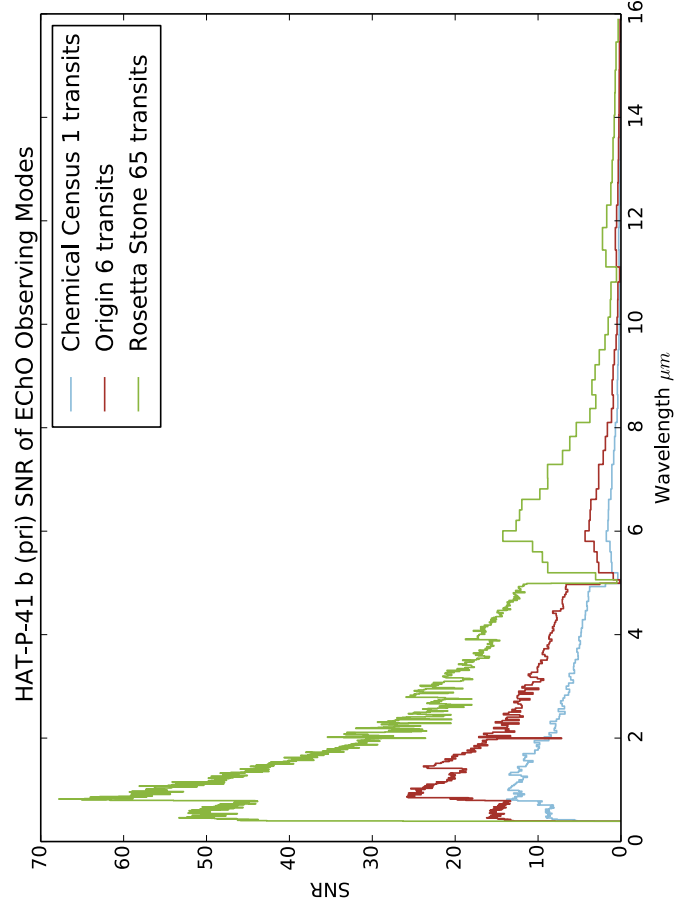
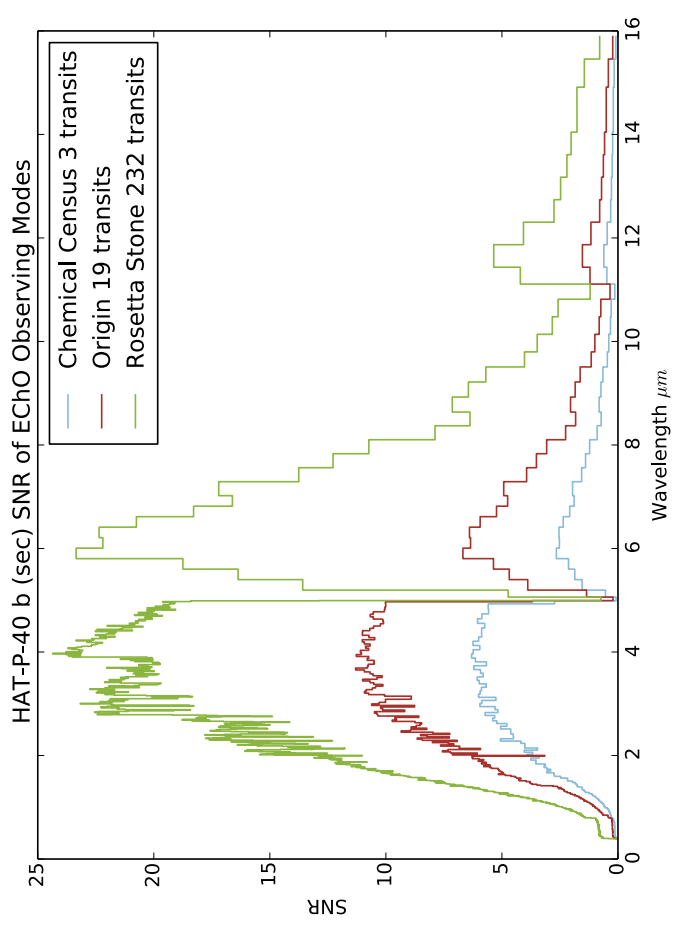
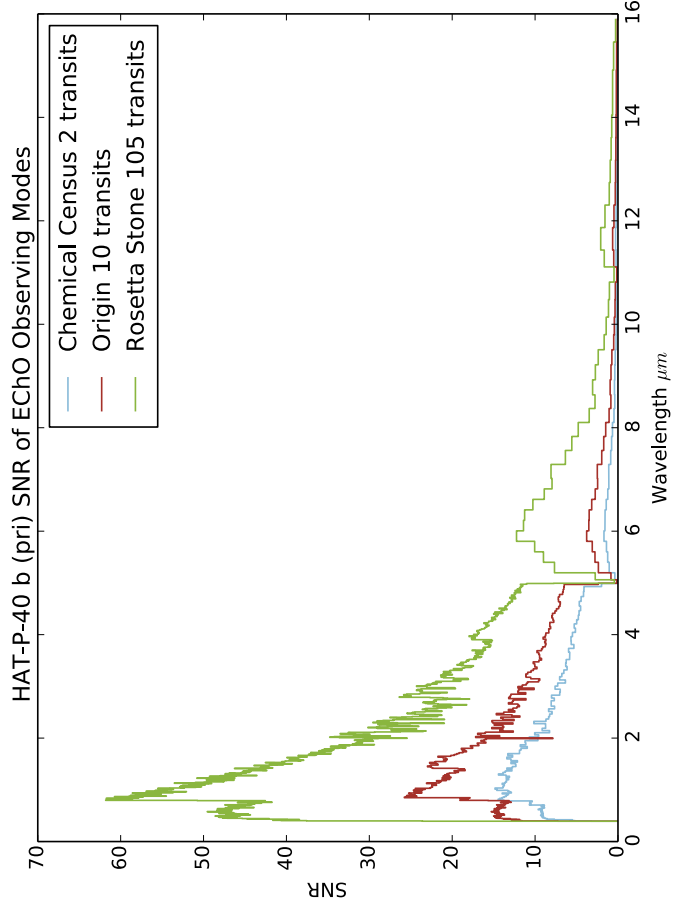


HAT-P-39 b (pri) SNR of EChO Observing Modes

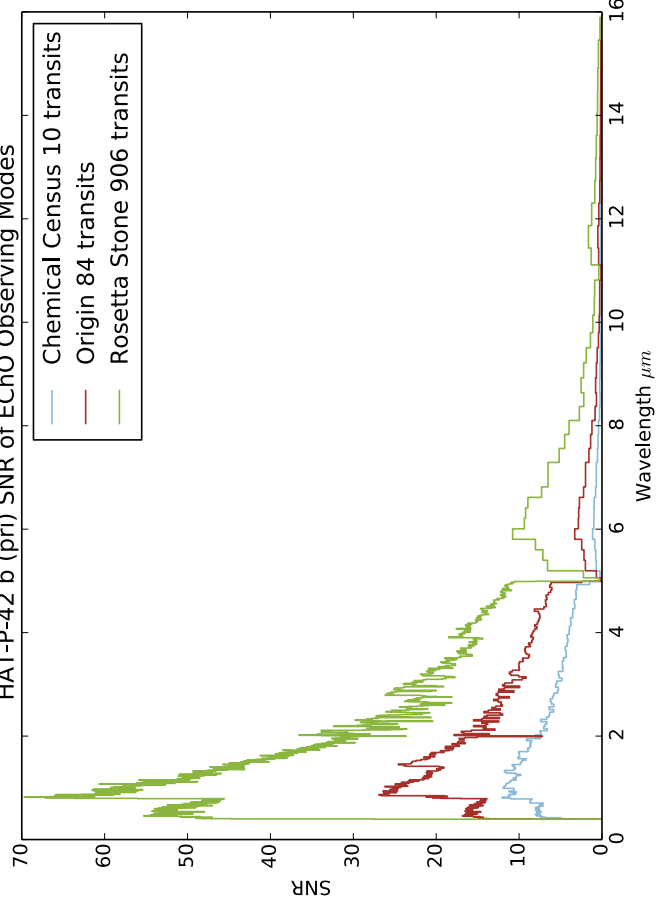


HAT-P-39 b (sec) SNR of EChO Observing Modes

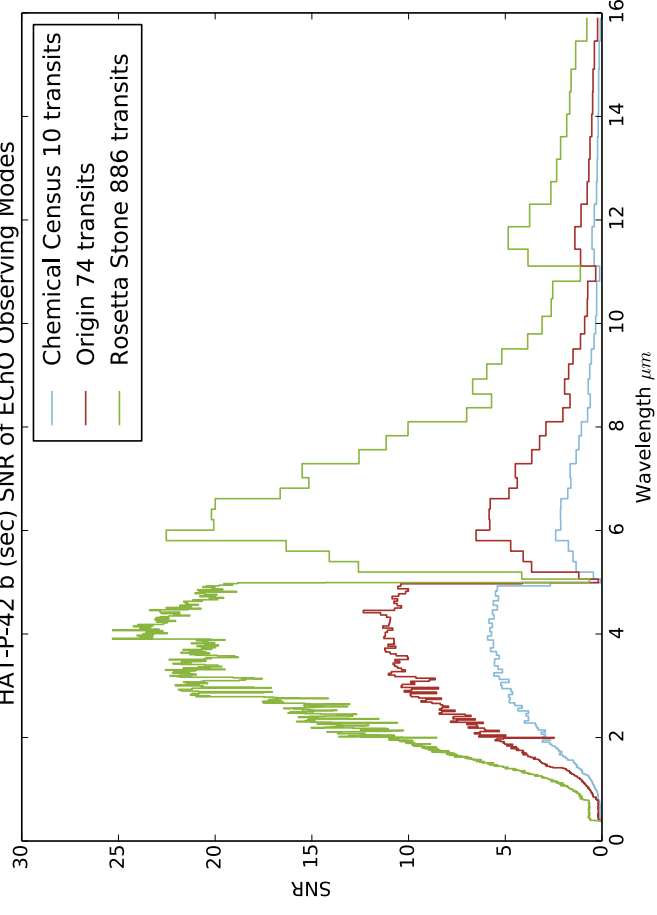




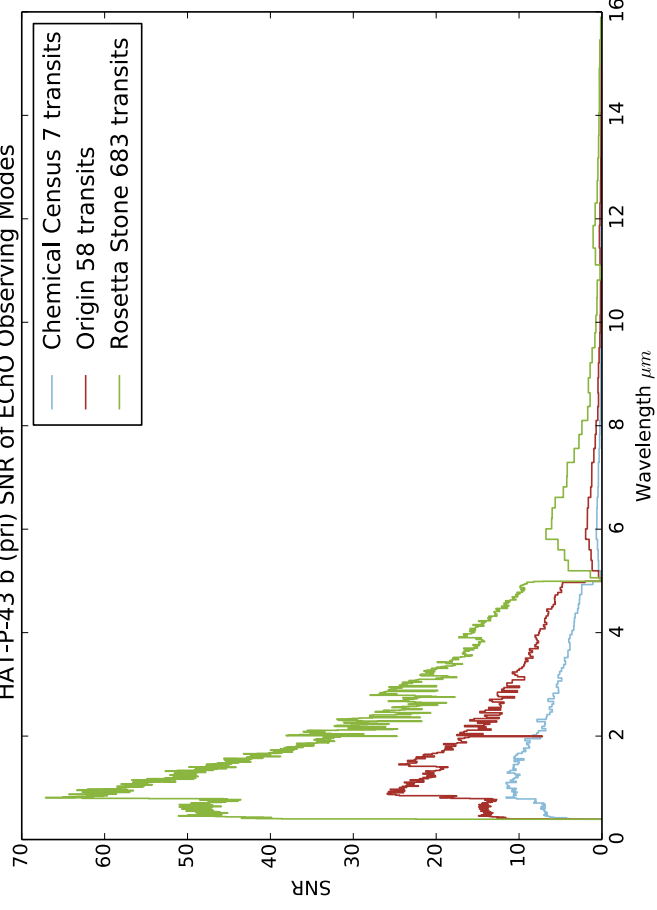
HAT-P-42 b (pri) SNR of EChO Observing Modes



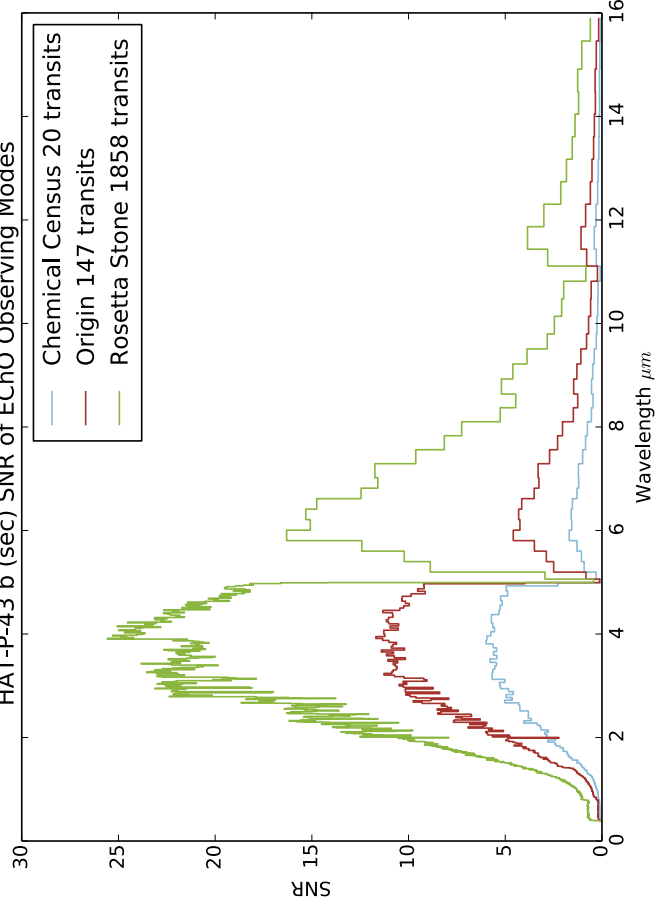
HAT-P-42 b (sec) SNR of EChO Observing Modes



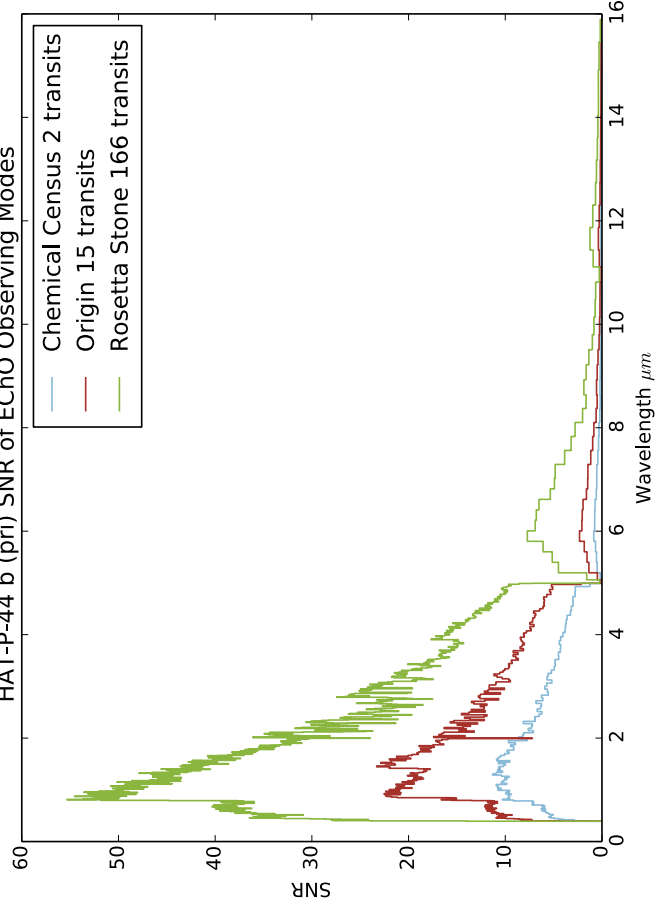
HAT-P-43 b (pri) SNR of EChO Observing Modes



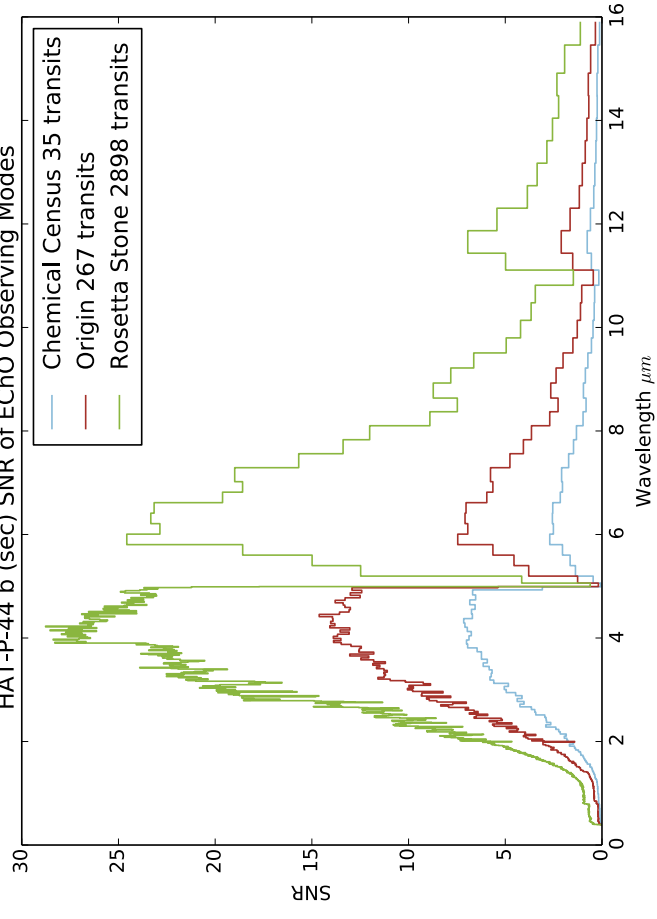
HAT-P-43 b (sec) SNR of EChO Observing Modes



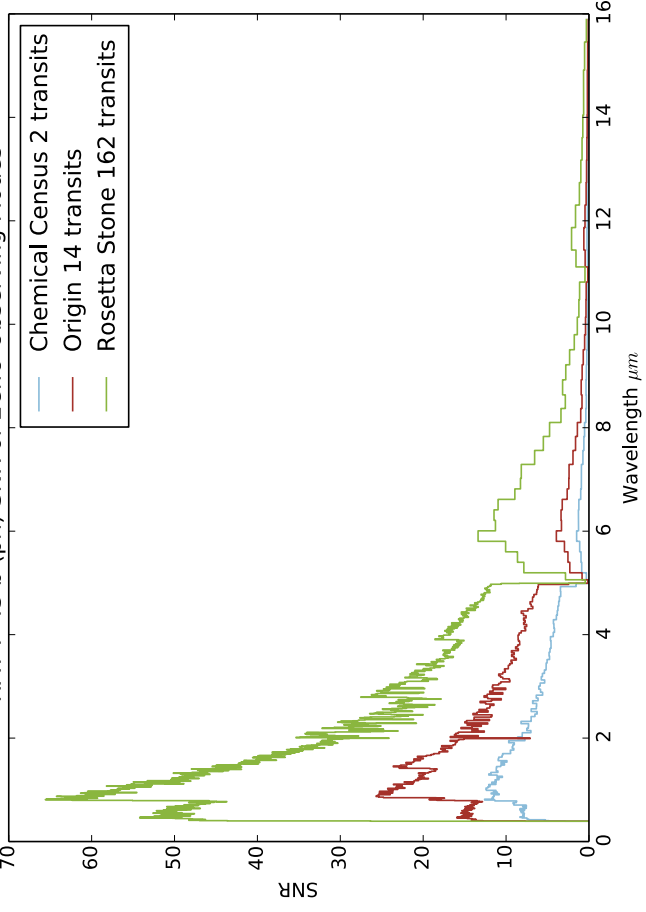
HAT-P-44 b (pri) SNR of EChO Observing Modes



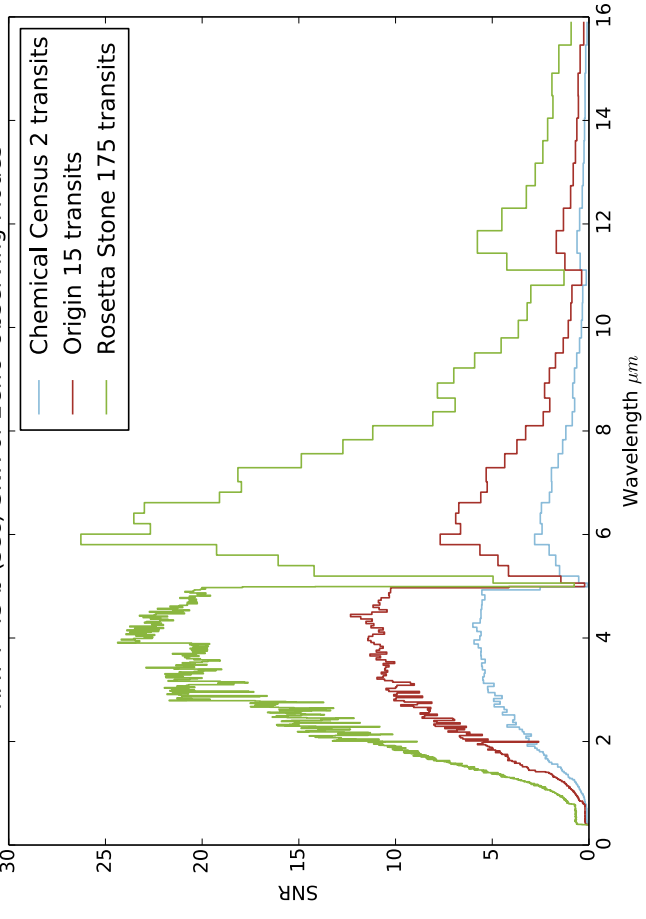
HAT-P-44 b (sec) SNR of EChO Observing Modes



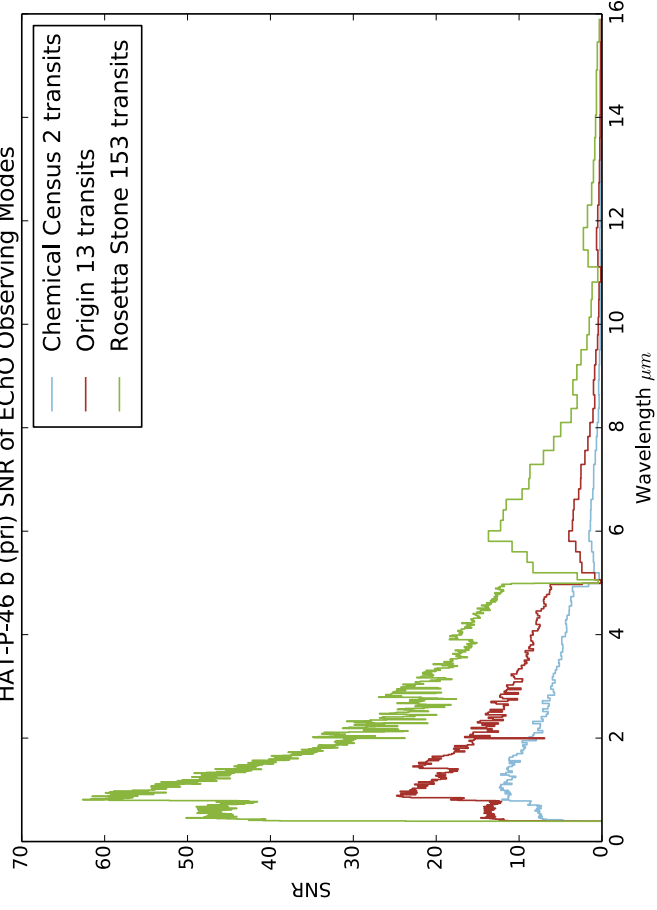
HAT-P-45 b (pri) SNR of EChO Observing Modes



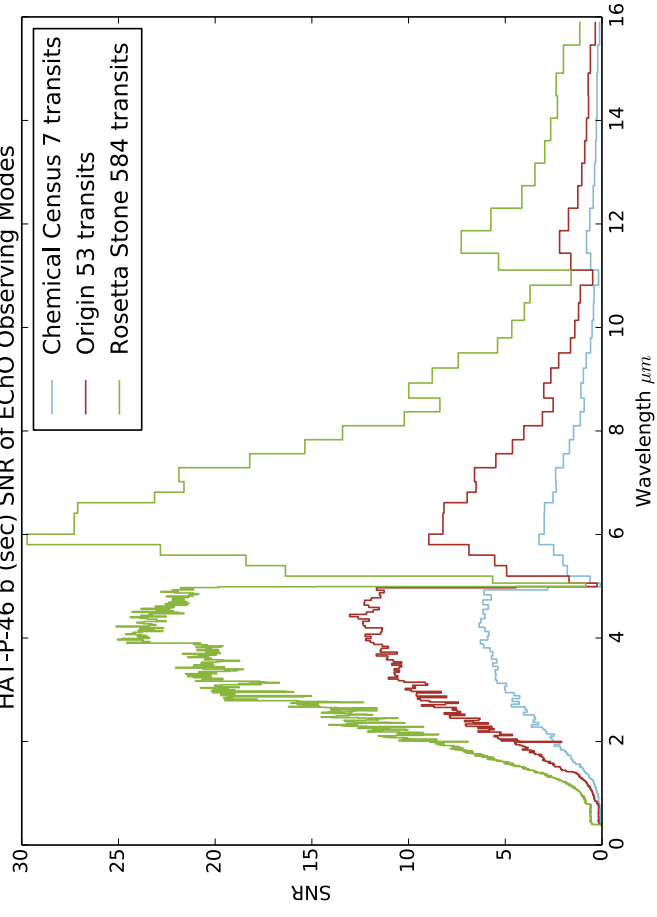
HAT-P-45 b (sec) SNR of EChO Observing Modes



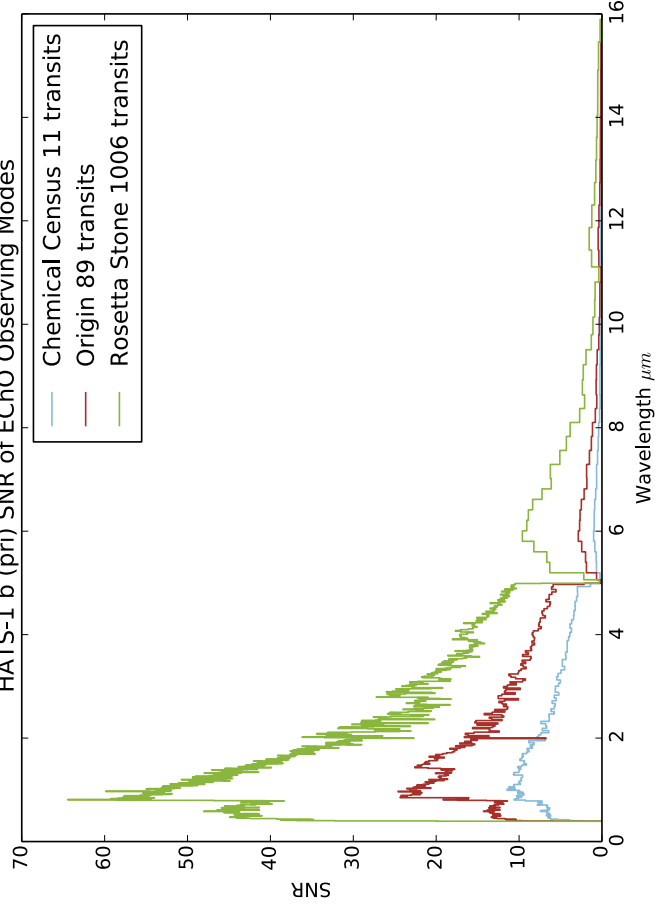
HAT-P-46 b (pri) SNR of EChO Observing Modes



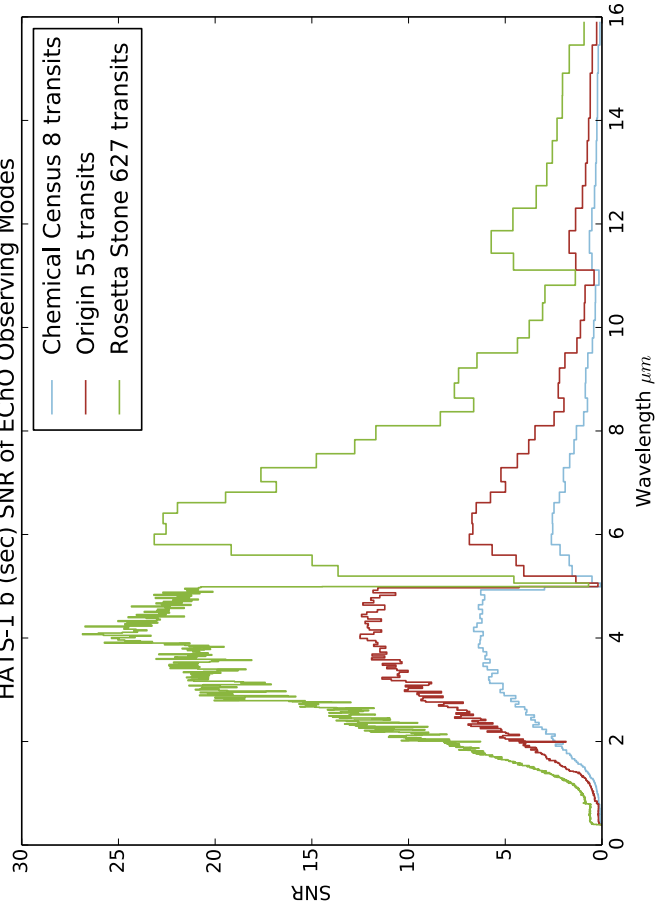
HAT-P-46 b (sec) SNR of EChO Observing Modes



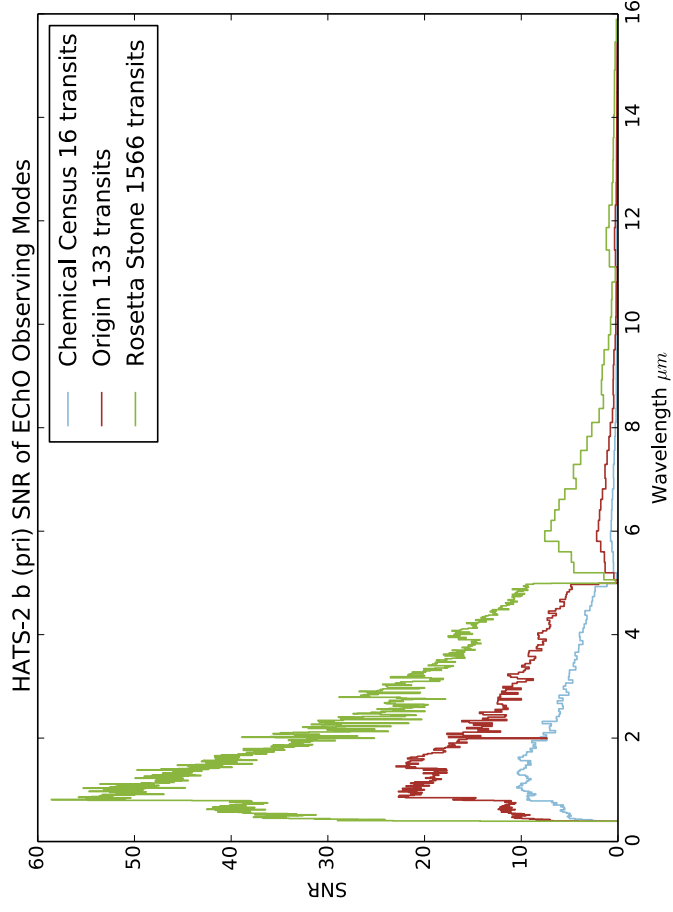
HATS-1 b (pri) SNR of EChO Observing Modes



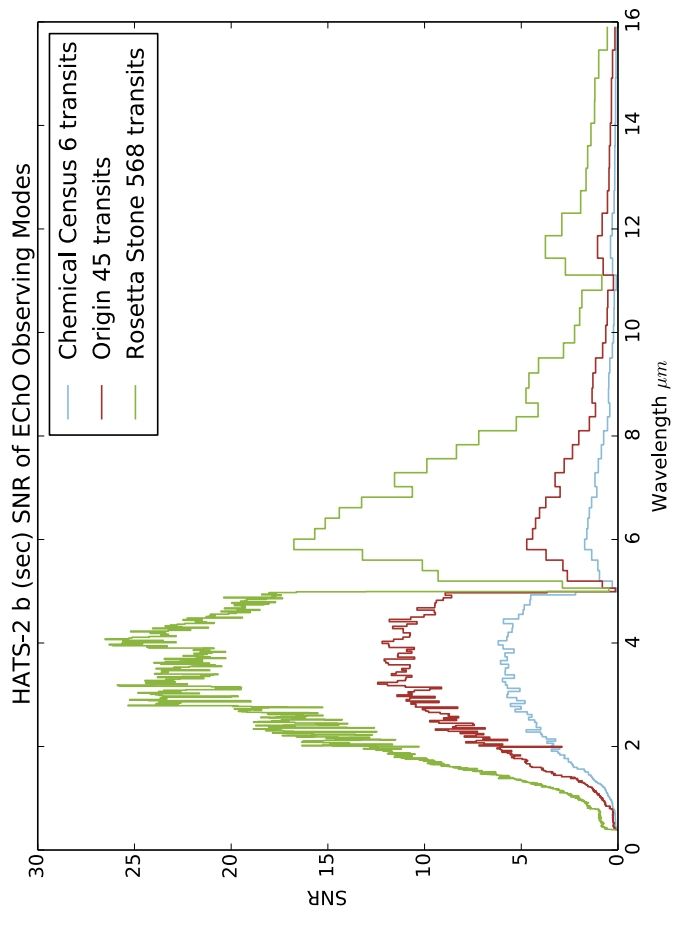
HATS-1 b (sec) SNR of EChO Observing Modes



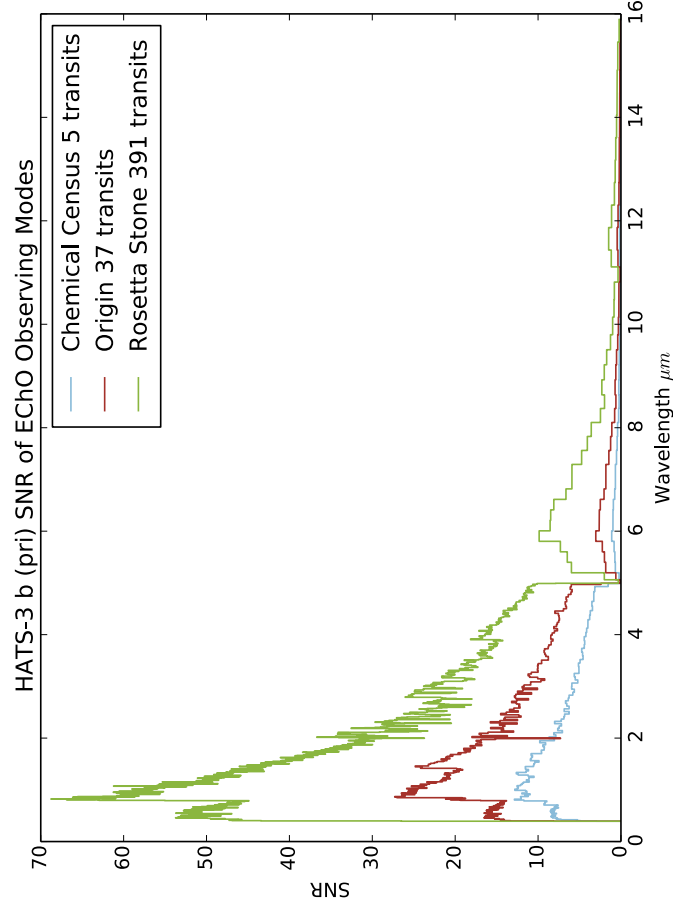
HATS-2 b (pri) SNR of EChO Observing Modes



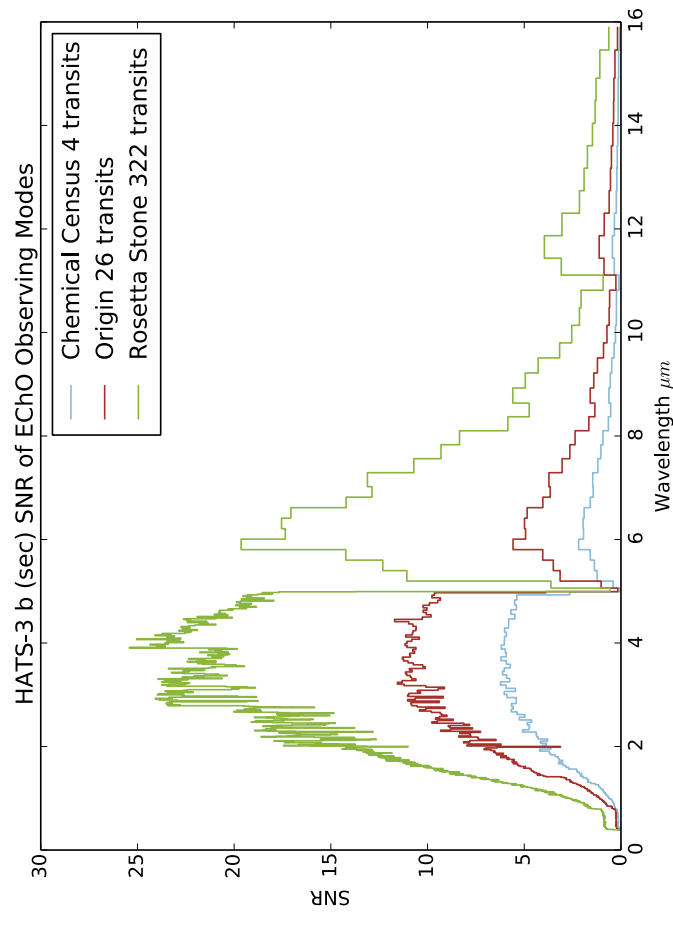
HATS-2 b (sec) SNR of EChO Observing Modes



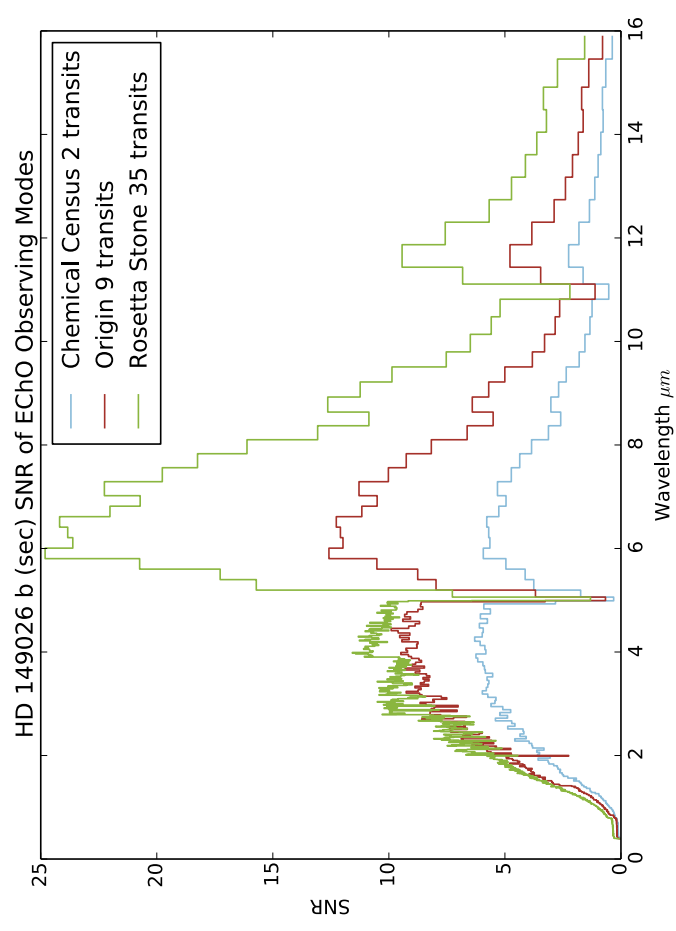
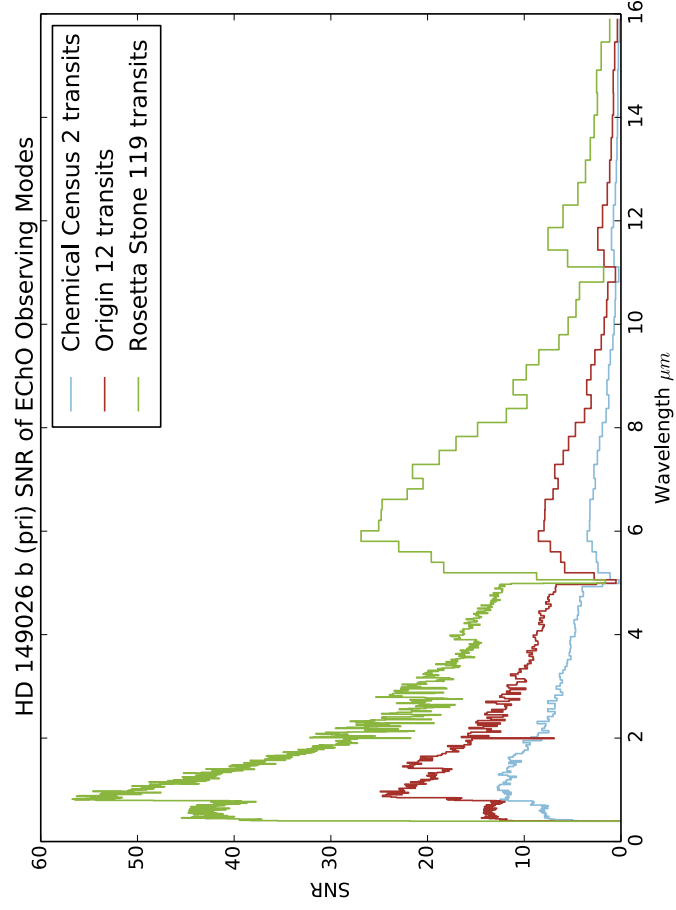
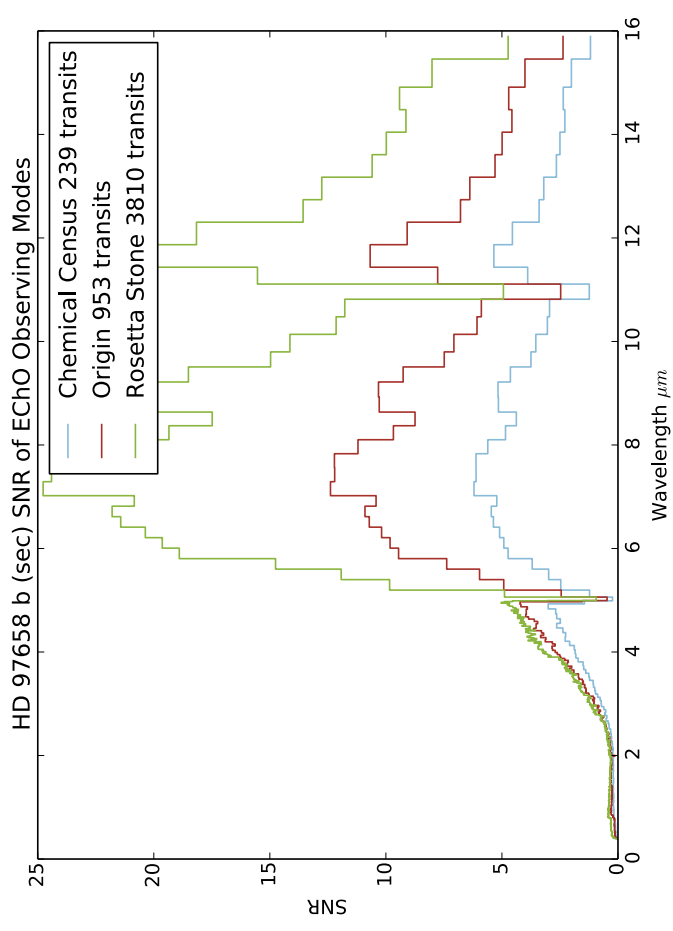
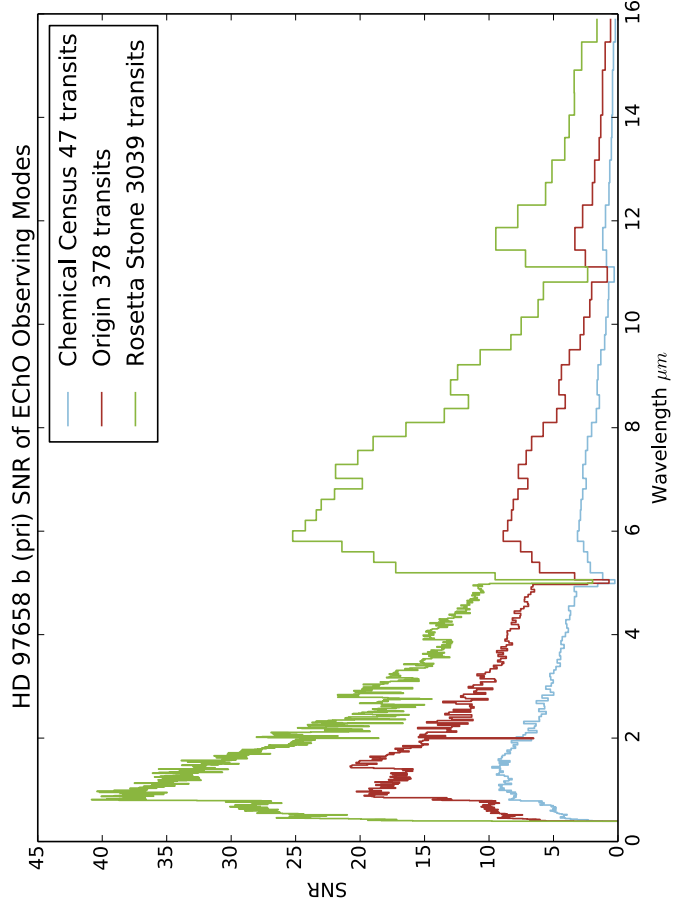
HATS-3 b (pri) SNR of EChO Observing Modes

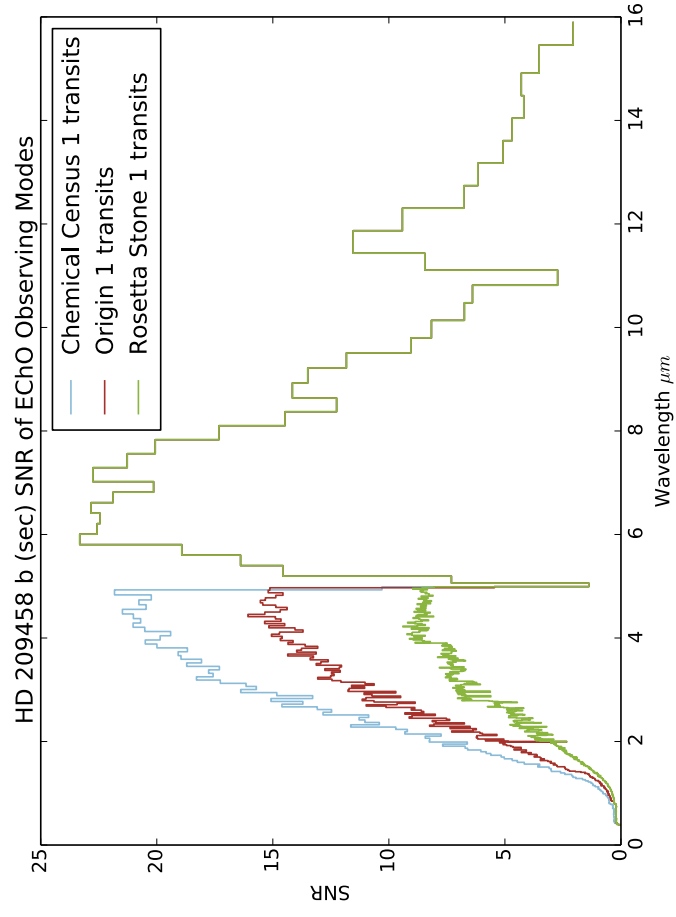
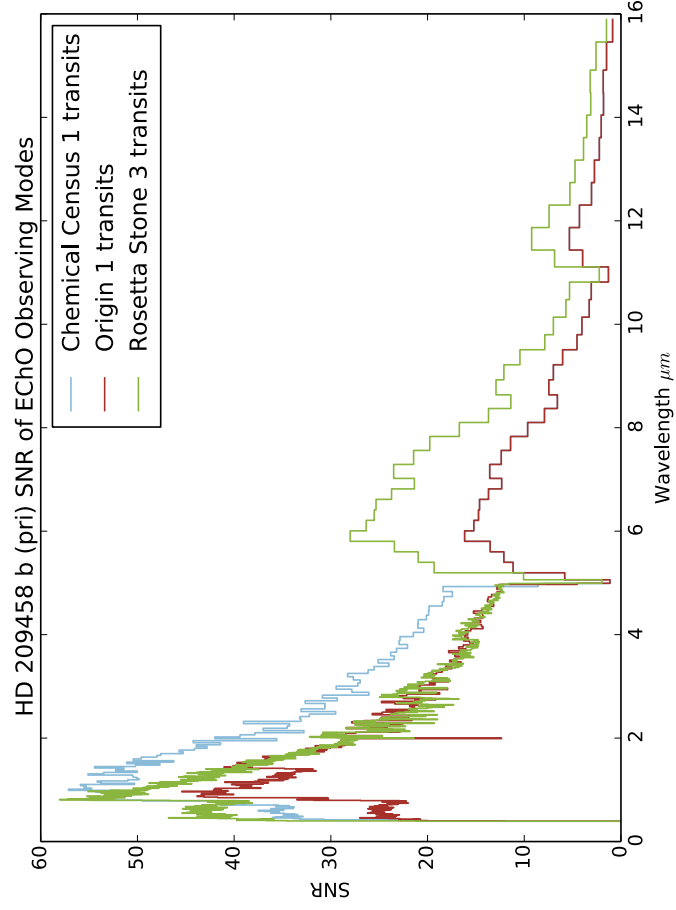
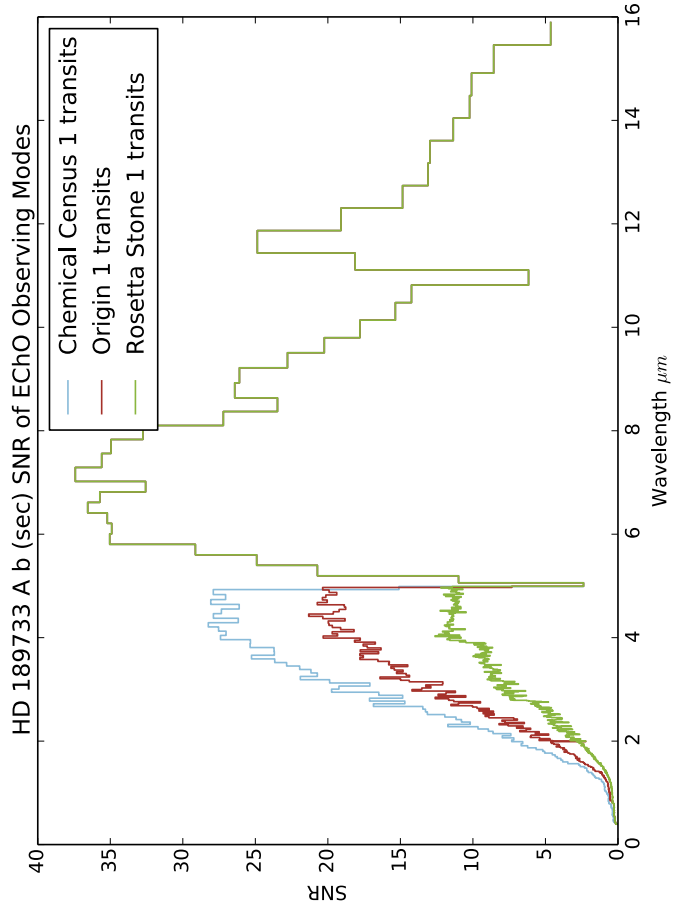
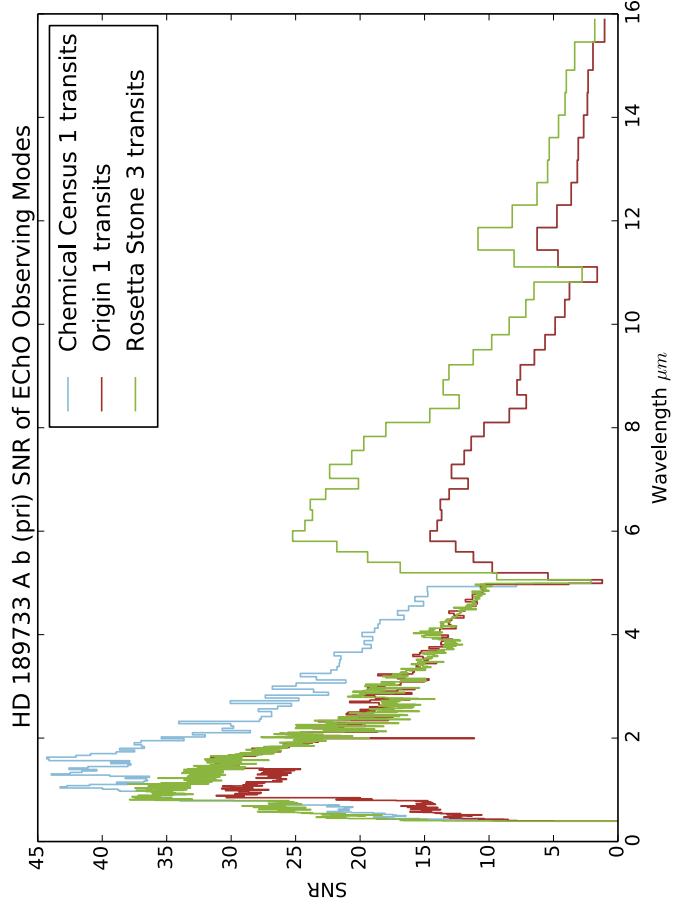


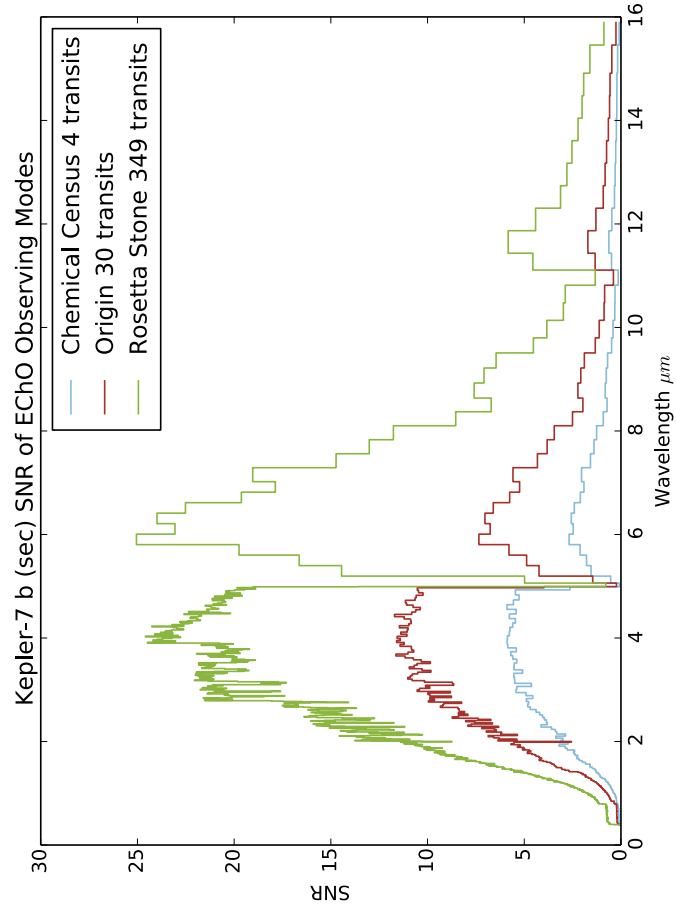
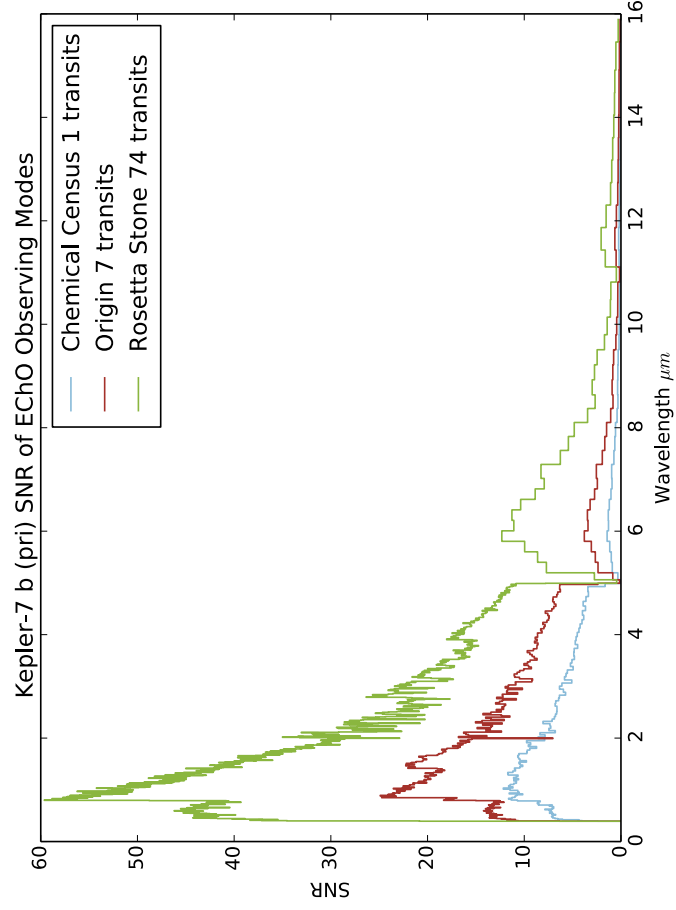
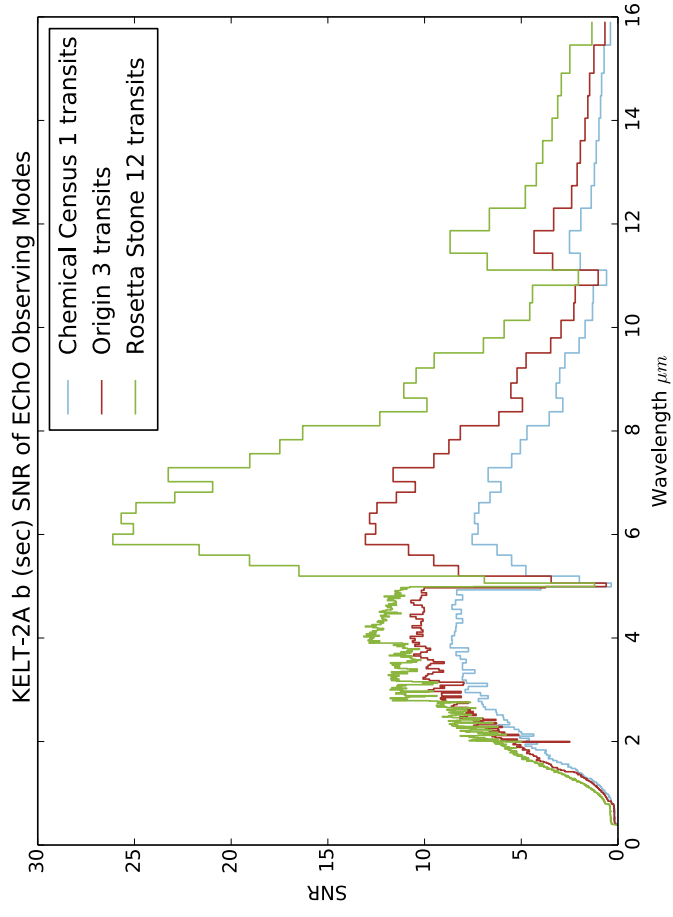
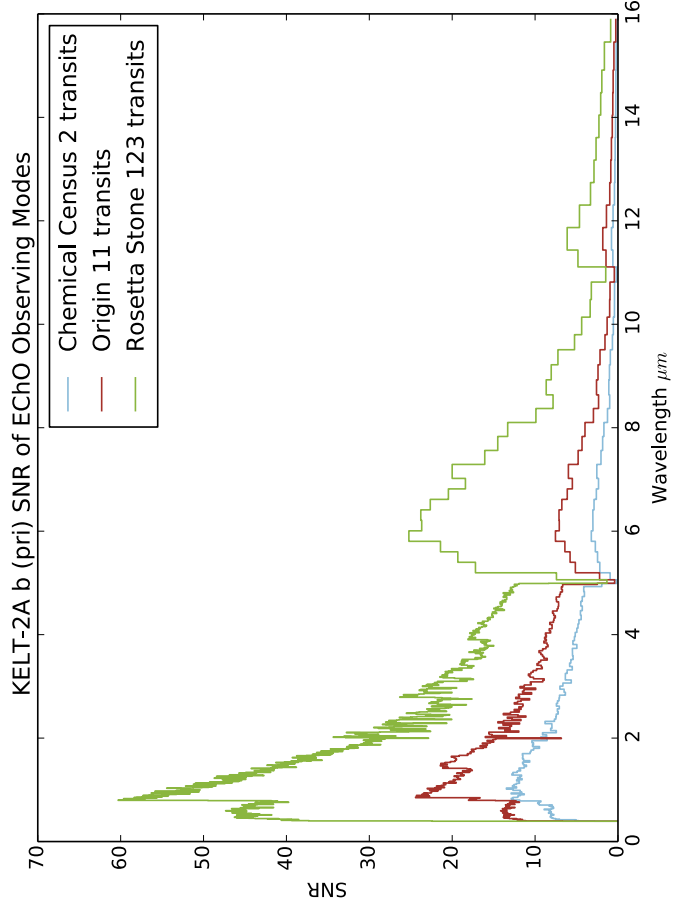
HATS-3 b (sec) SNR of EChO Observing Modes



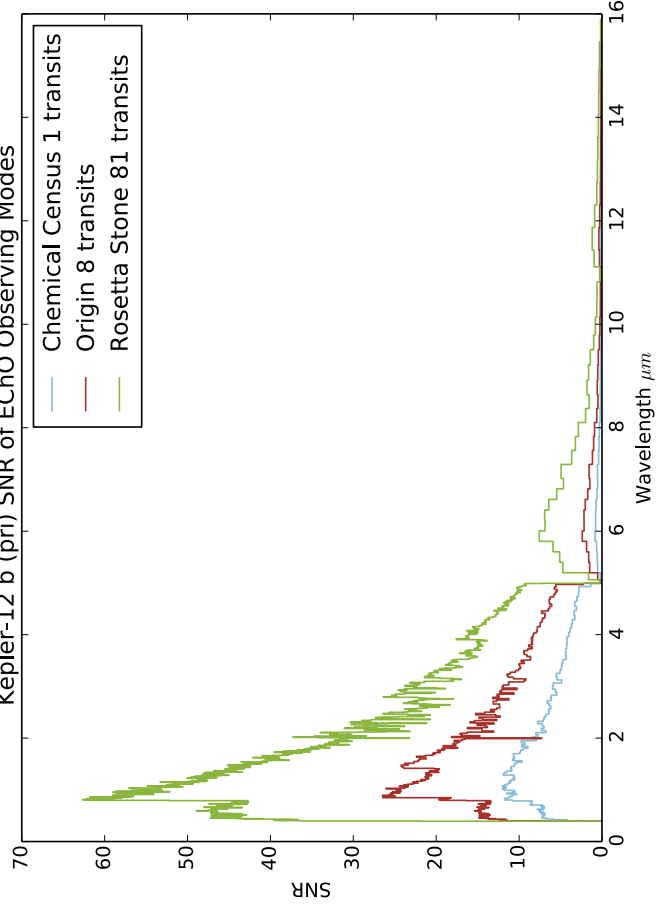




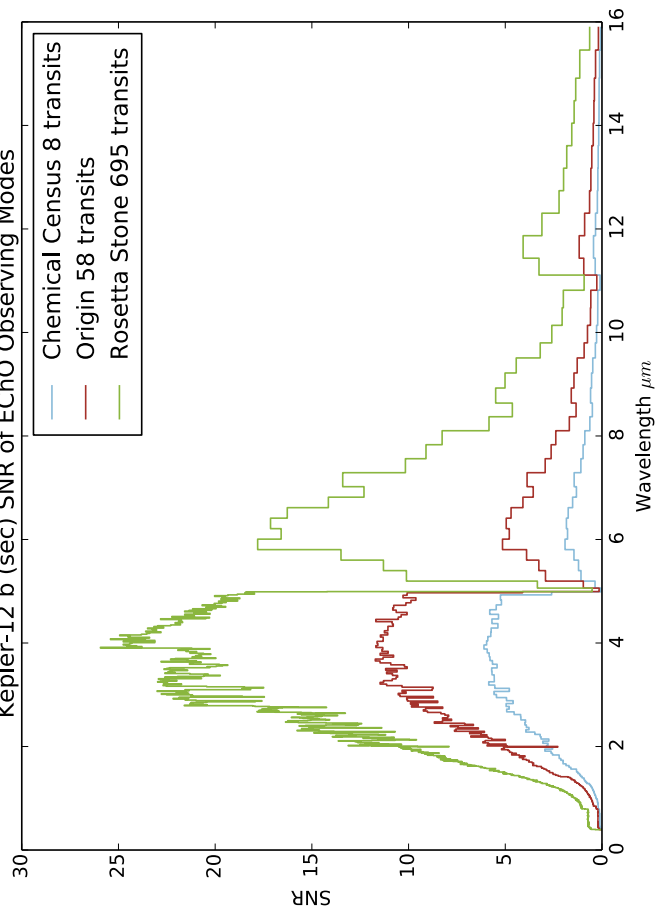




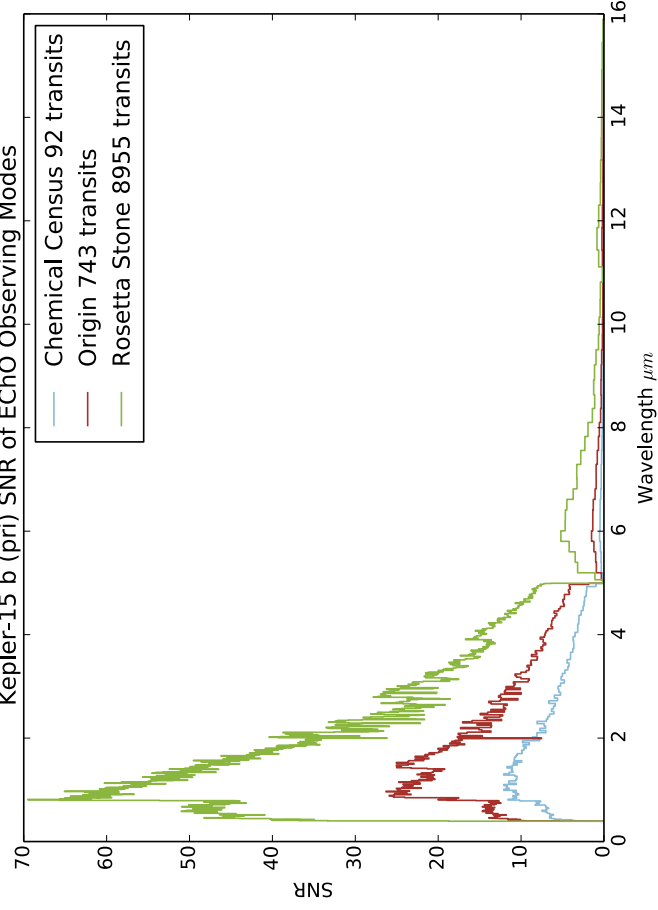
Kepler-12 b (pri) SNR of EChO Observing Modes



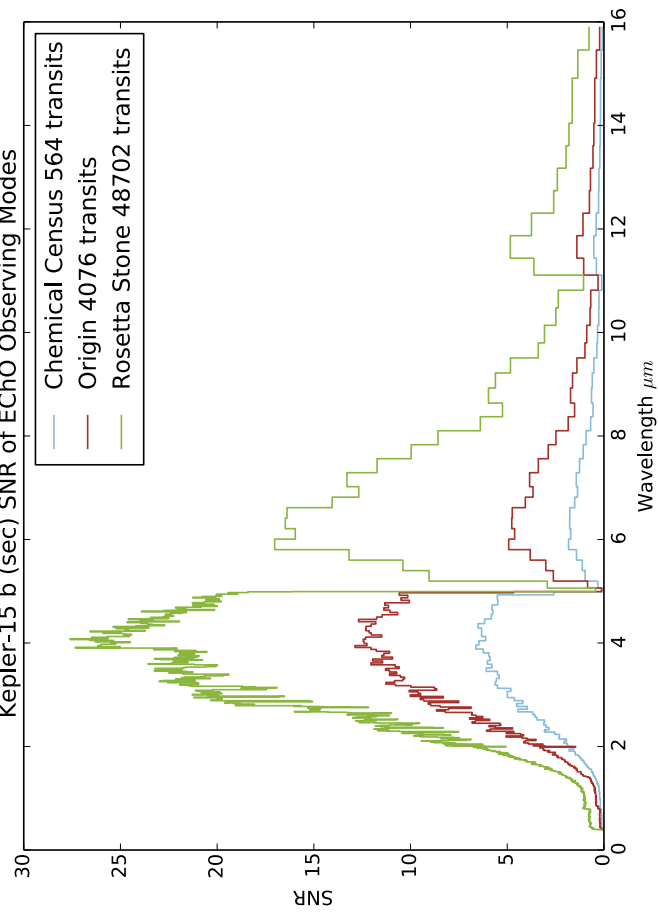
Kepler-12 b (sec) SNR of EChO Observing Modes



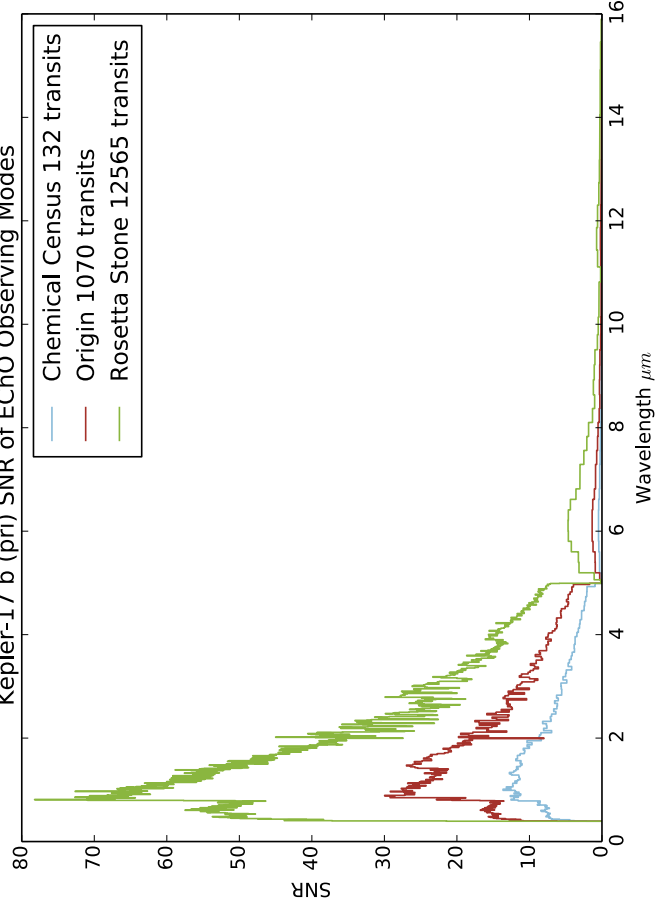
Kepler-15 b (pri) SNR of EChO Observing Modes



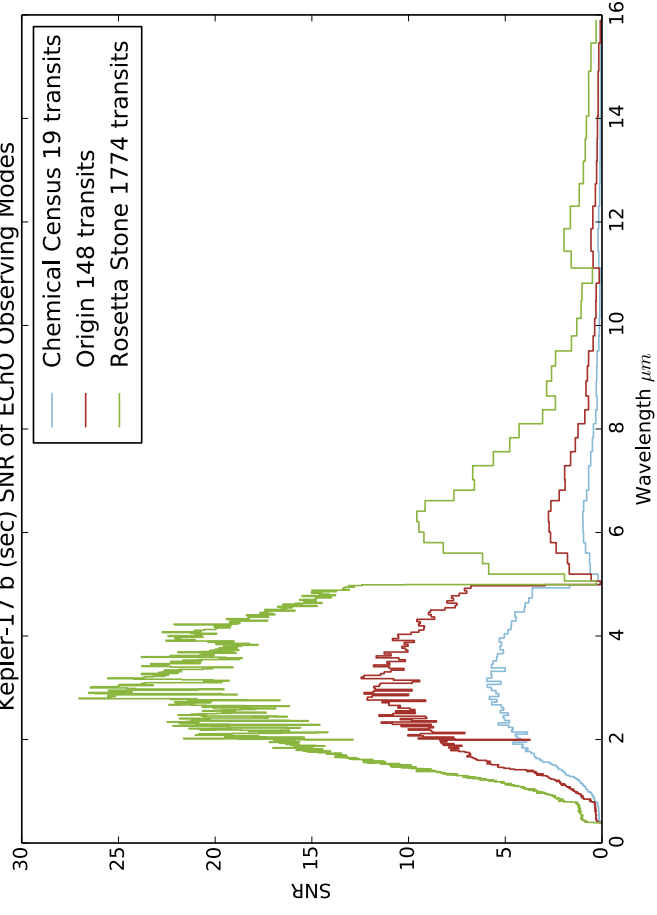
Kepler-15 b (sec) SNR of EChO Observing Modes



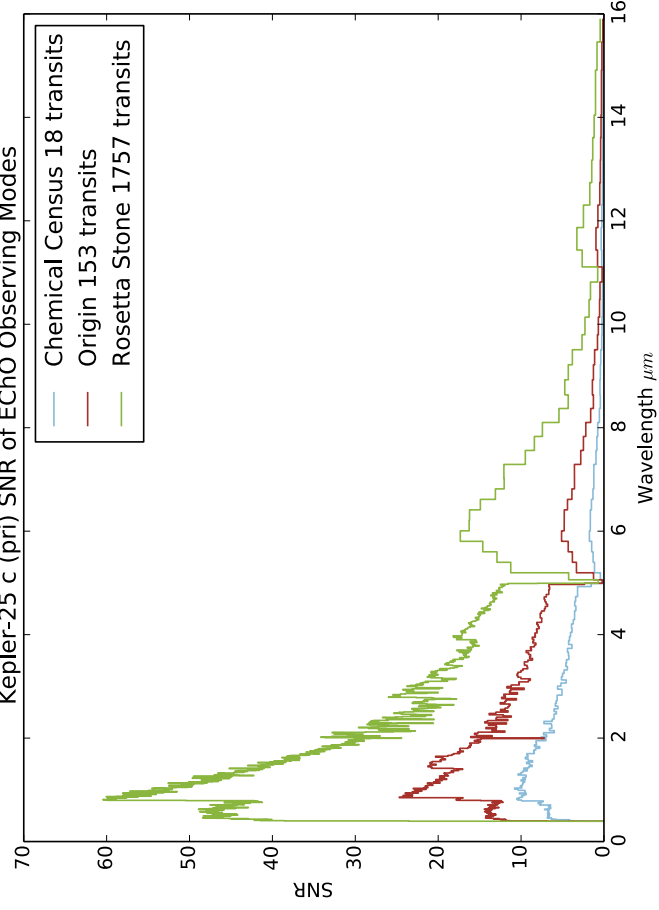
Kepler-17 b (pri) SNR of EChO Observing Modes



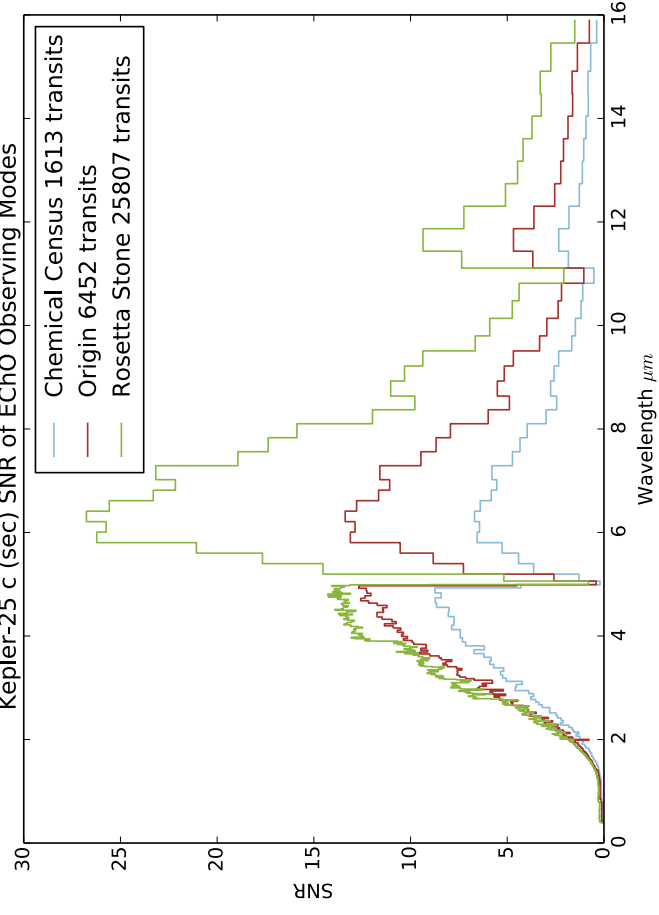
Kepler-17 b (sec) SNR of EChO Observing Modes



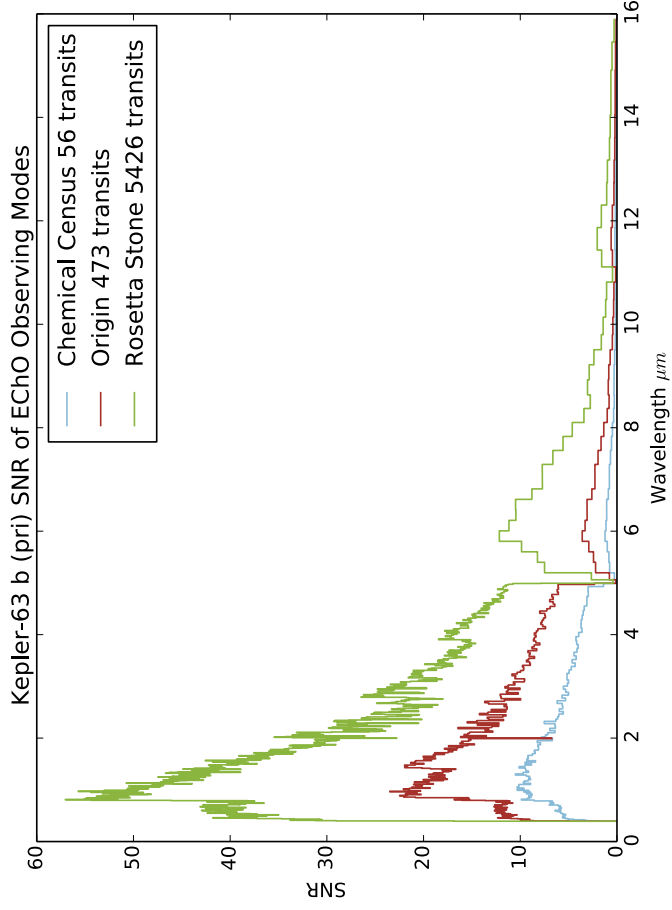
Kepler-25 c (pri) SNR of EChO Observing Modes



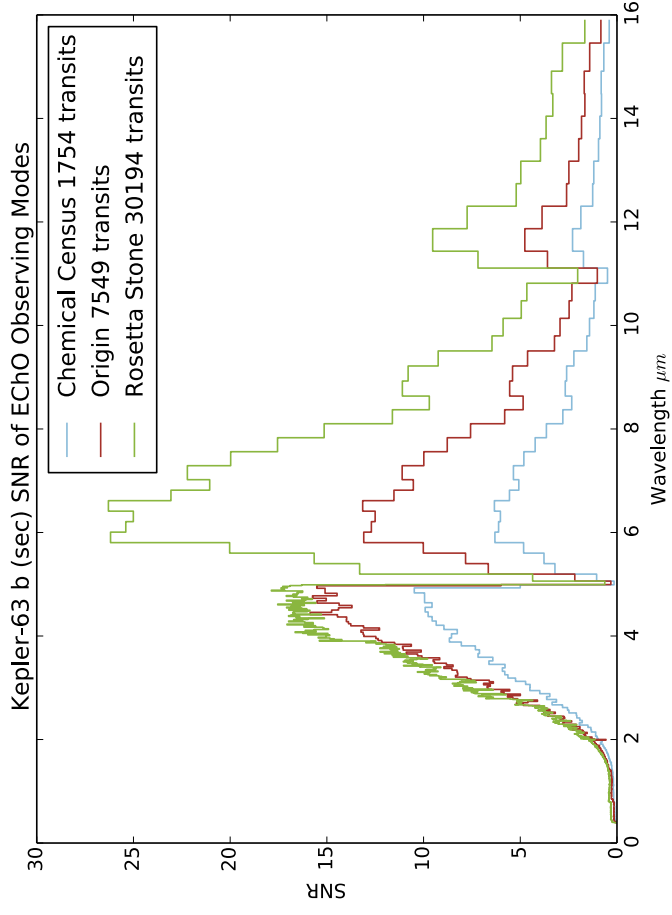
Kepler-25 c (sec) SNR of EChO Observing Modes



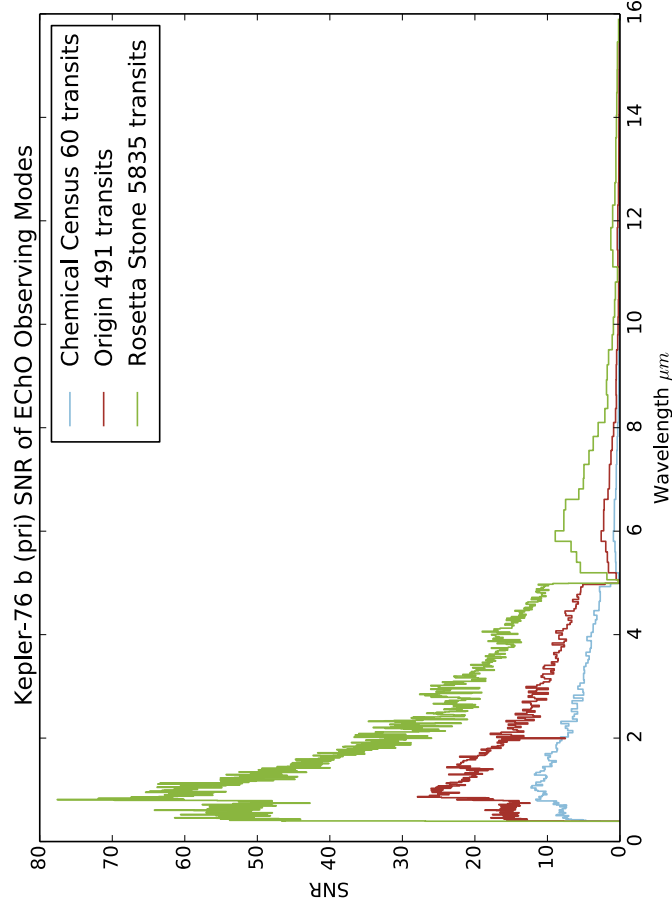
Kepler-63 b (pri) SNR of EChO Observing Modes



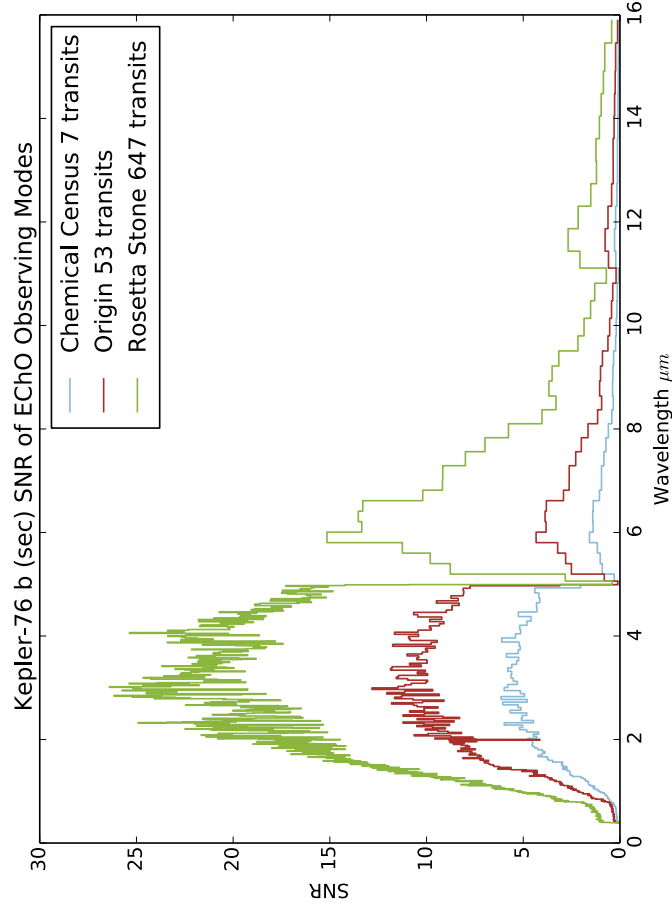
Kepler-63 b (sec) SNR of EChO Observing Modes

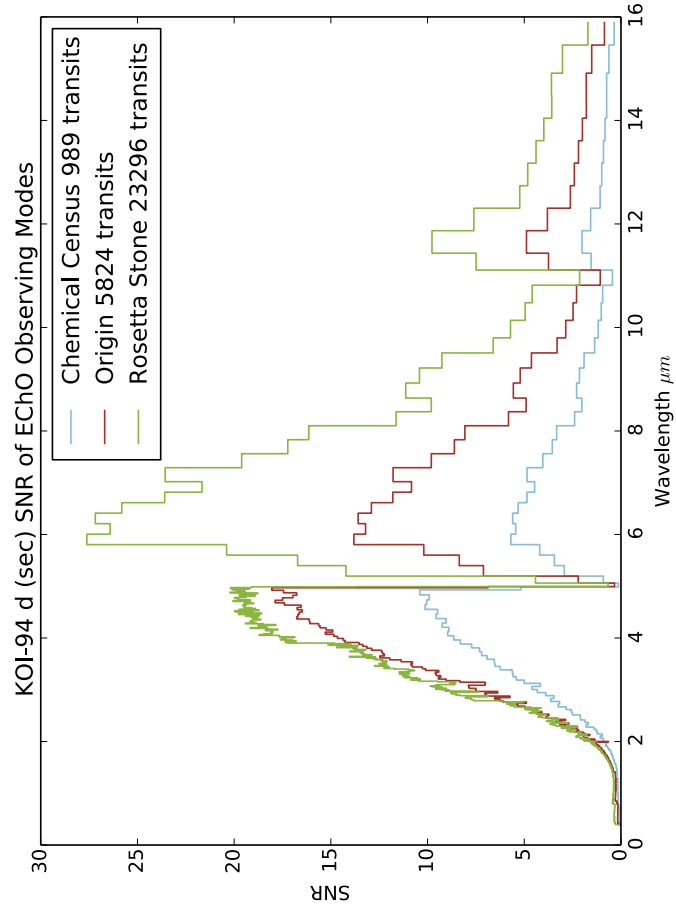
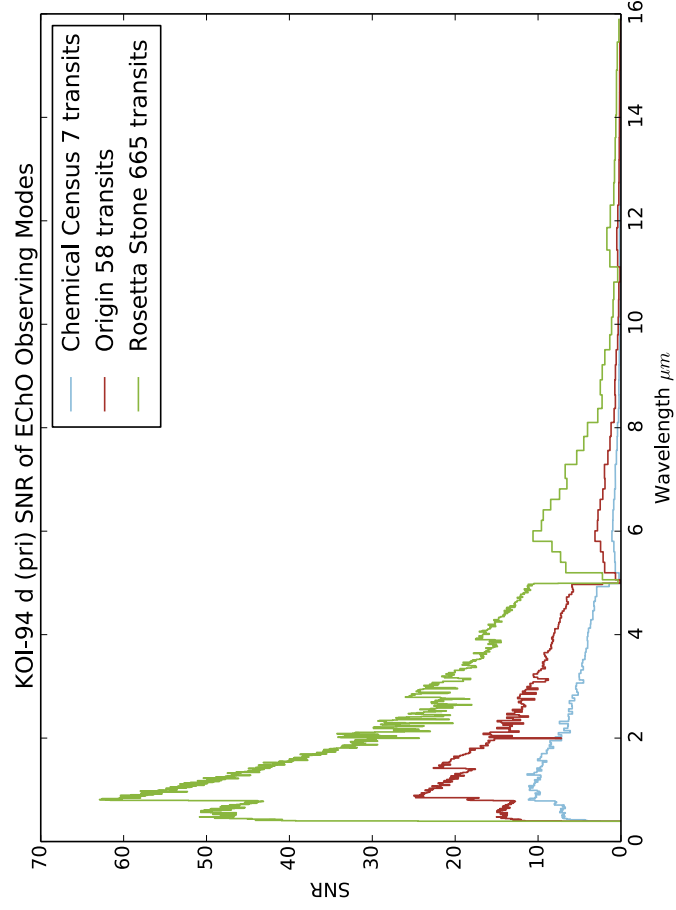
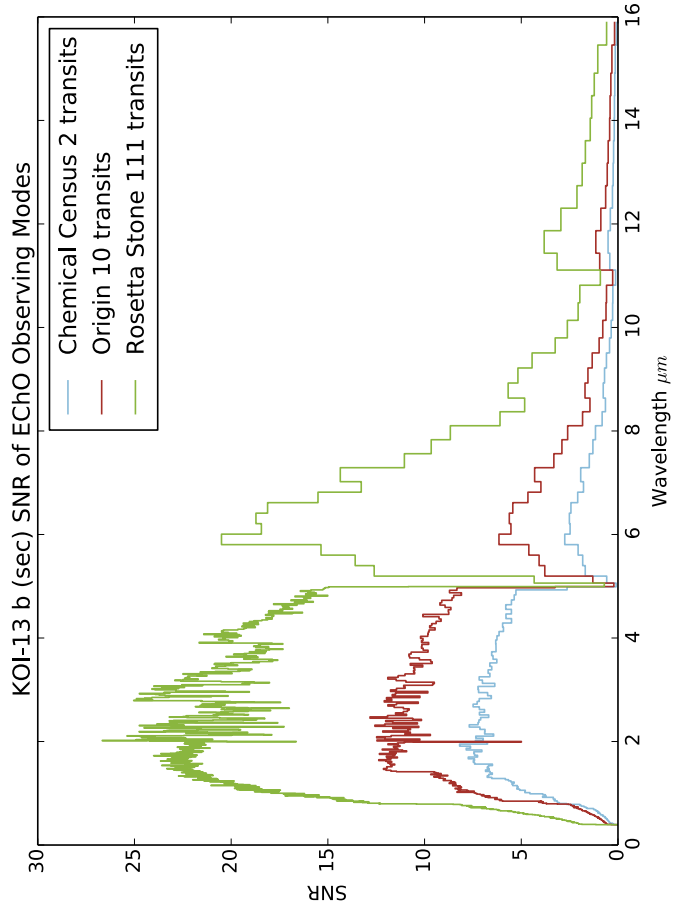
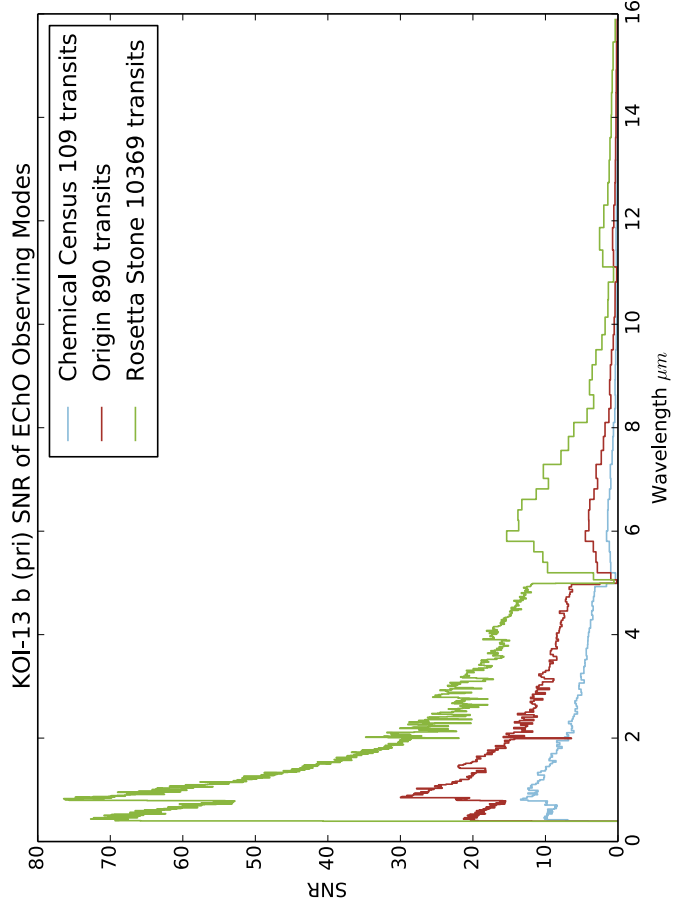


Kepler-76 b (pri) SNR of EChO Observing Modes

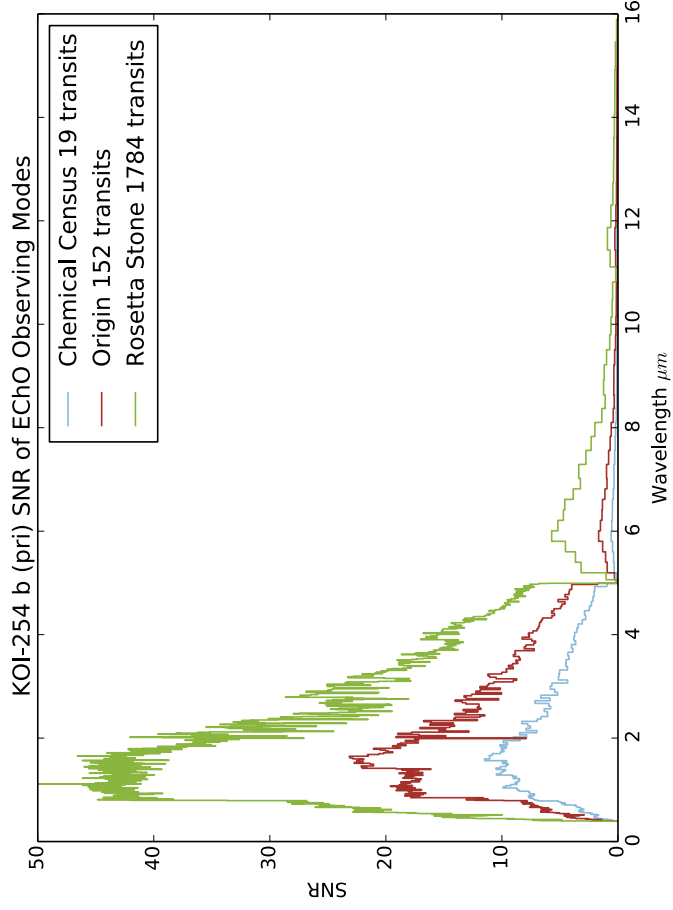


Kepler-76 b (sec) SNR of EChO Observing Modes

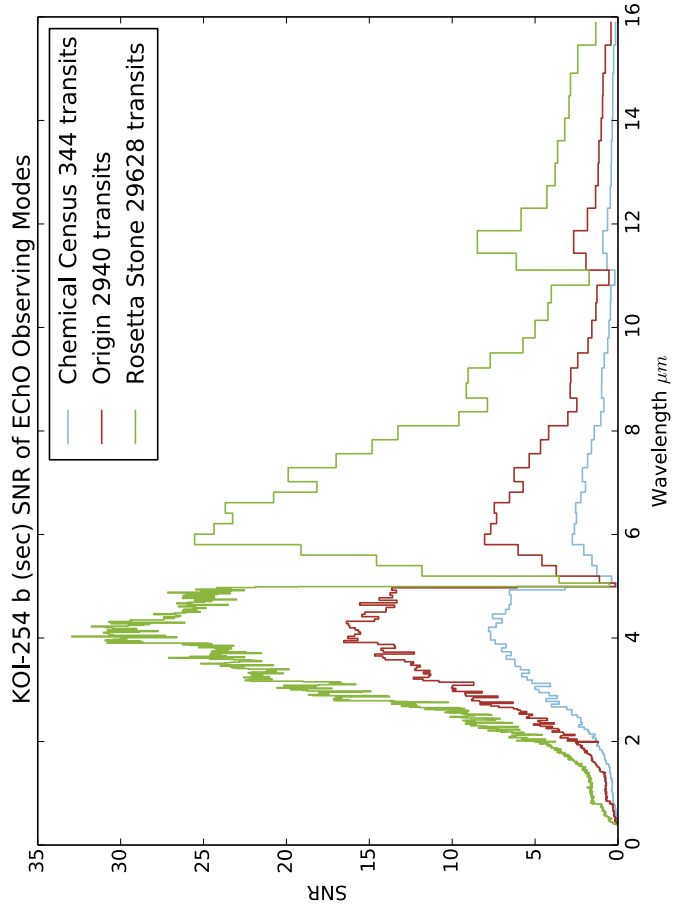




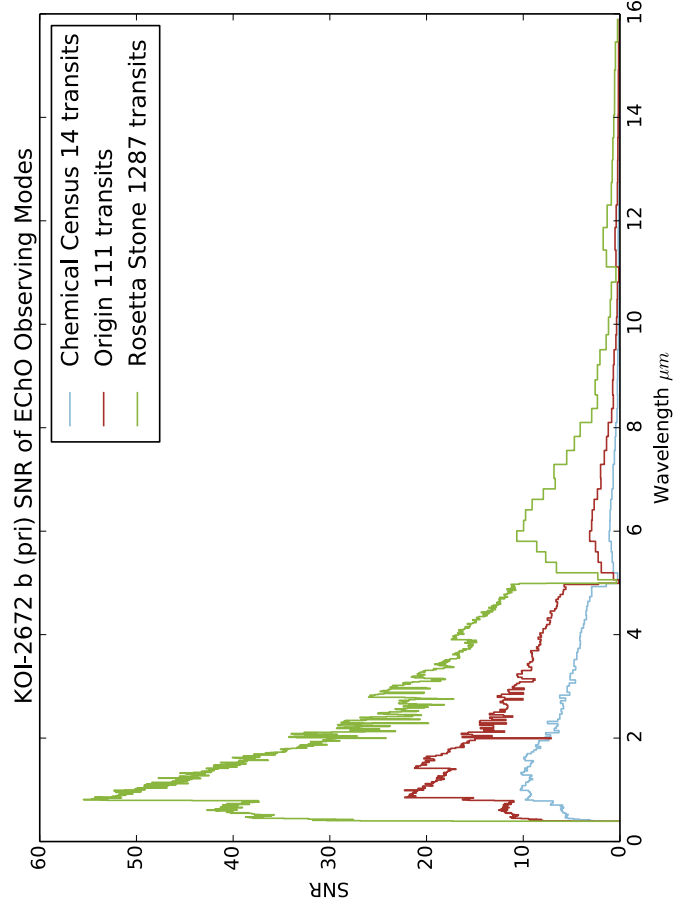
KOI-254 b (pri) SNR of EChO Observing Modes



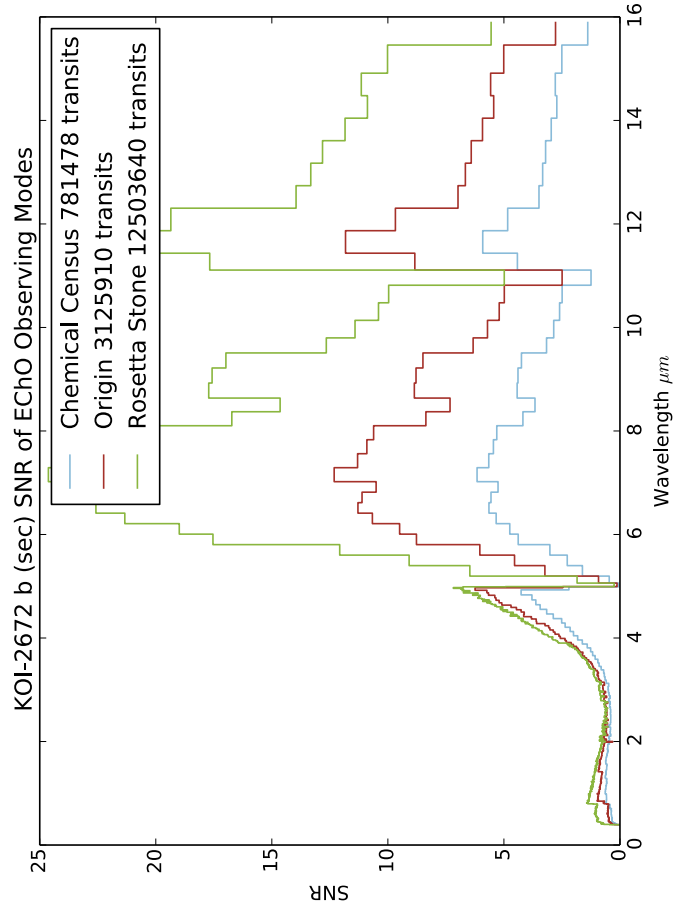
KOI-254 b (sec) SNR of EChO Observing Modes



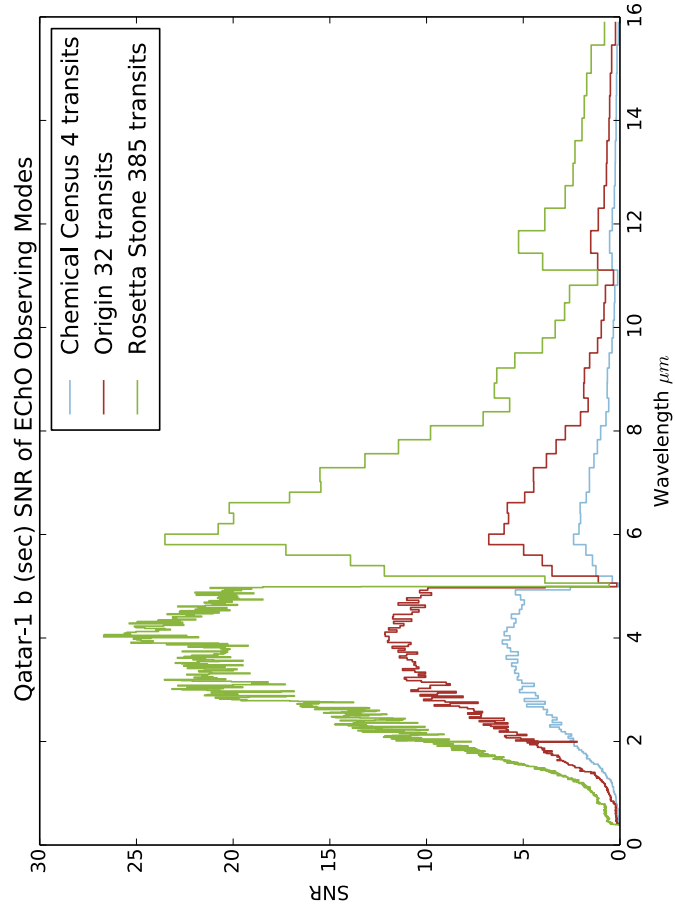
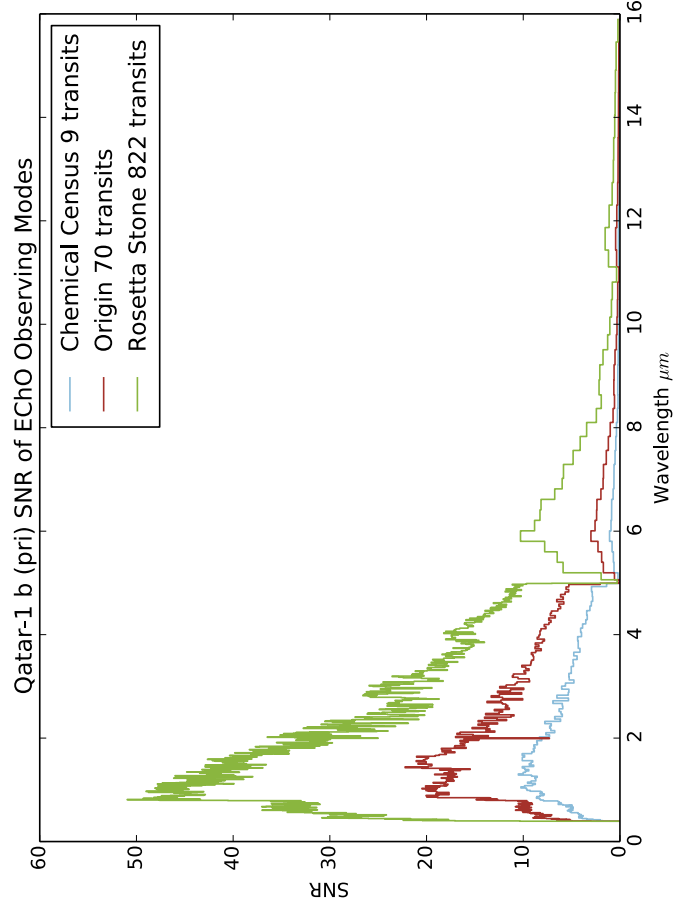
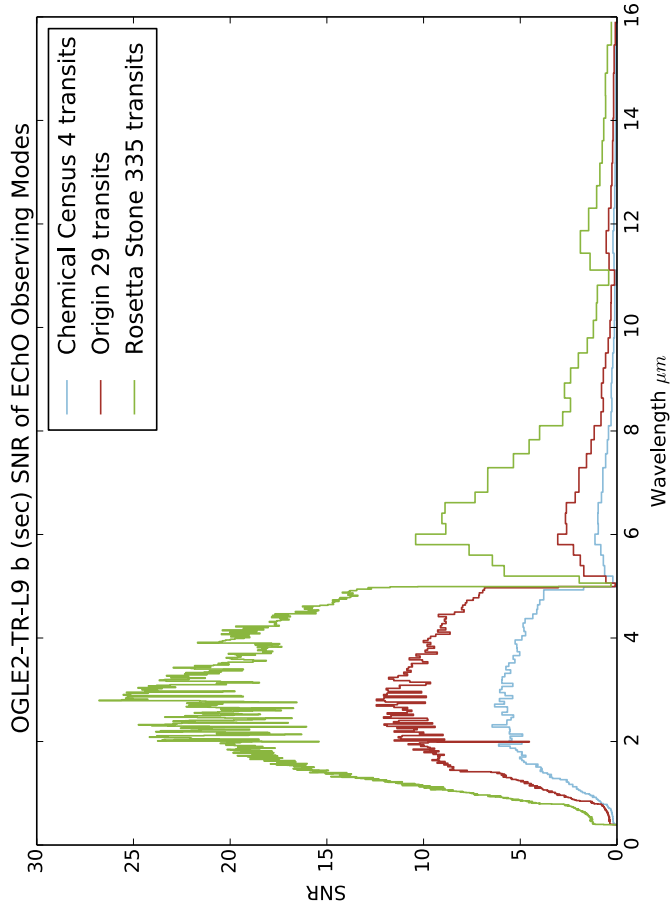
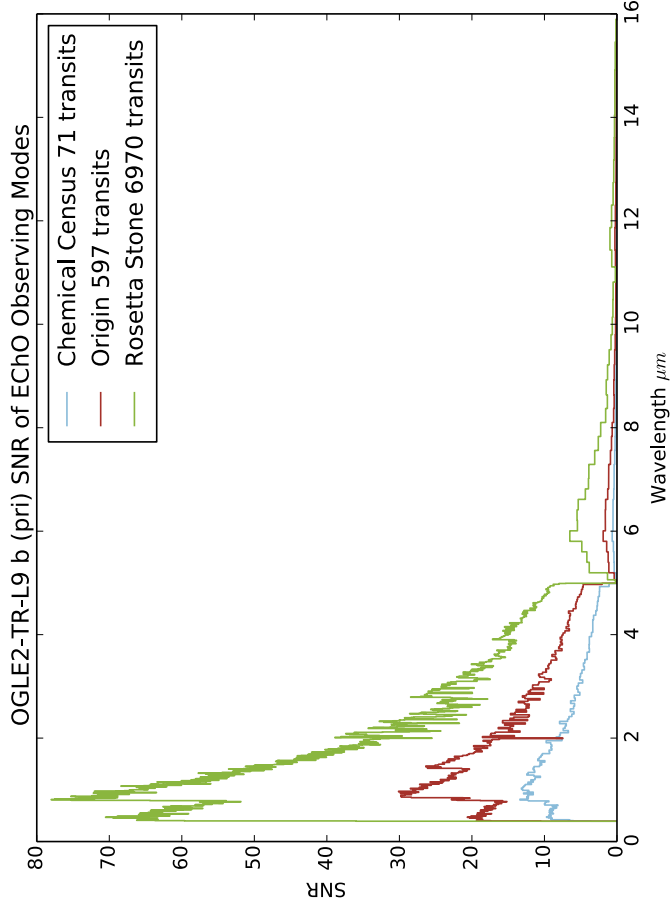
KOI-2672 b (pri) SNR of EChO Observing Modes



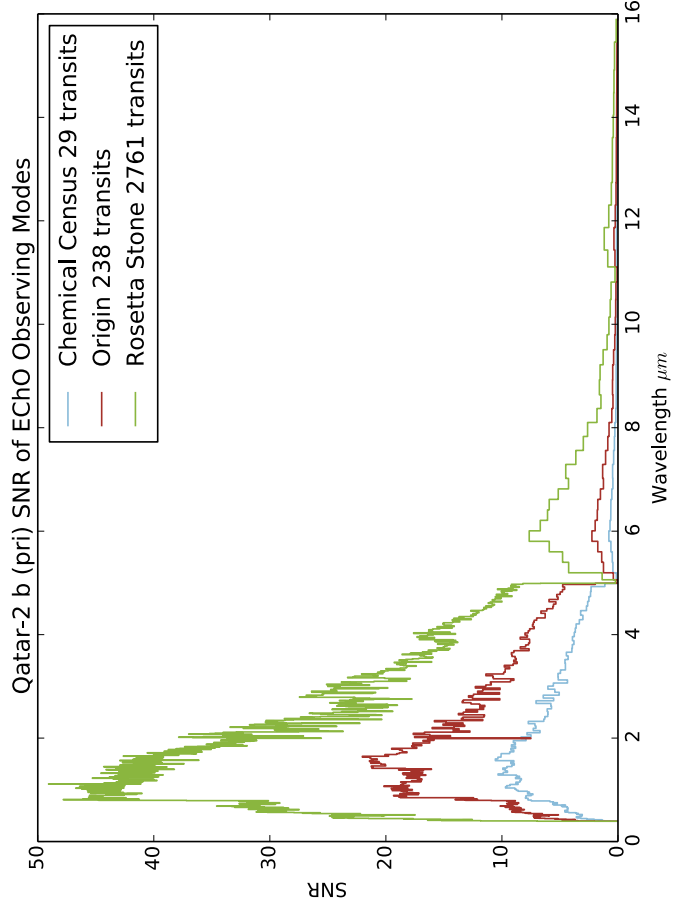
KOI-2672 b (sec) SNR of EChO Observing Modes



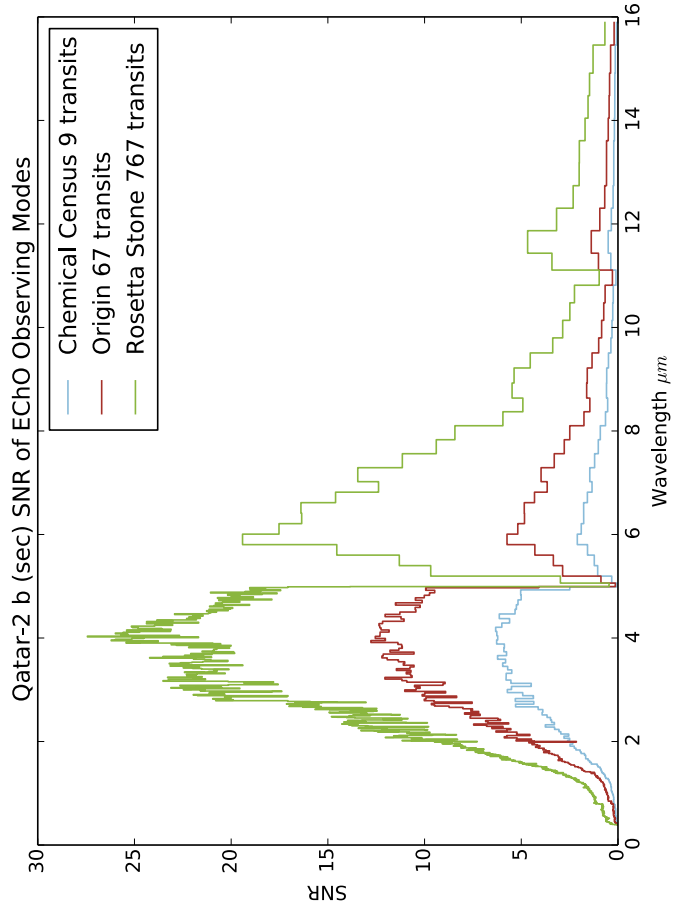




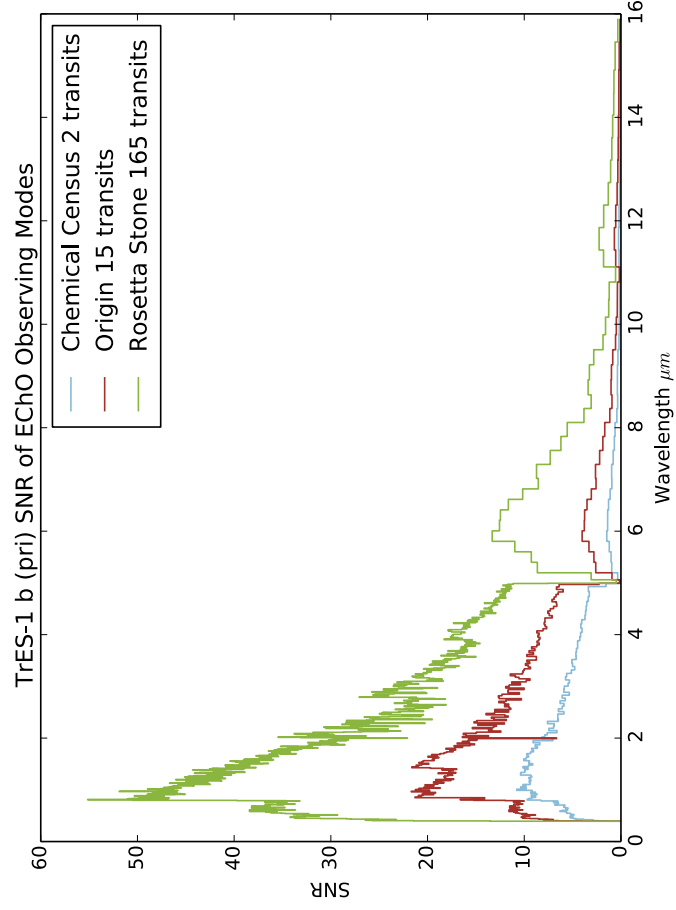
Qatar-2 b (pri) SNR of EChO Observing Modes



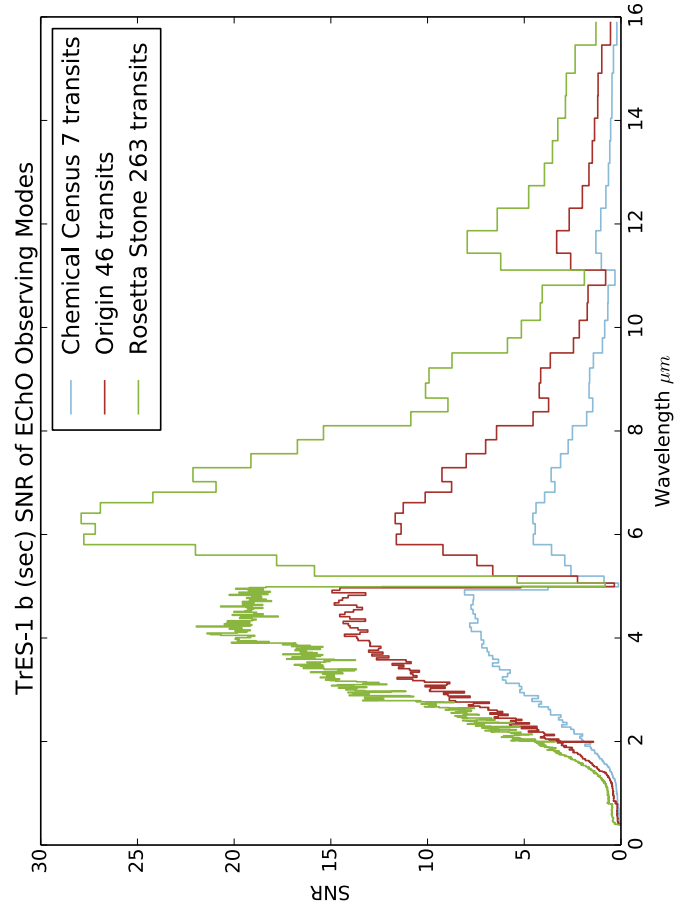
Qatar-2 b (sec) SNR of EChO Observing Modes



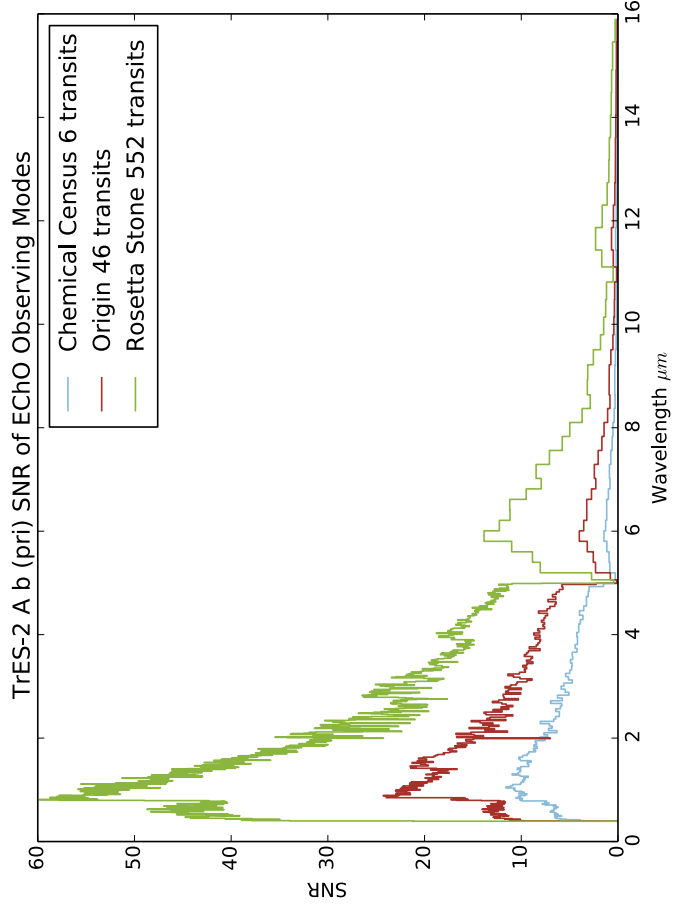
TrES-1 b (pri) SNR of EChO Observing Modes



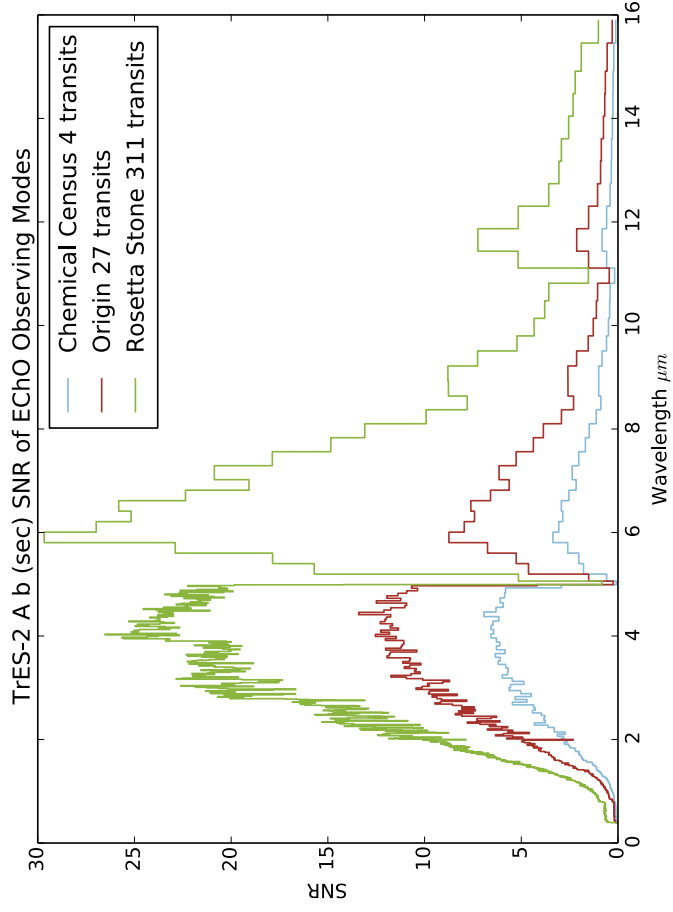
TrES-1 b (sec) SNR of EChO Observing Modes



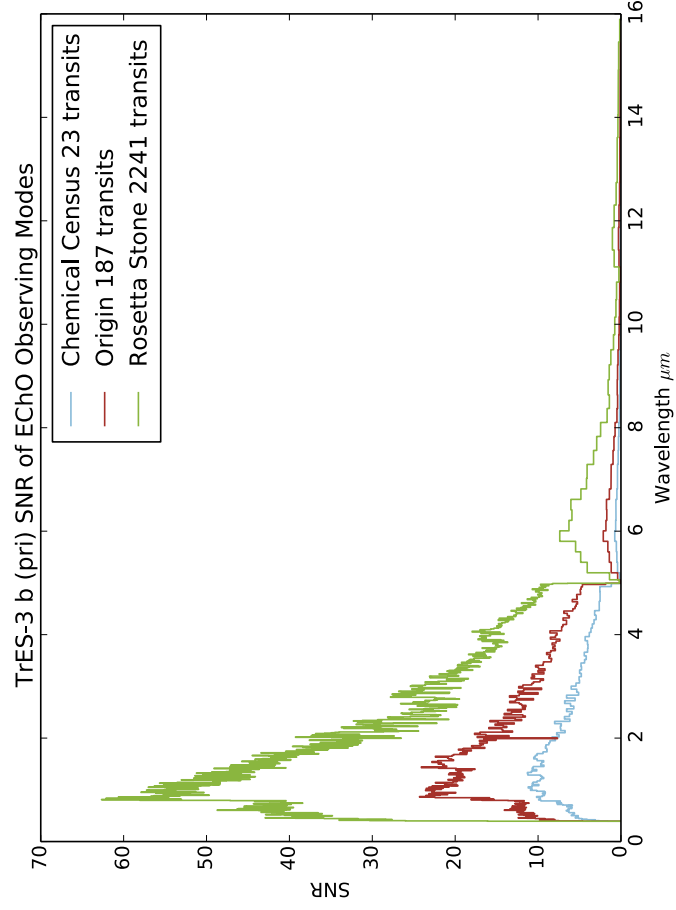
TrES-2 A b (pri) SNR of EChO Observing Modes



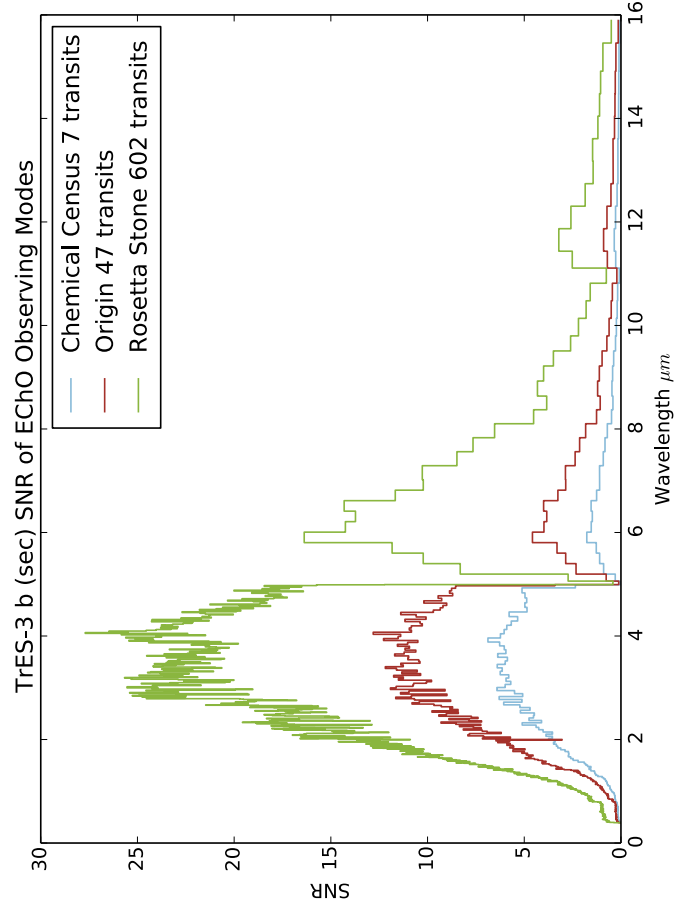
TrES-2 A b (sec) SNR of EChO Observing Modes

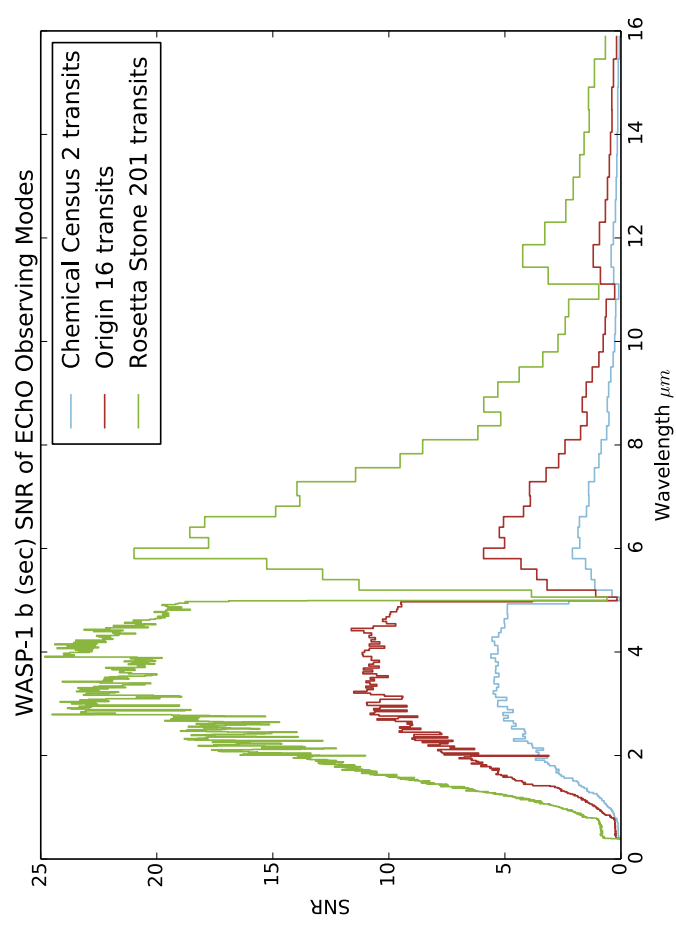
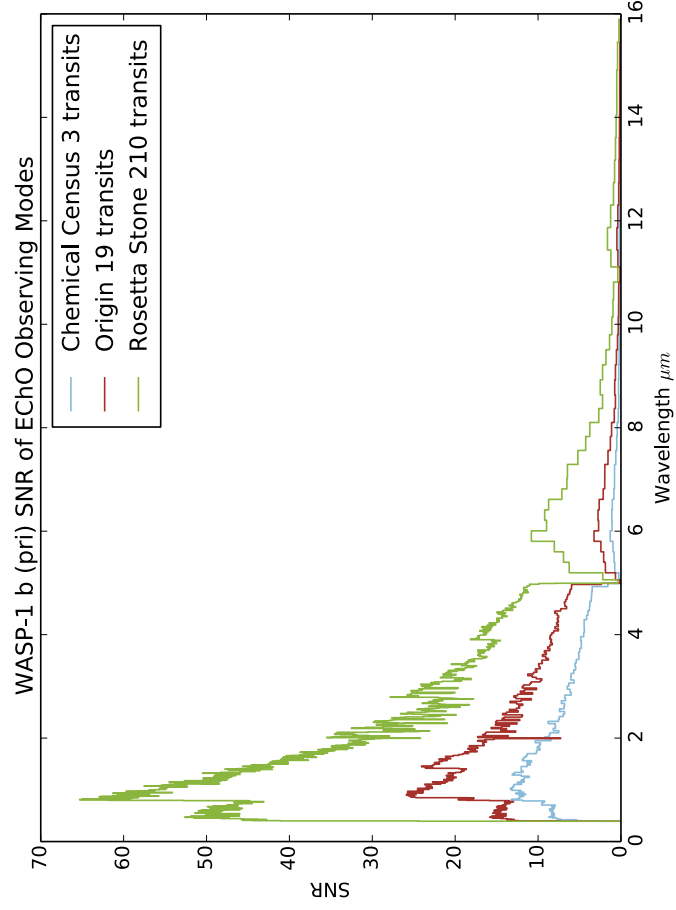
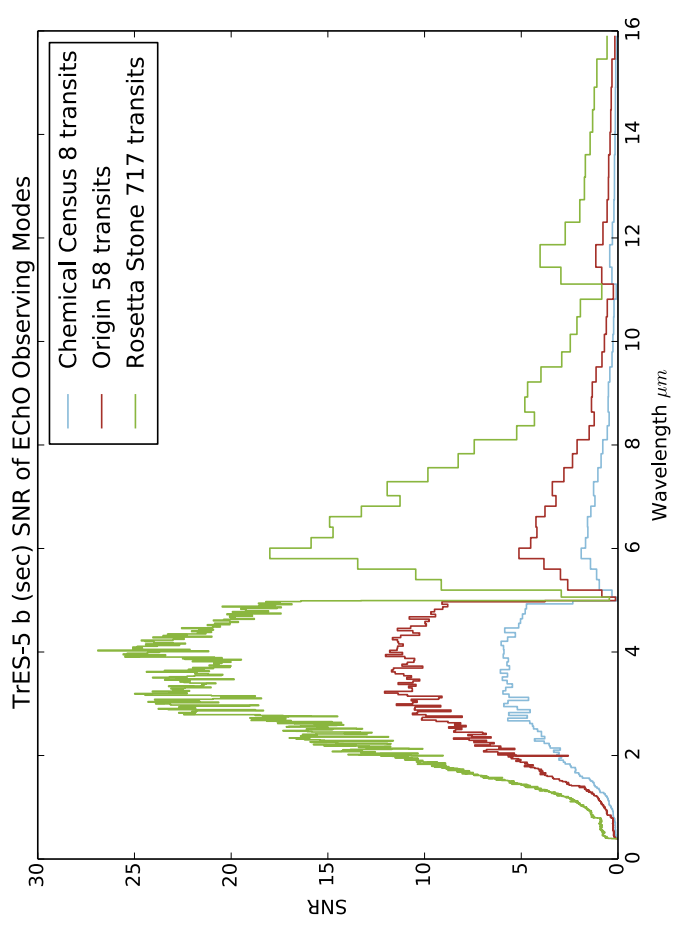
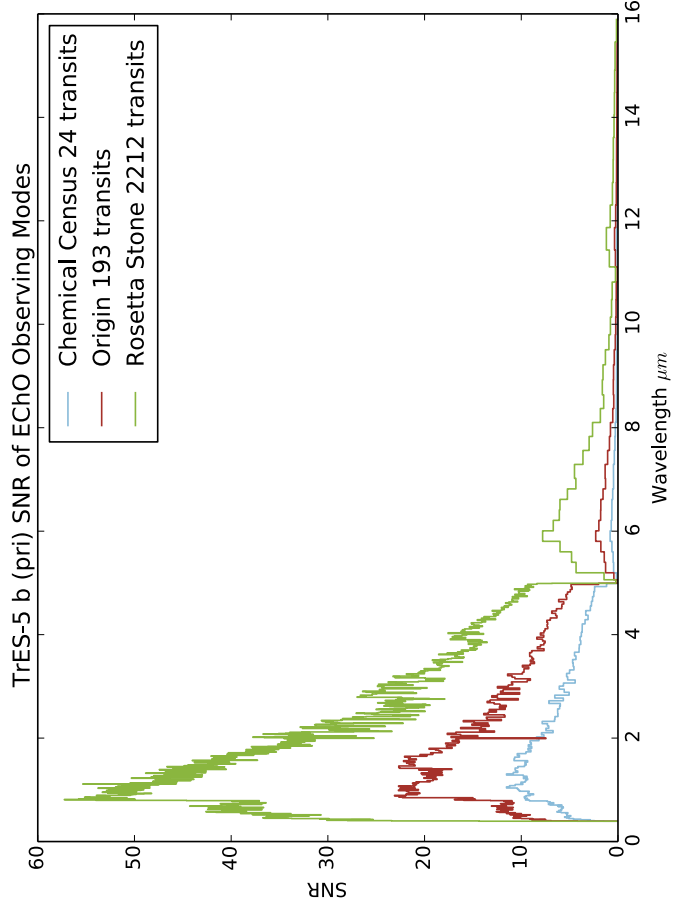


TrES-3 b (pri) SNR of EChO Observing Modes

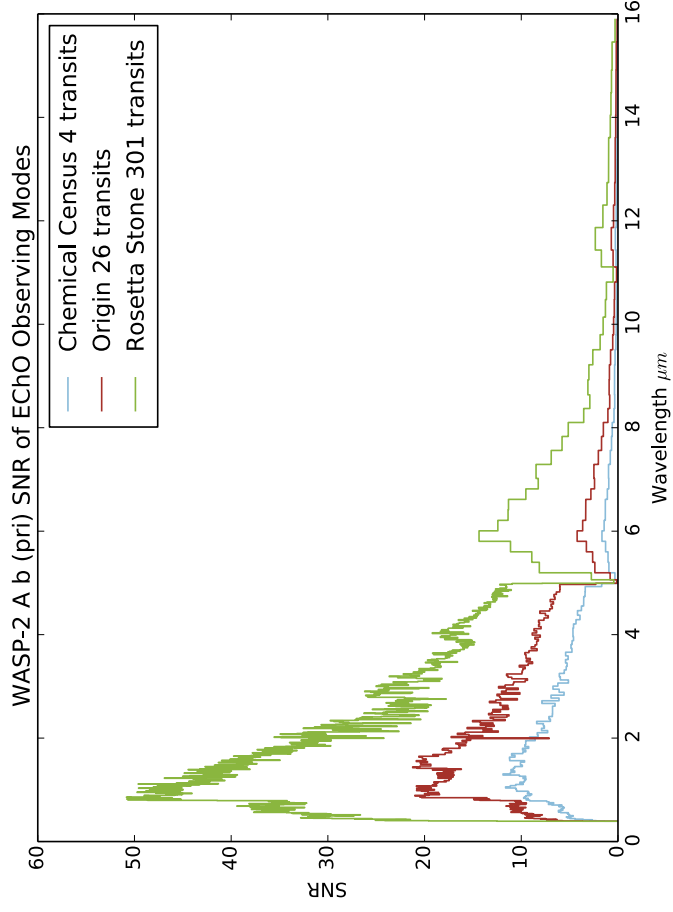


TrES-3 b (sec) SNR of EChO Observing Modes

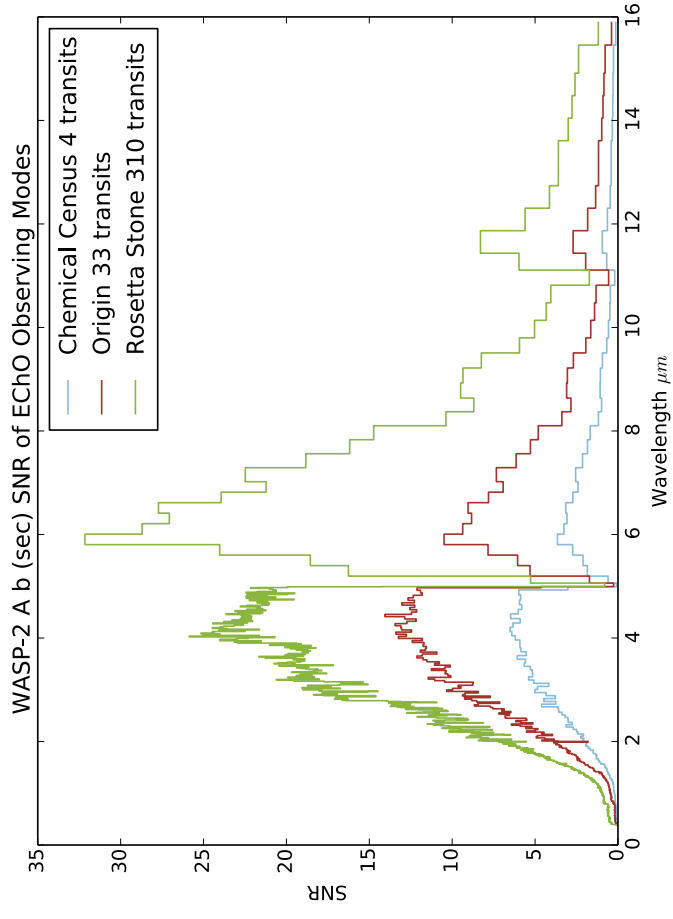




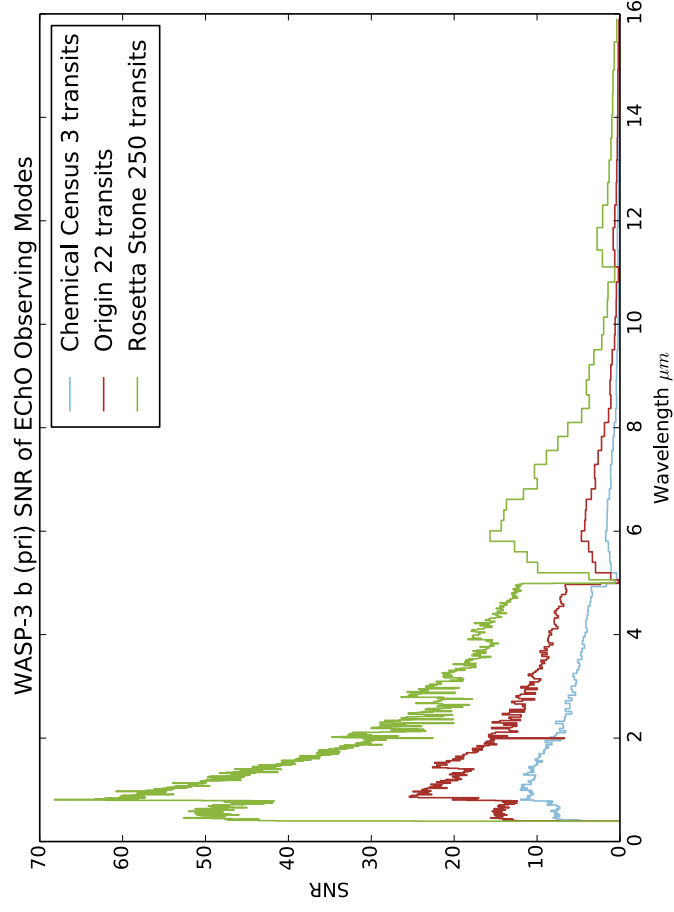
WASP-2 A b (pri) SNR of EChO Observing Modes



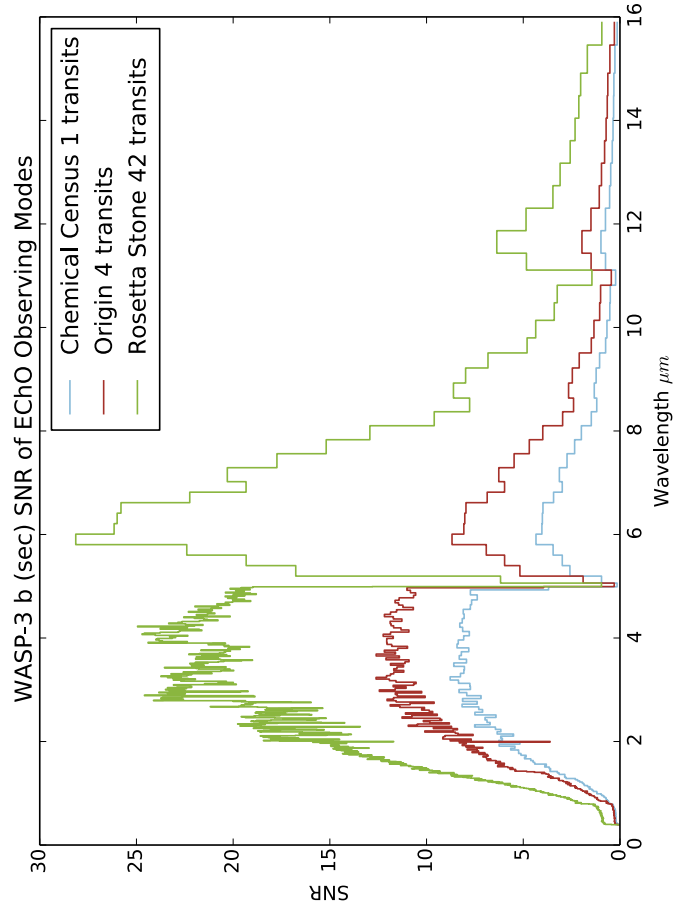
WASP-2 A b (sec) SNR of EChO Observing Modes



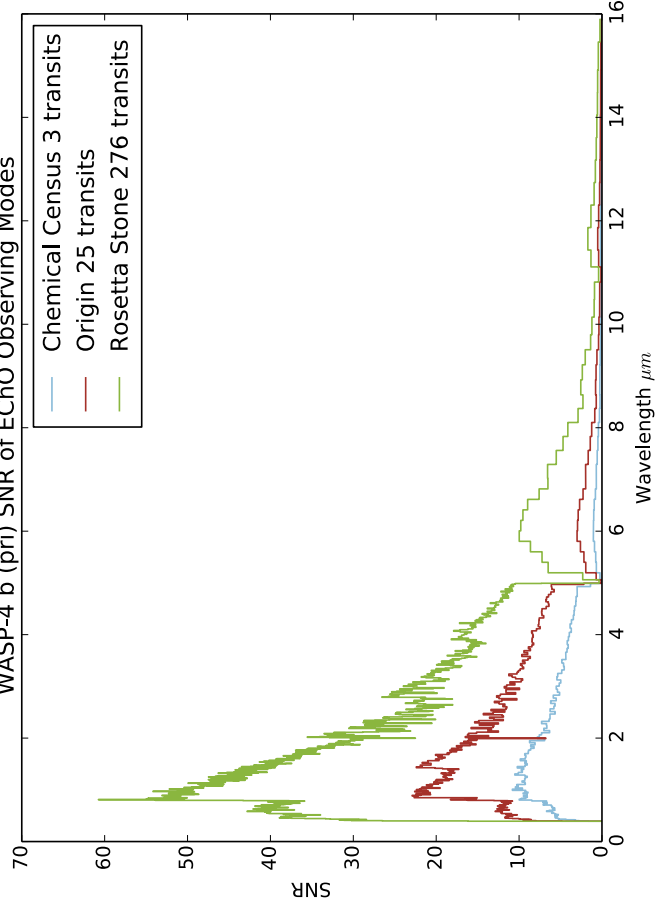
WASP-3 b (pri) SNR of EChO Observing Modes



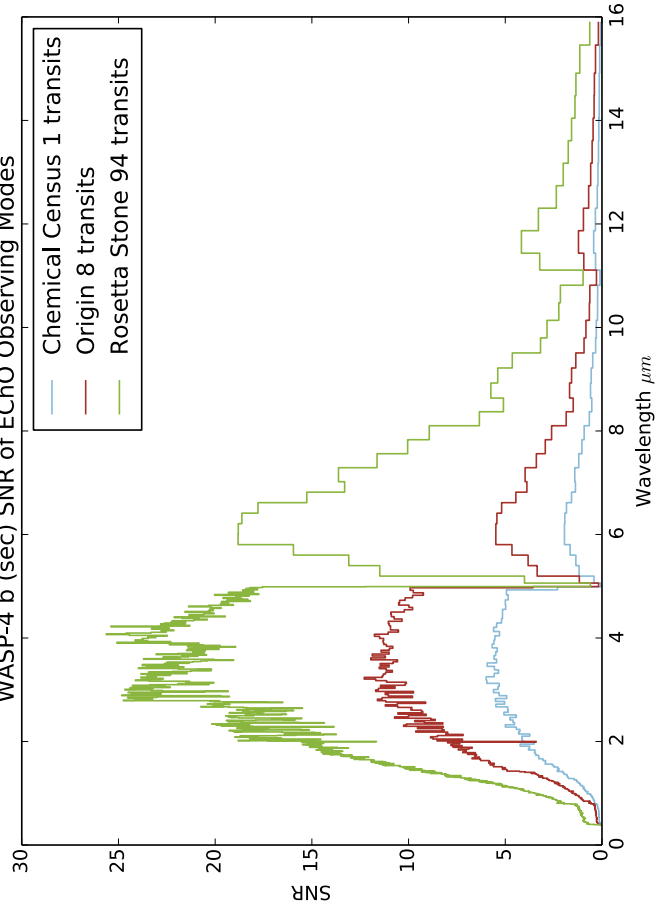
WASP-3 b (sec) SNR of EChO Observing Modes



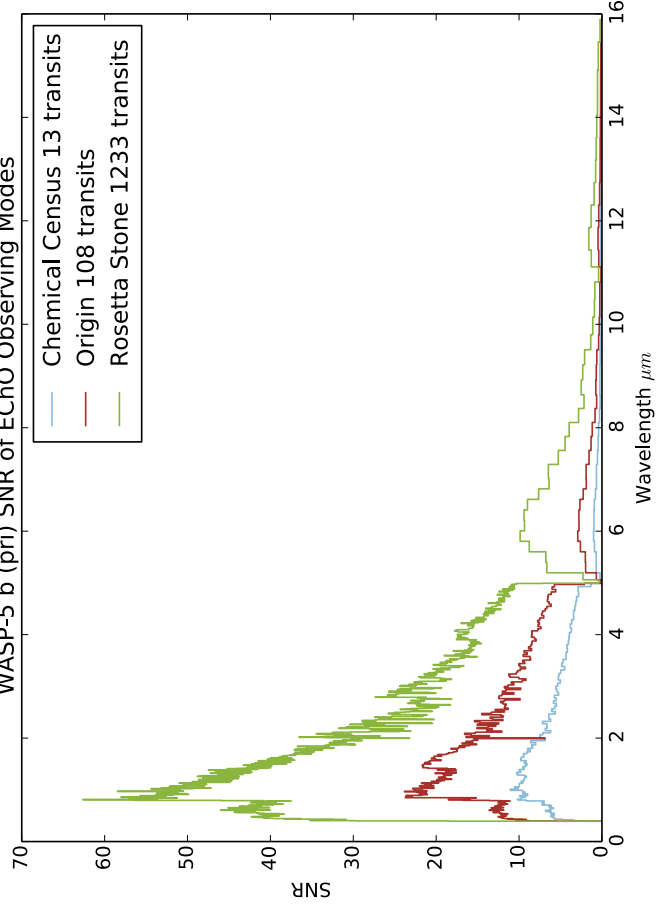
WASP-4 b (pri) SNR of EChO Observing Modes



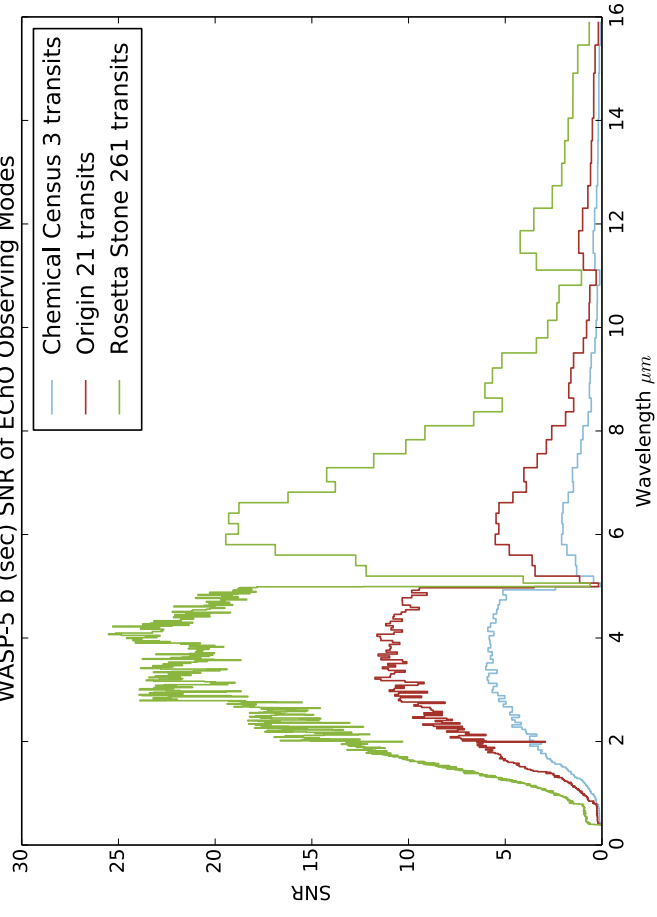
WASP-4 b (sec) SNR of EChO Observing Modes



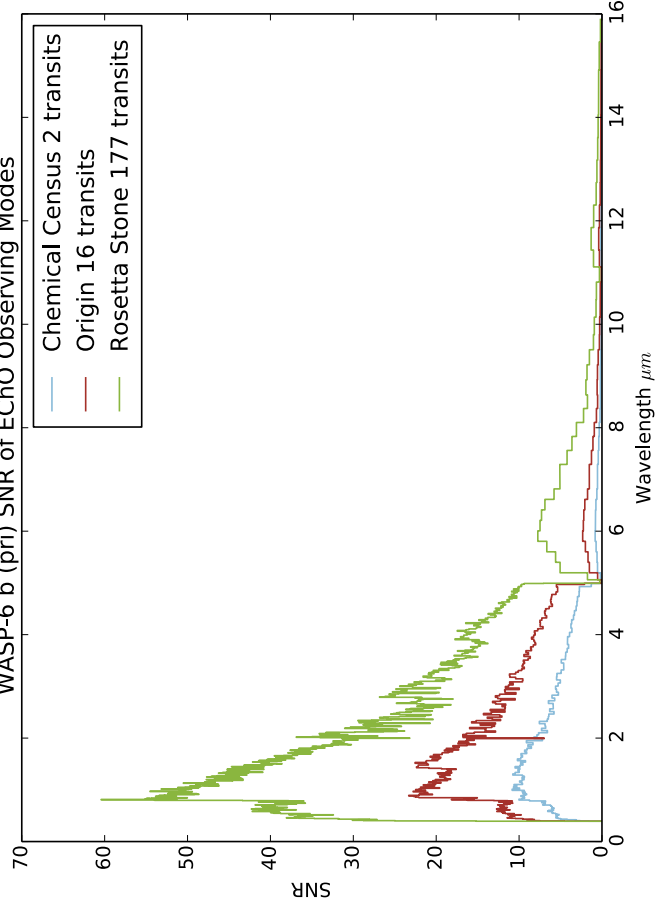
WASP-5 b (pri) SNR of EChO Observing Modes



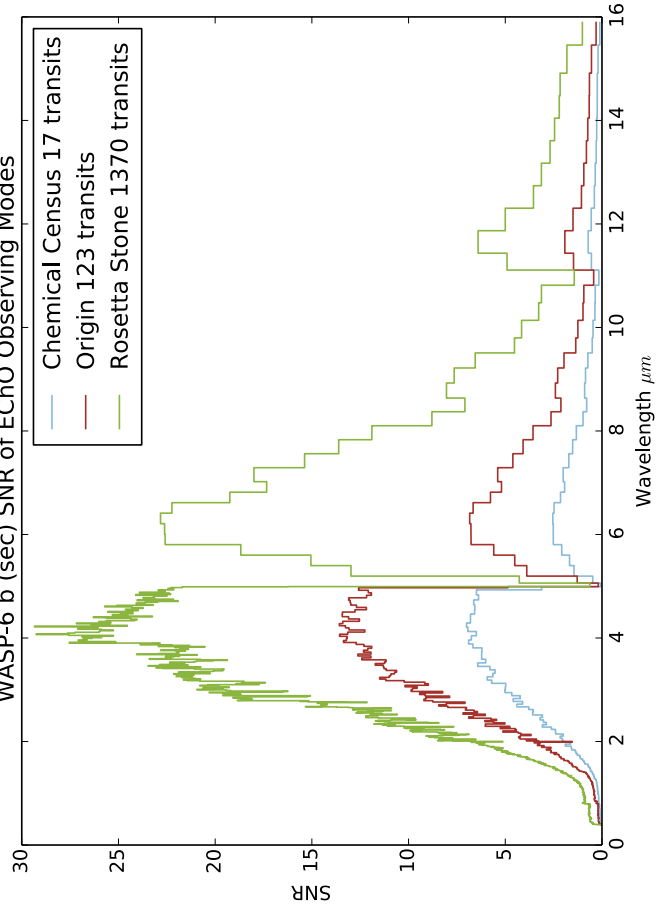
WASP-5 b (sec) SNR of EChO Observing Modes



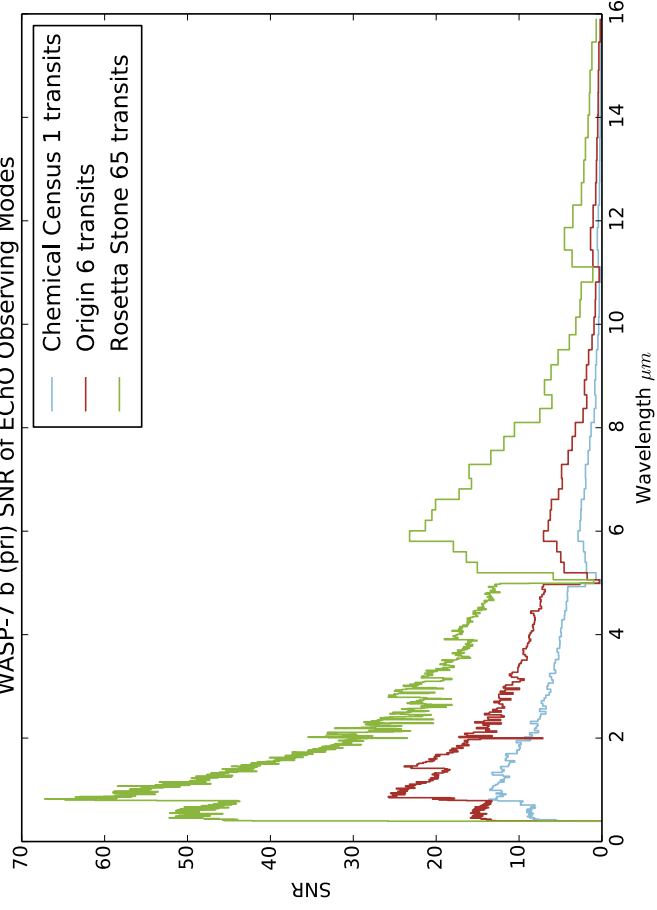
WASP-6 b (pri) SNR of EChO Observing Modes



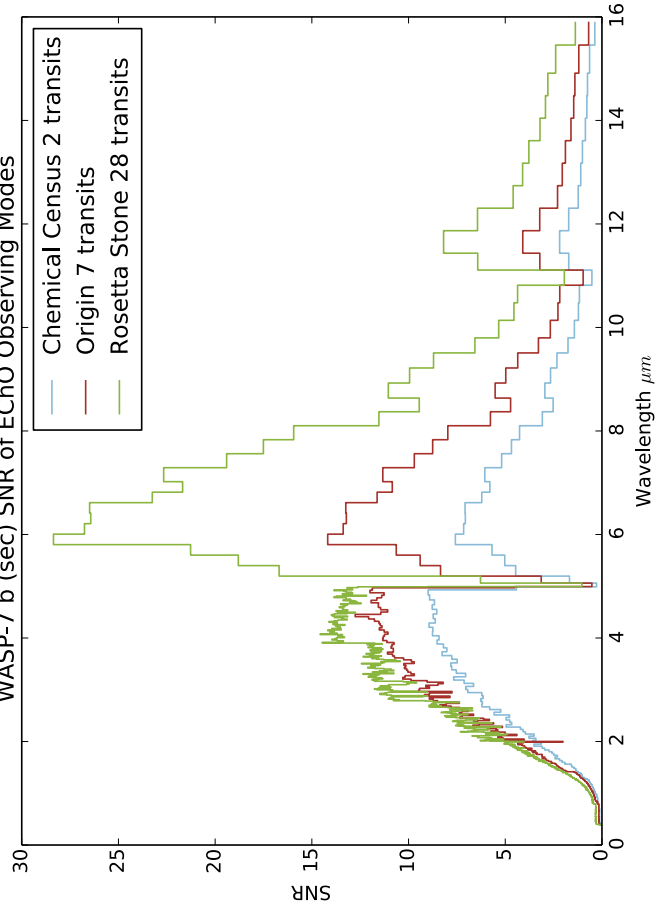
WASP-6 b (sec) SNR of EChO Observing Modes



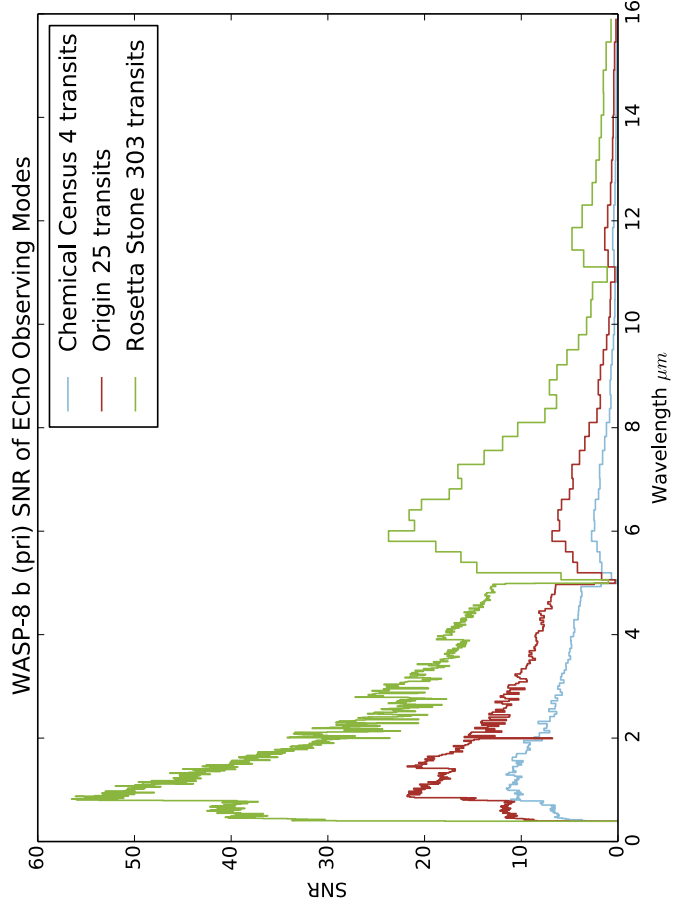
WASP-7 b (pri) SNR of EChO Observing Modes



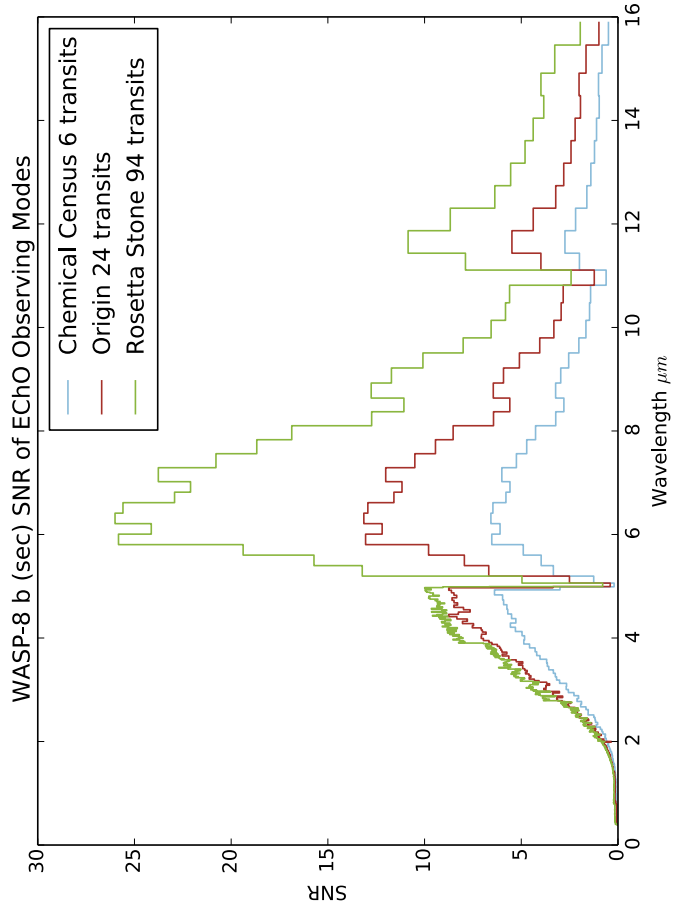
WASP-7 b (sec) SNR of EChO Observing Modes



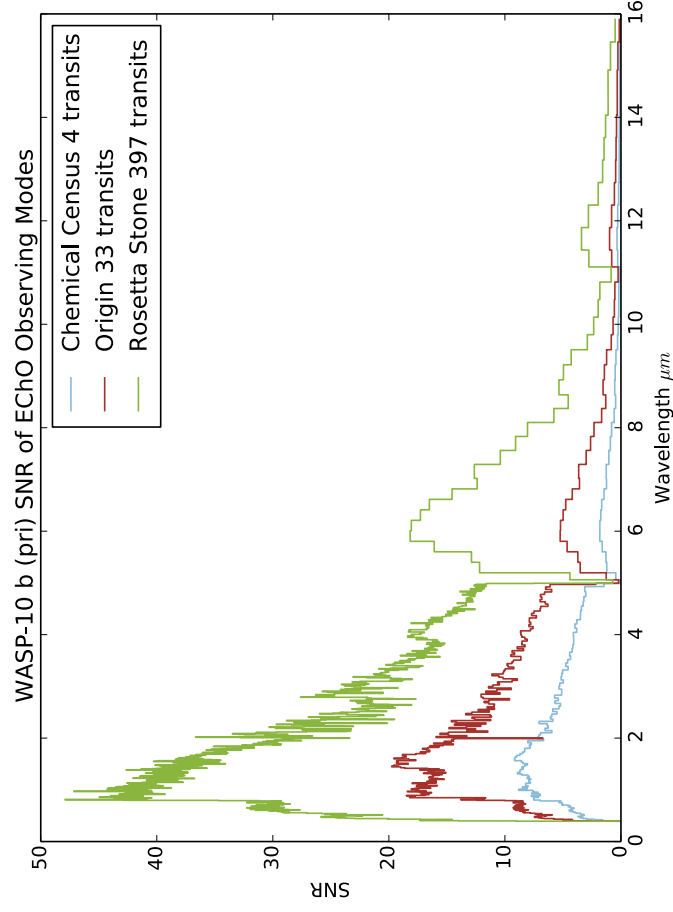
WASP-8 b (pri) SNR of EChO Observing Modes



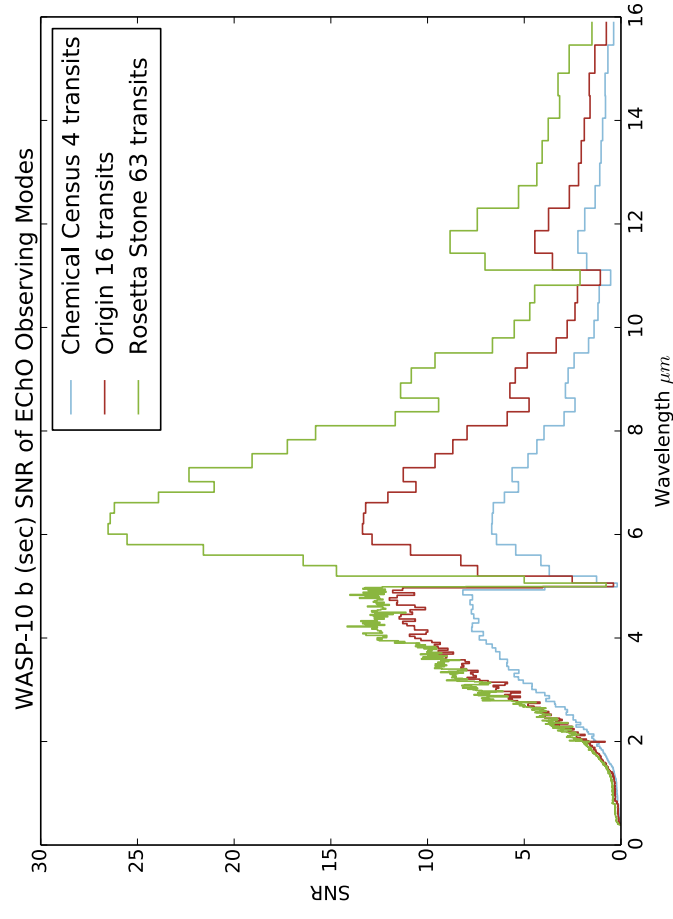
WASP-8 b (sec) SNR of EChO Observing Modes



WASP-10 b (pri) SNR of EChO Observing Modes

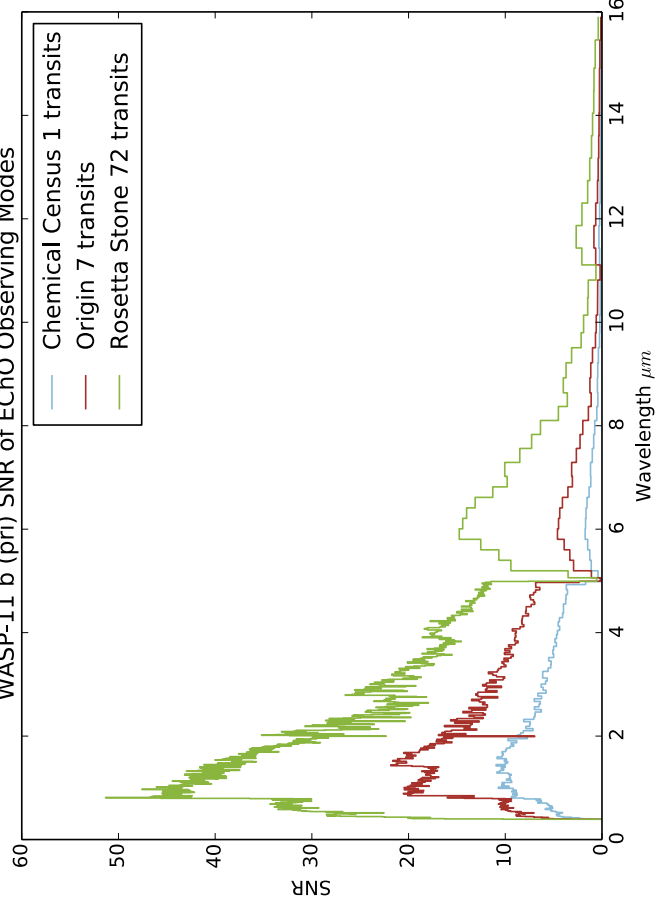


WASP-10 b (sec) SNR of EChO Observing Modes

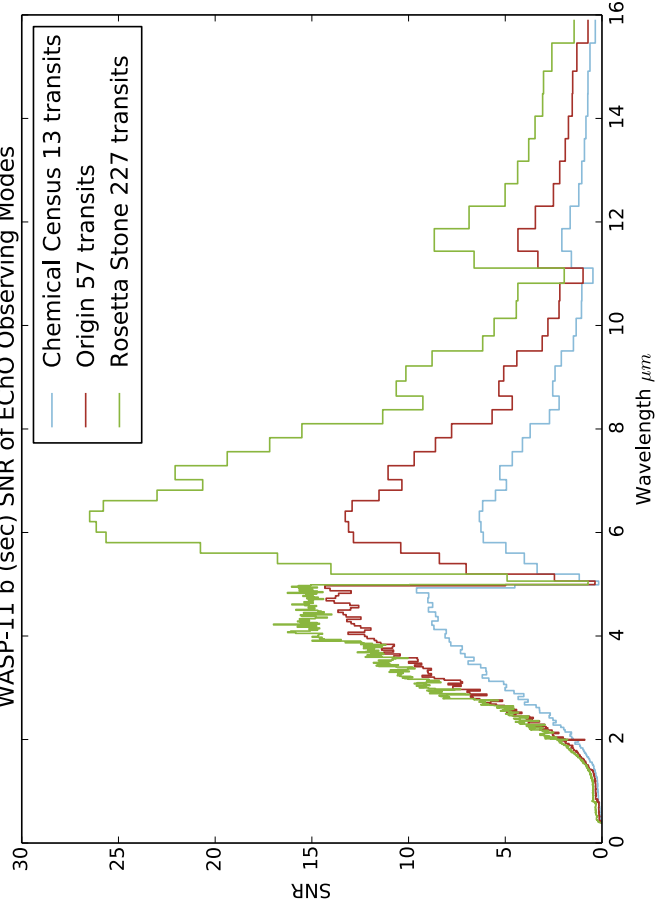




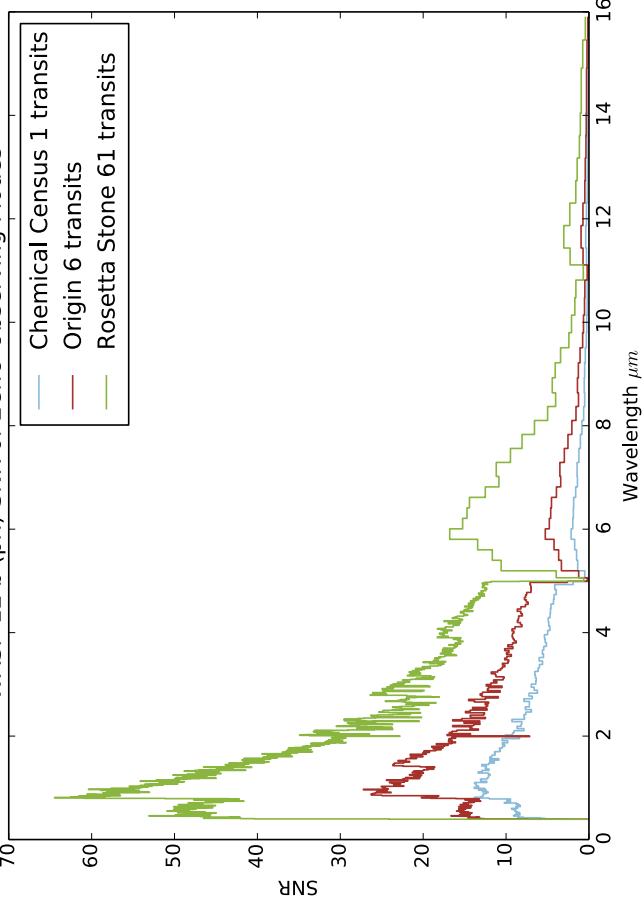
WASP-11 b (pri) SNR of EChO Observing Modes



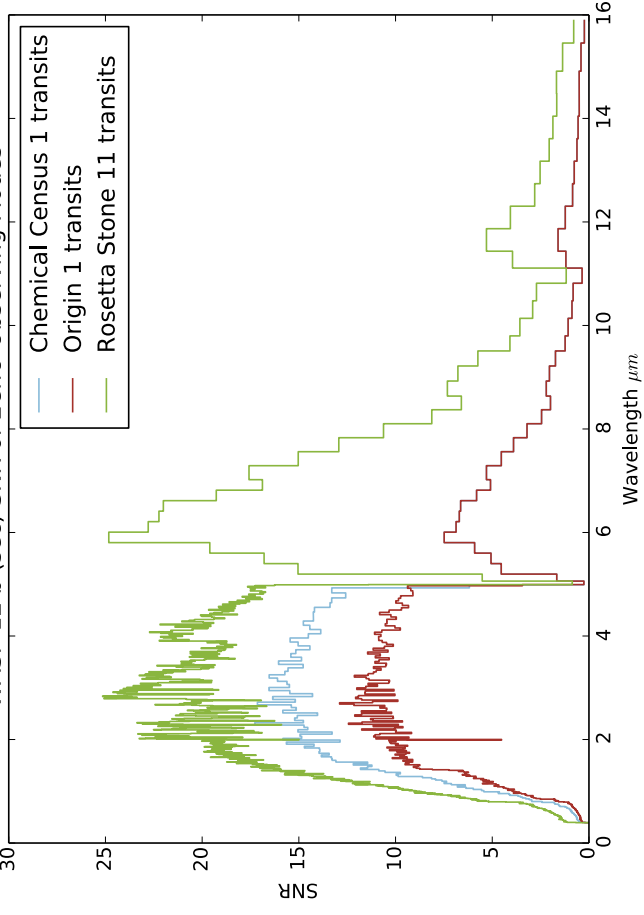
WASP-11 b (sec) SNR of EChO Observing Modes



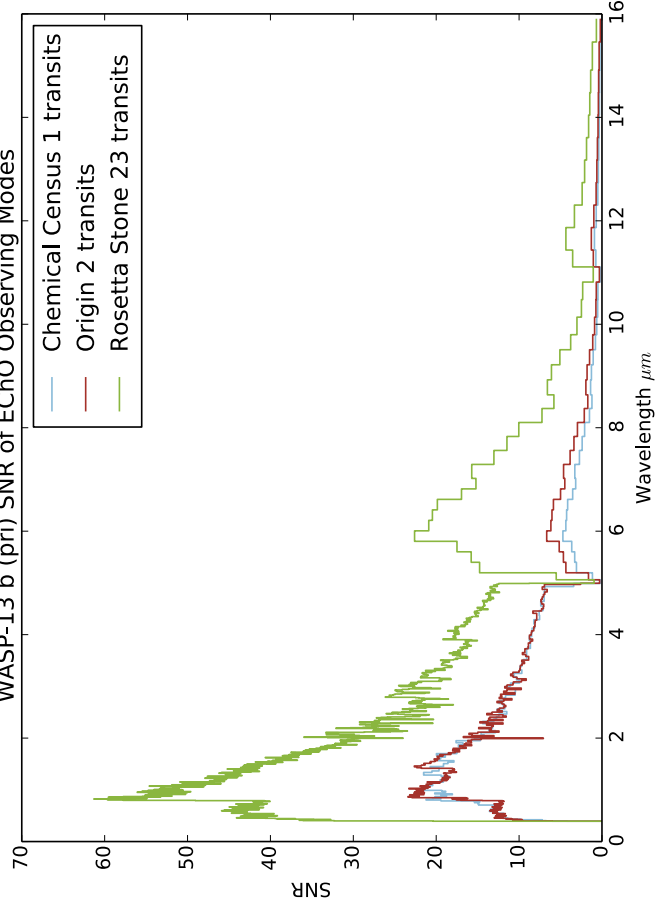
WASP-12 b (pri) SNR of EChO Observing Modes



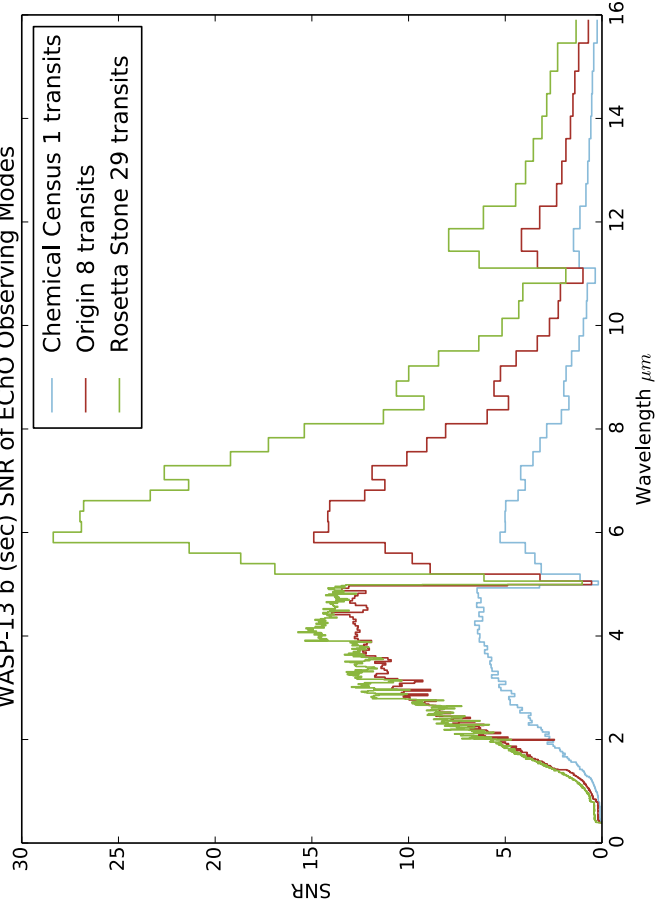
WASP-12 b (sec) SNR of EChO Observing Modes



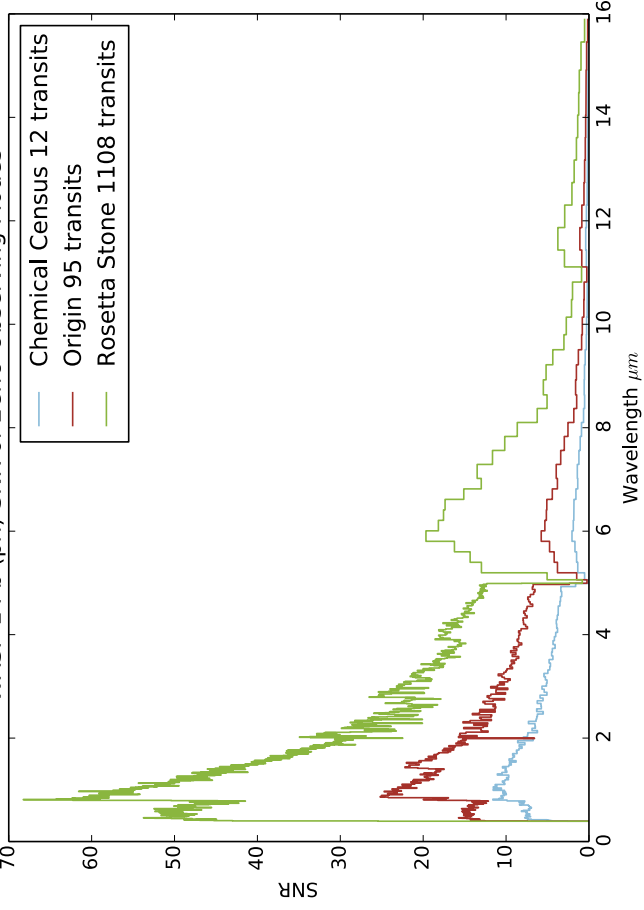
WASP-13 b (pri) SNR of EChO Observing Modes



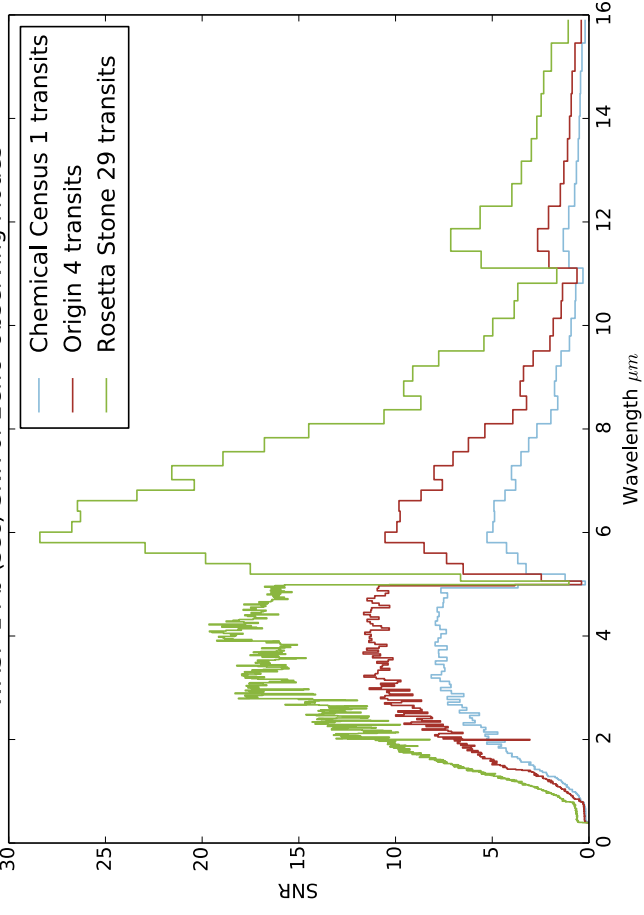
WASP-13 b (sec) SNR of EChO Observing Modes



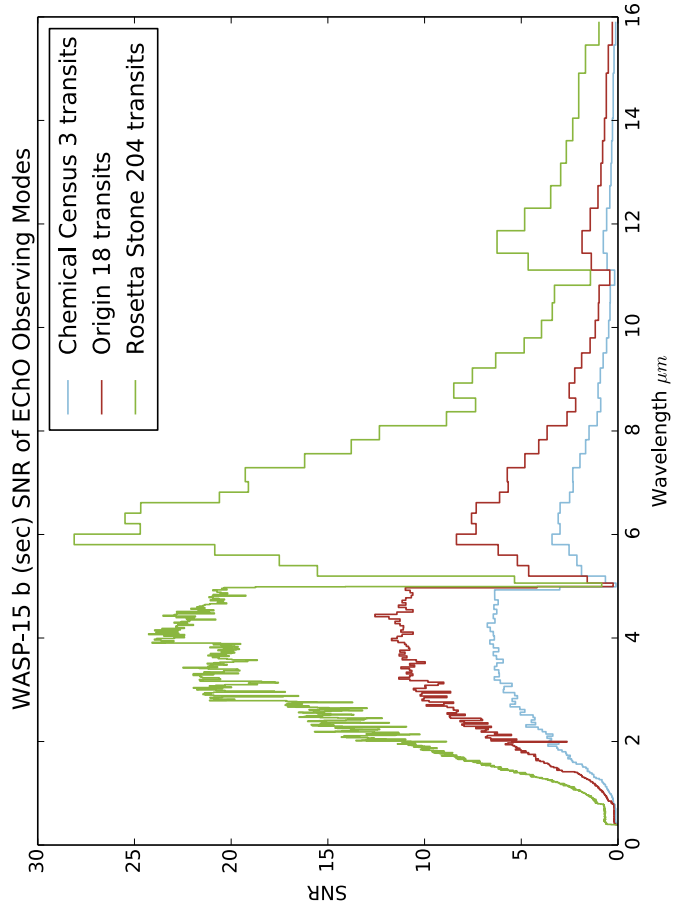
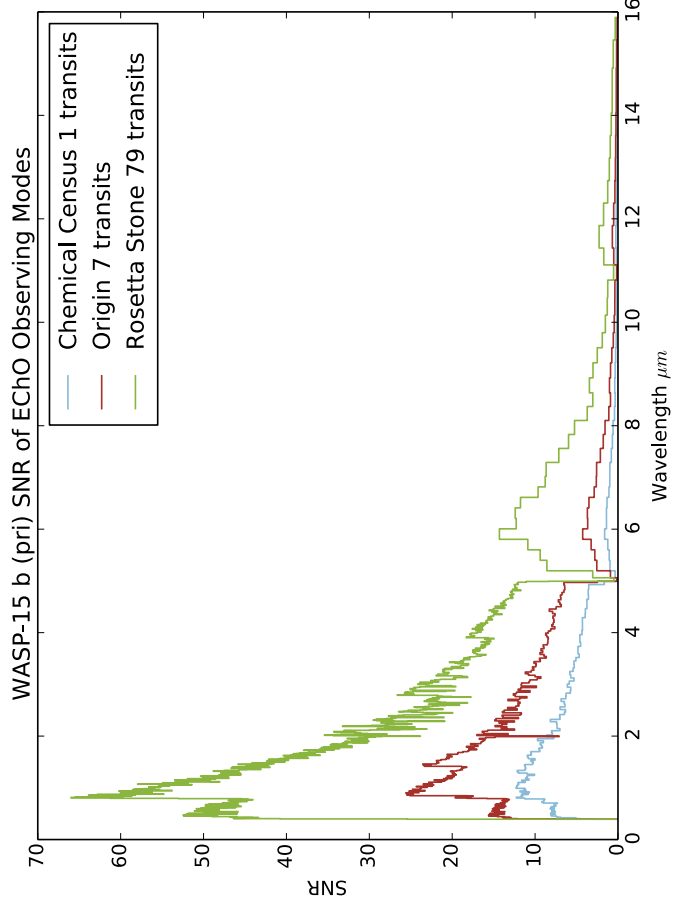
WASP-14 b (pri) SNR of EChO Observing Modes



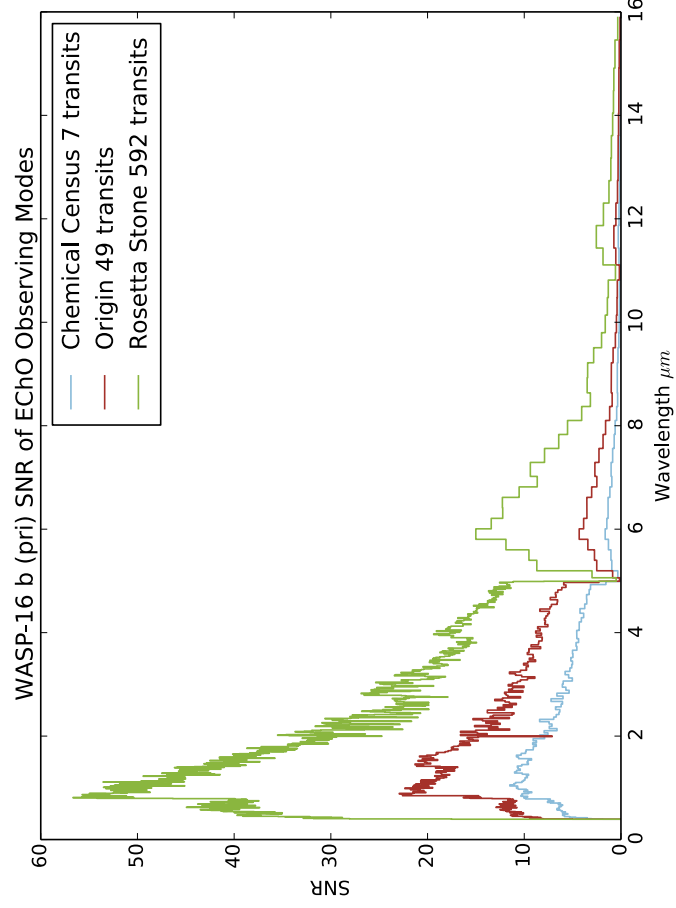
WASP-14 b (sec) SNR of EChO Observing Modes



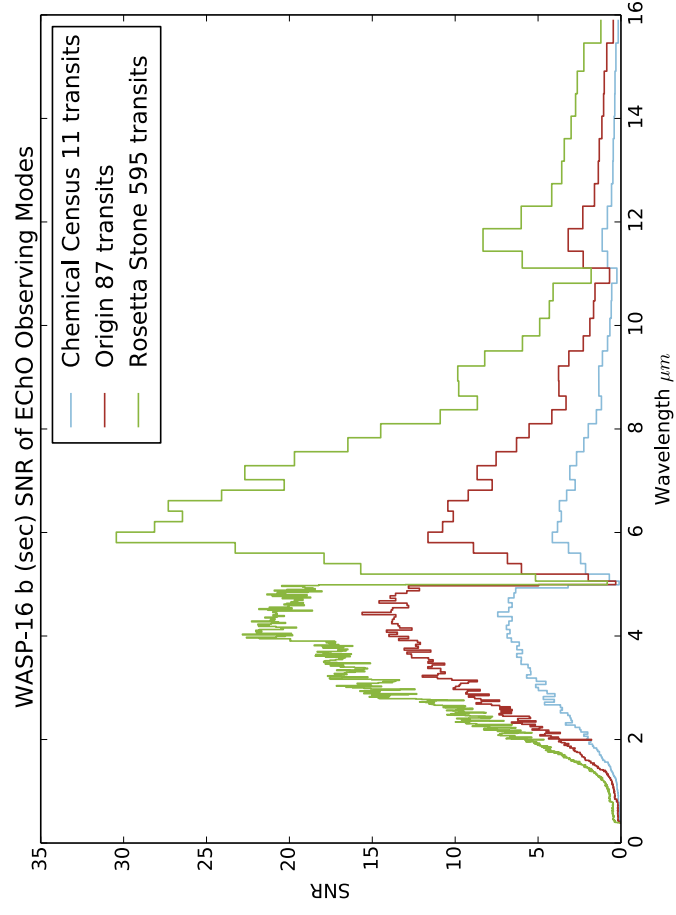
WASP-15 b (pri) SNR of EChO Observing Modes



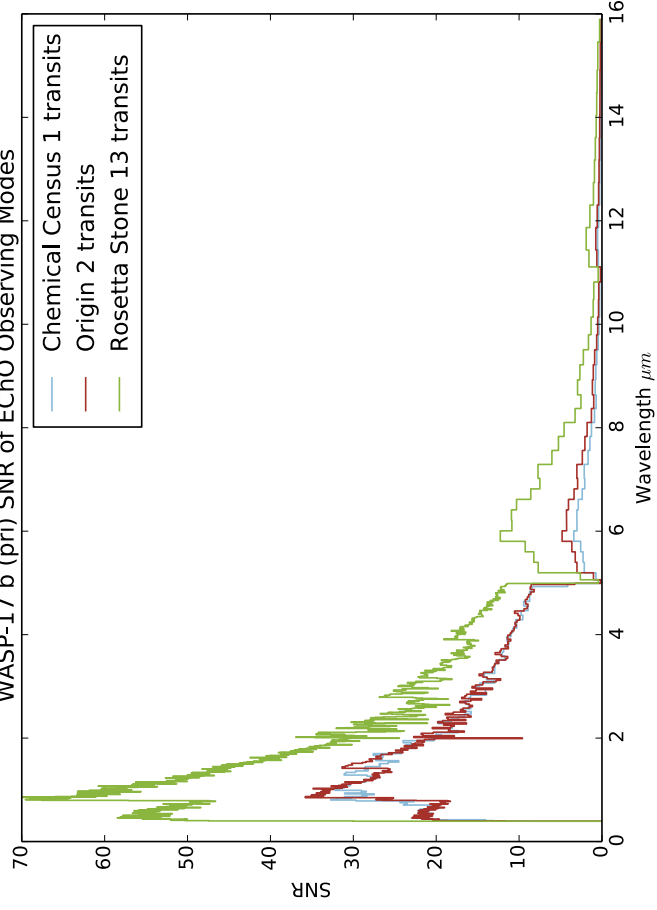
WASP-16 b (pri) SNR of EChO Observing Modes



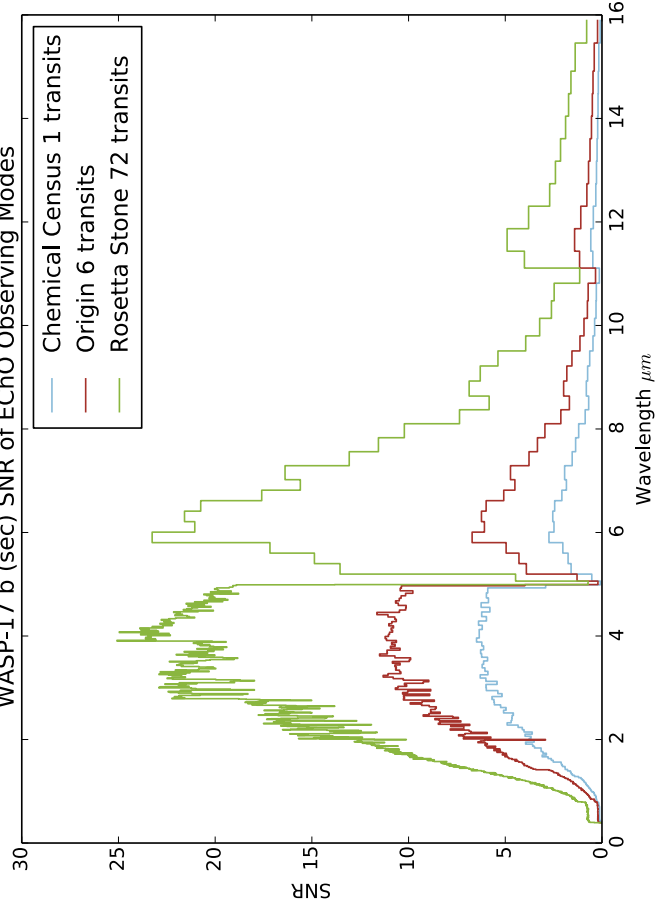
WASP-16 b (sec) SNR of EChO Observing Modes



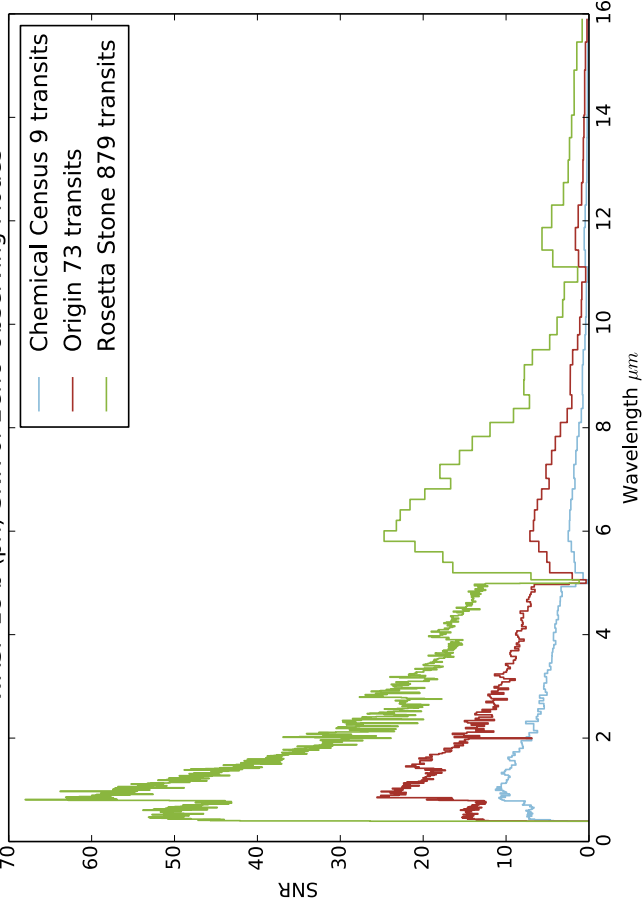
WASP-17 b (pri) SNR of EChO Observing Modes



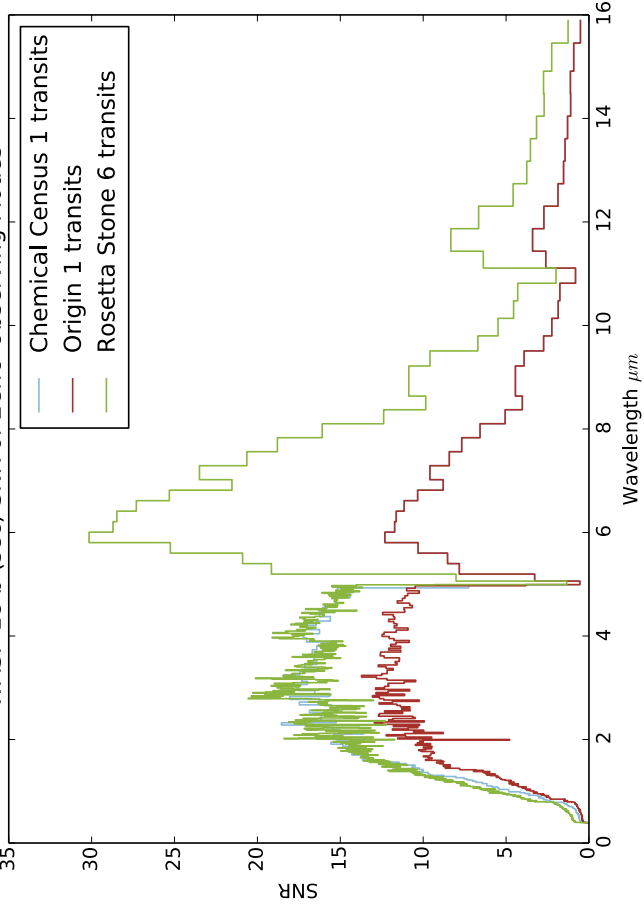
WASP-17 b (sec) SNR of EChO Observing Modes



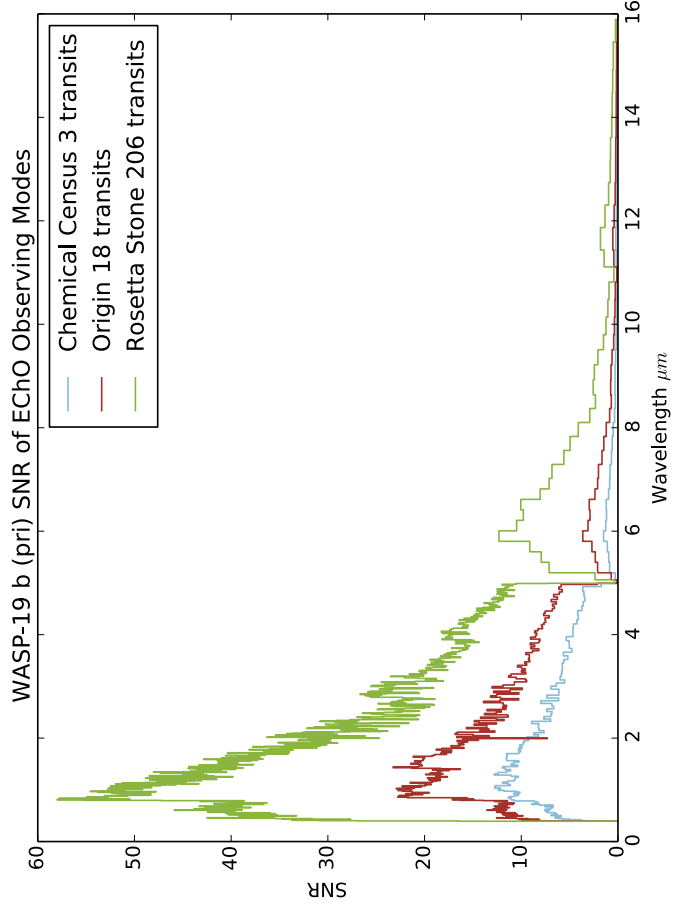
WASP-18 b (pri) SNR of EChO Observing Modes



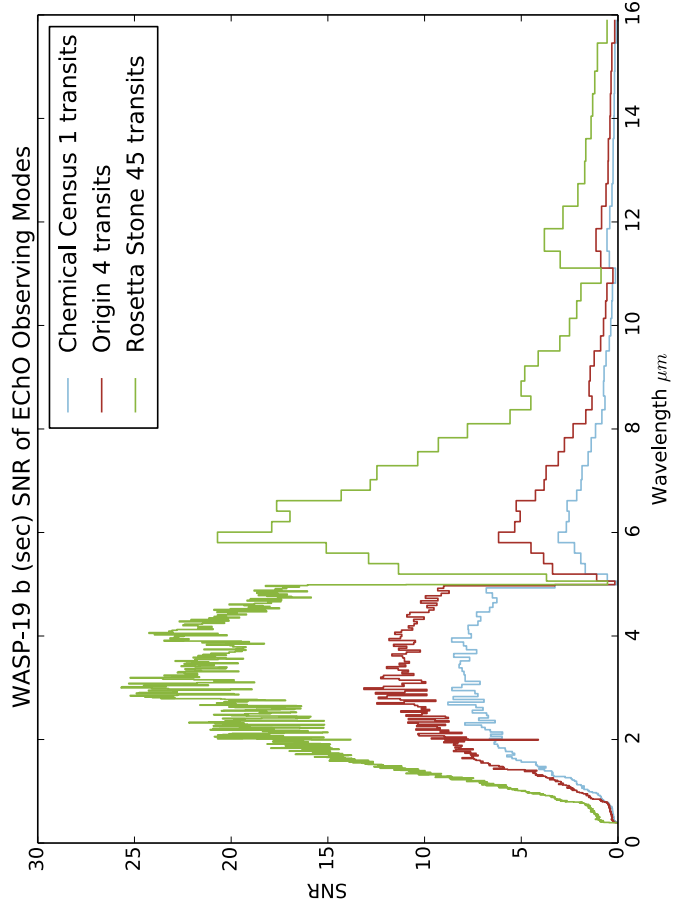
WASP-18 b (sec) SNR of EChO Observing Modes



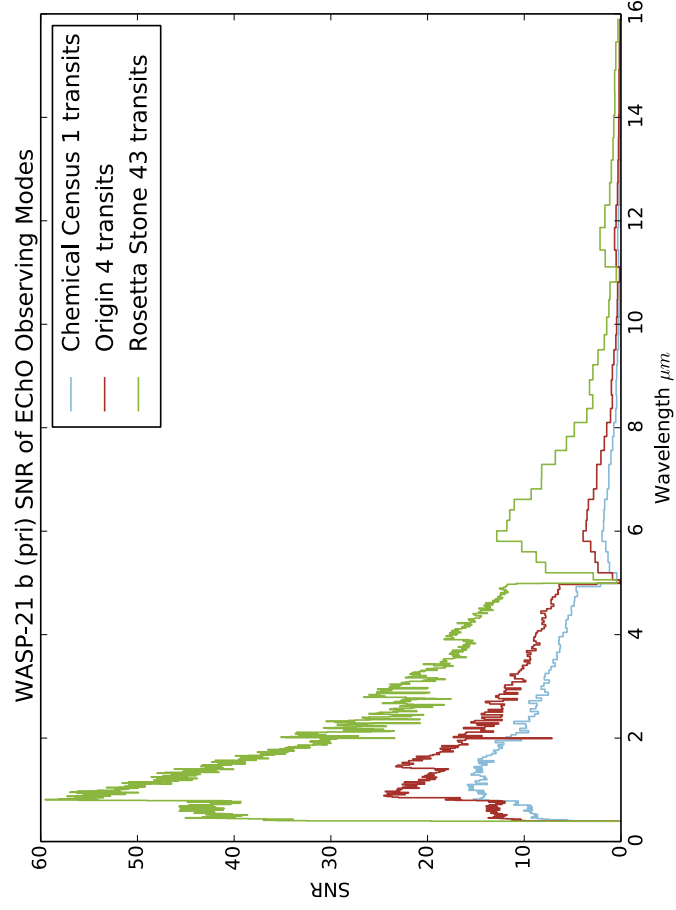
WASP-19 b (pri) SNR of EChO Observing Modes



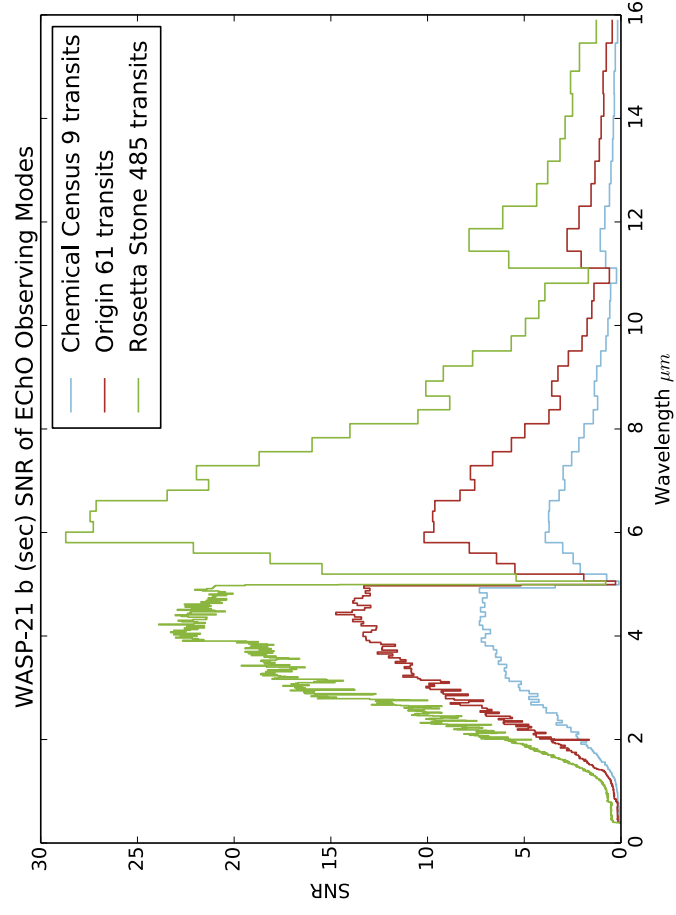
WASP-19 b (sec) SNR of EChO Observing Modes



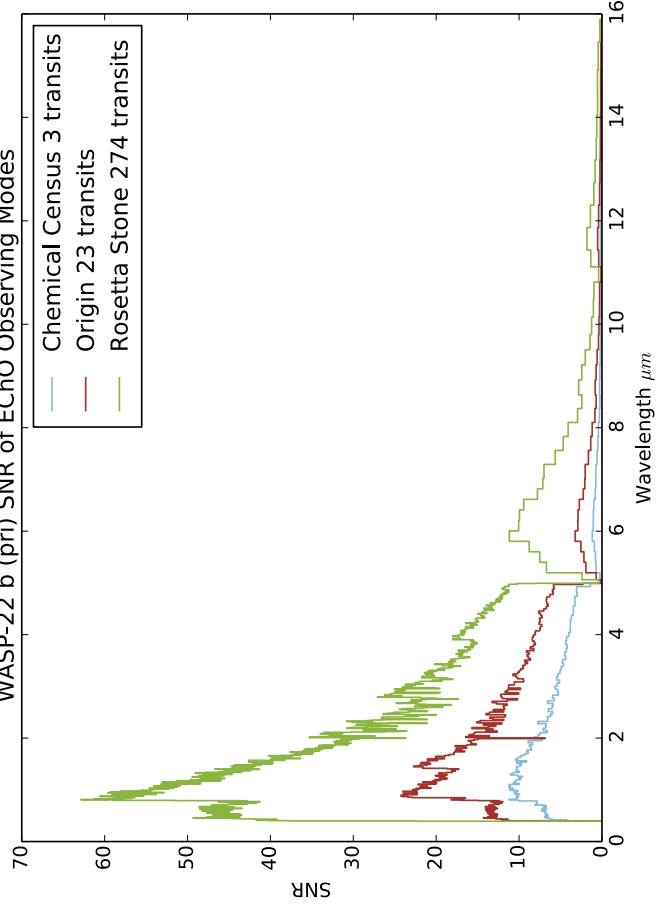
WASP-21 b (pri) SNR of EChO Observing Modes



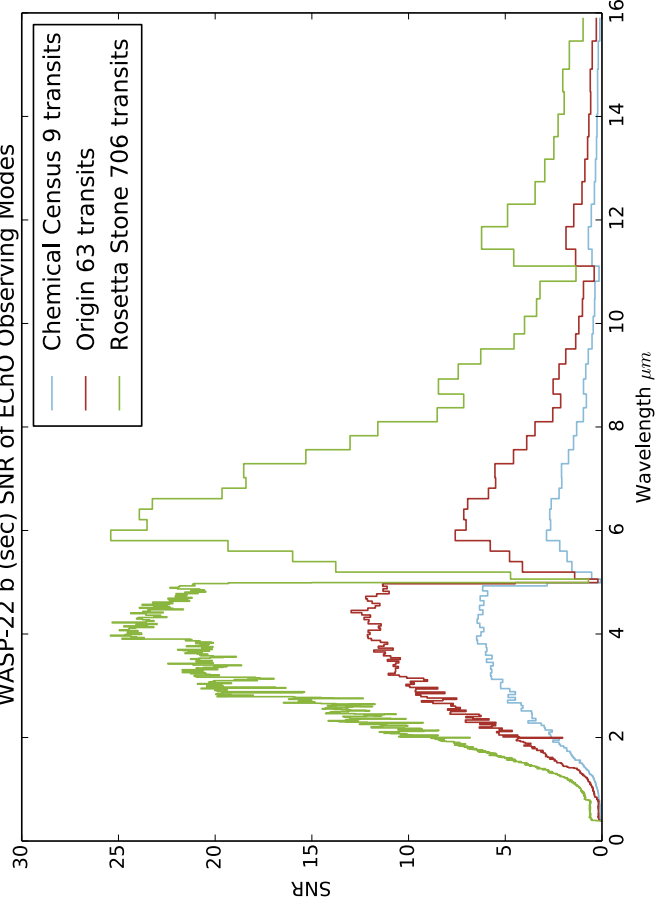
WASP-21 b (sec) SNR of EChO Observing Modes



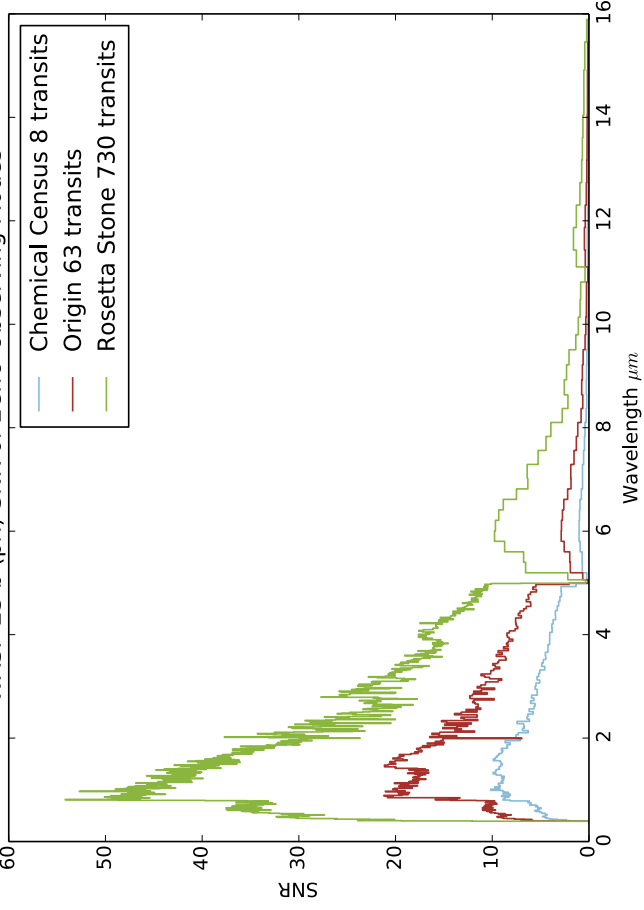
WASP-22 b (pri) SNR of EChO Observing Modes



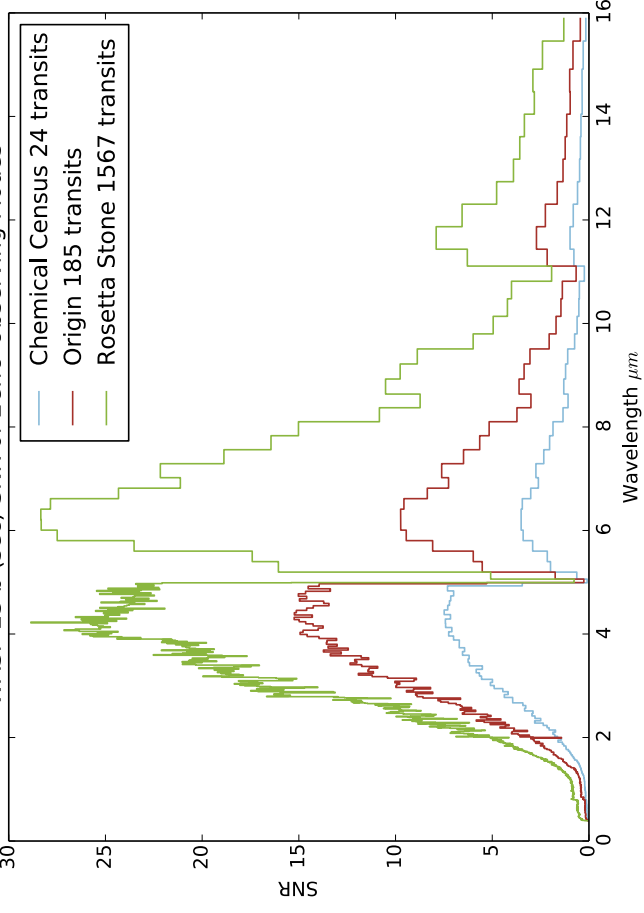
WASP-22 b (sec) SNR of EChO Observing Modes



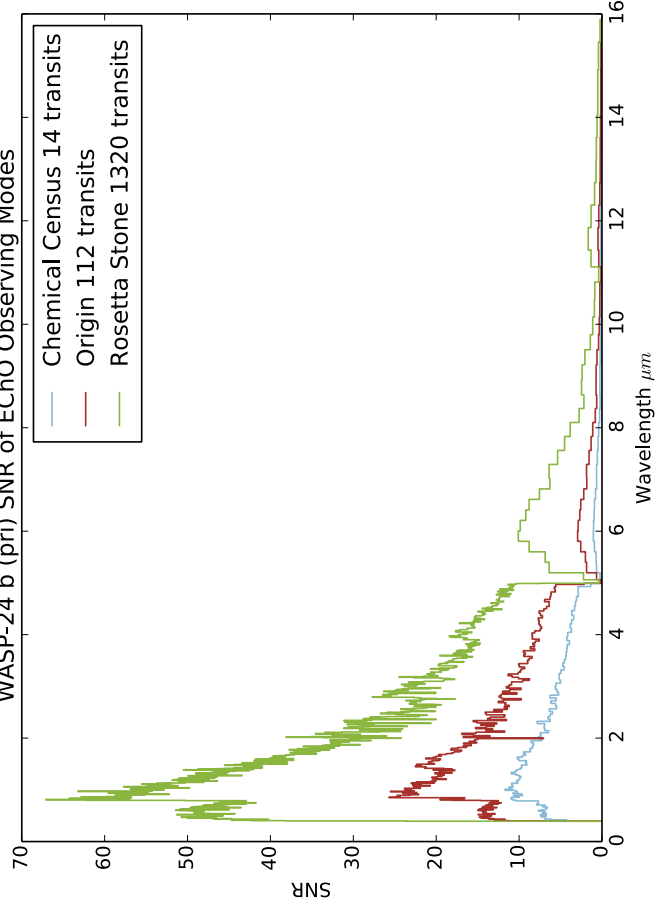
WASP-23 b (pri) SNR of EChO Observing Modes



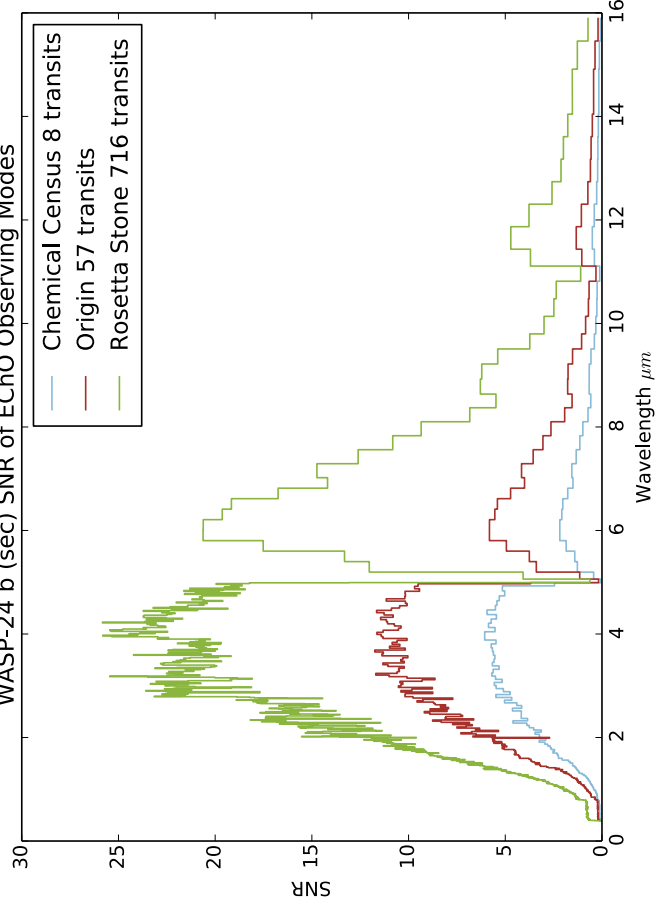
WASP-23 b (sec) SNR of EChO Observing Modes



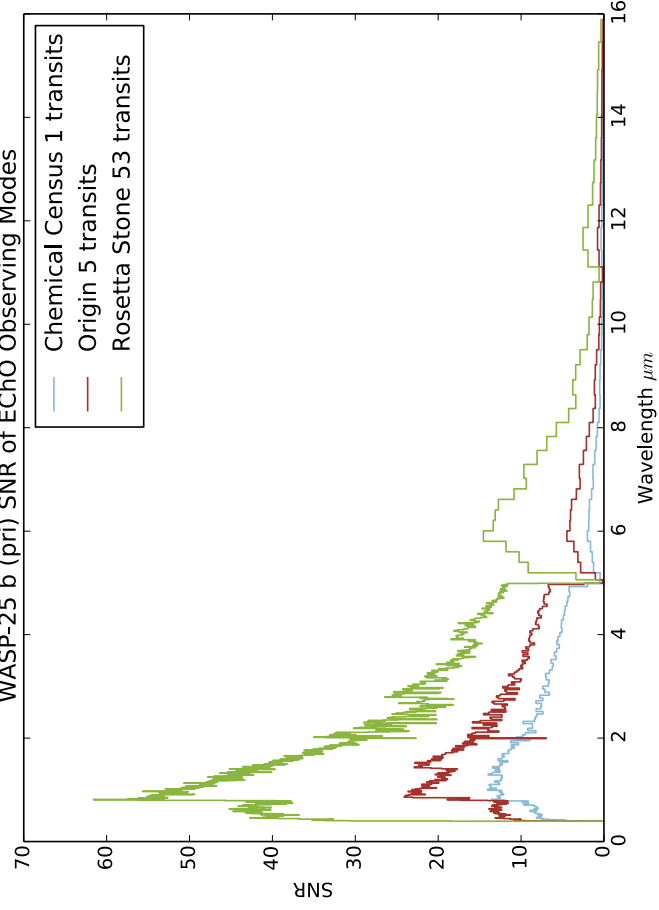
WASP-24 b (pri) SNR of EChO Observing Modes



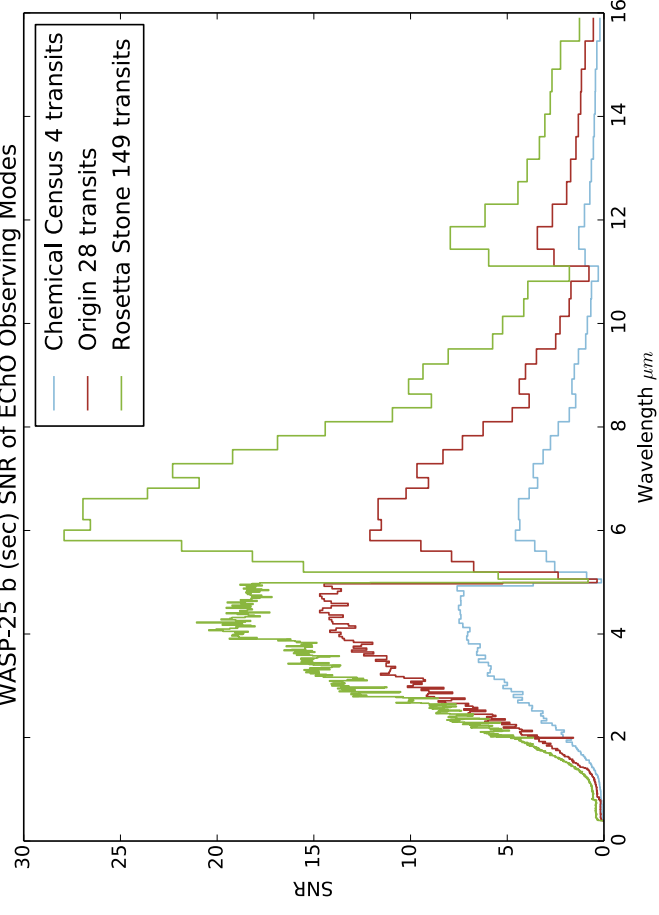
WASP-24 b (sec) SNR of EChO Observing Modes

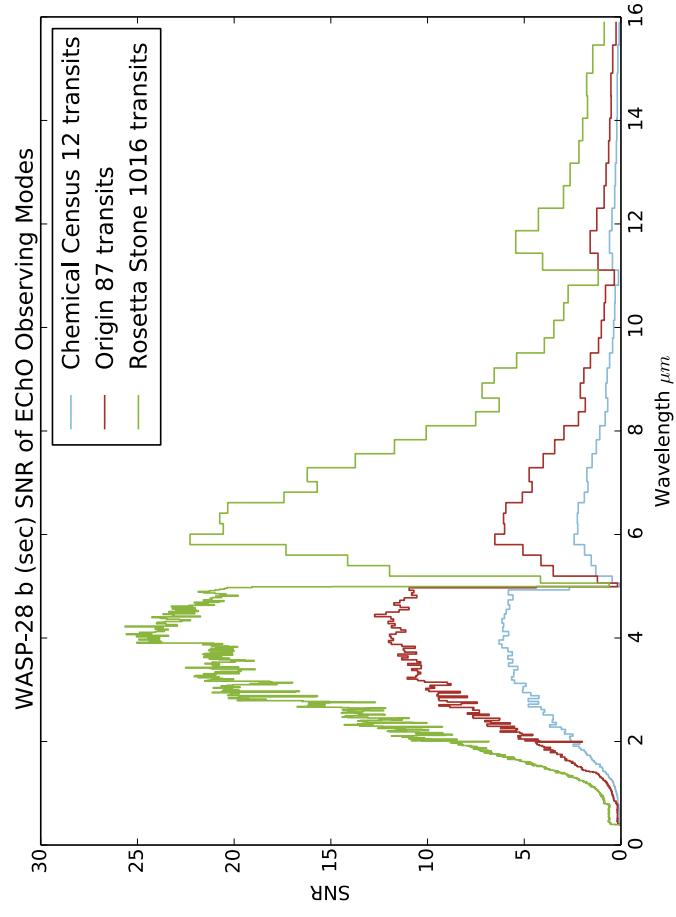
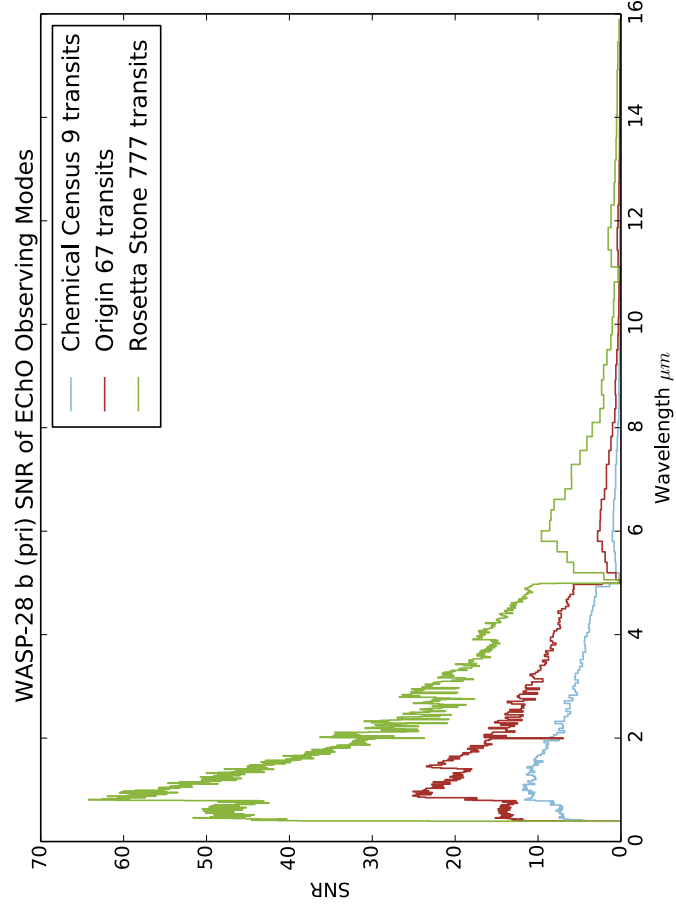
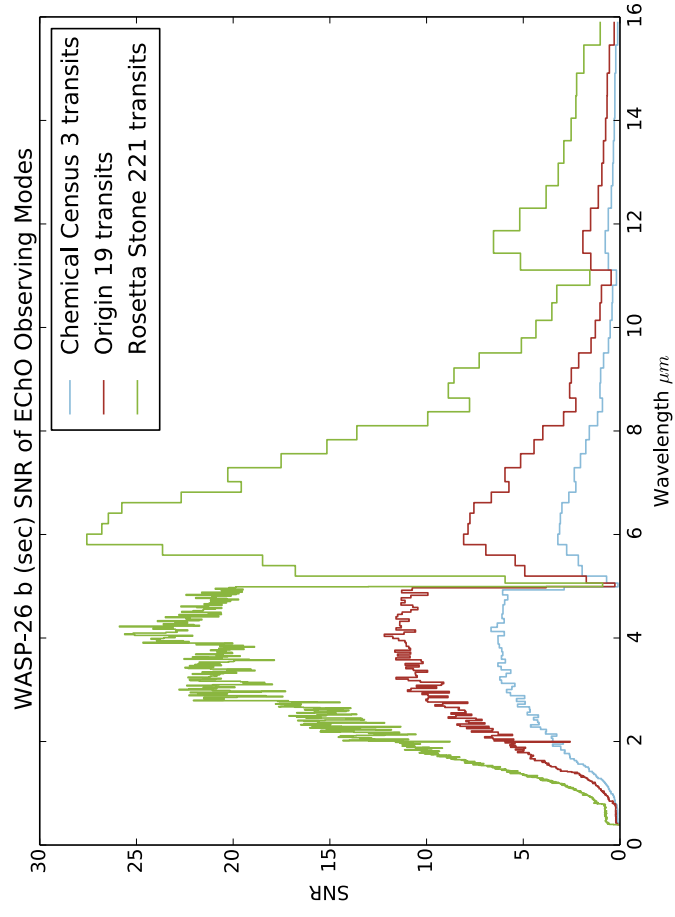
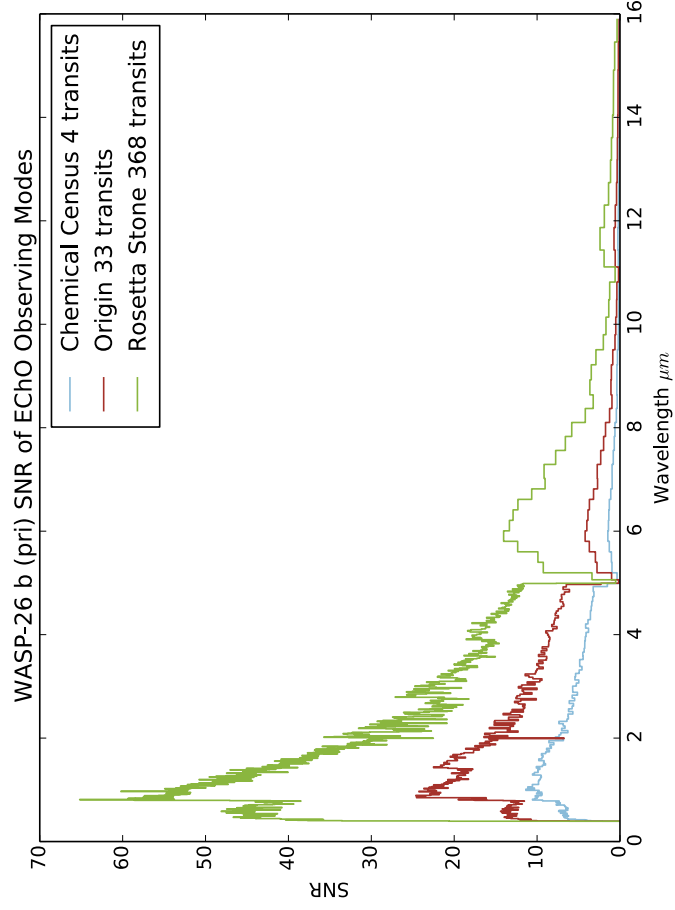


WASP-25 b (pri) SNR of EChO Observing Modes



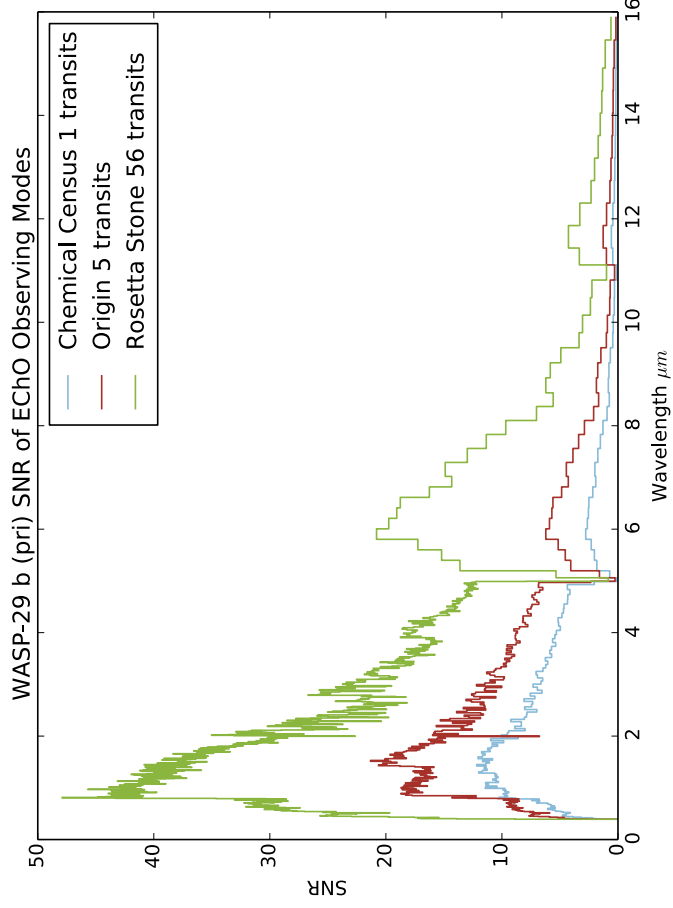
WASP-25 b (sec) SNR of EChO Observing Modes



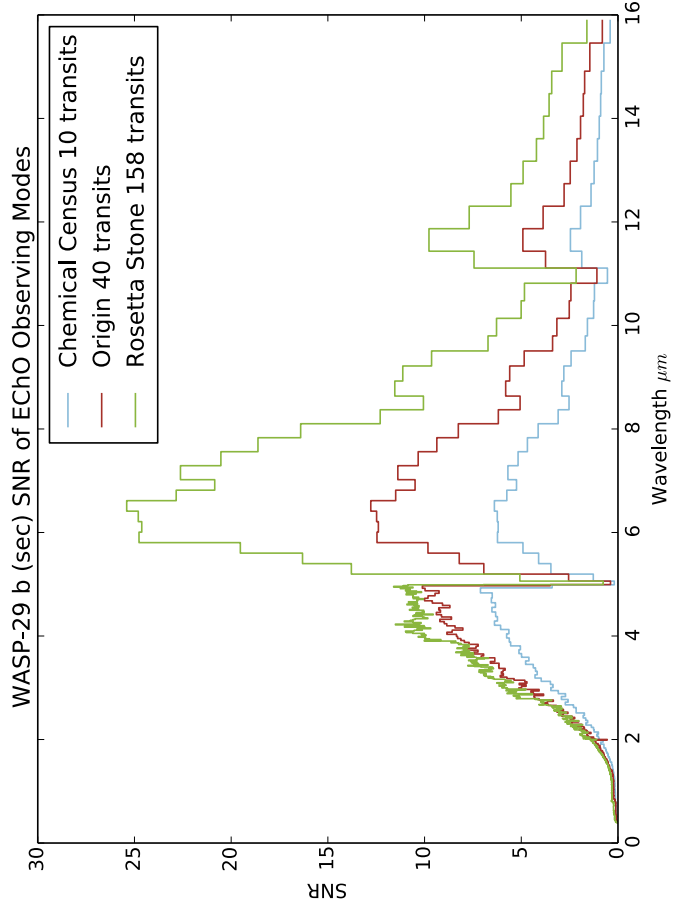




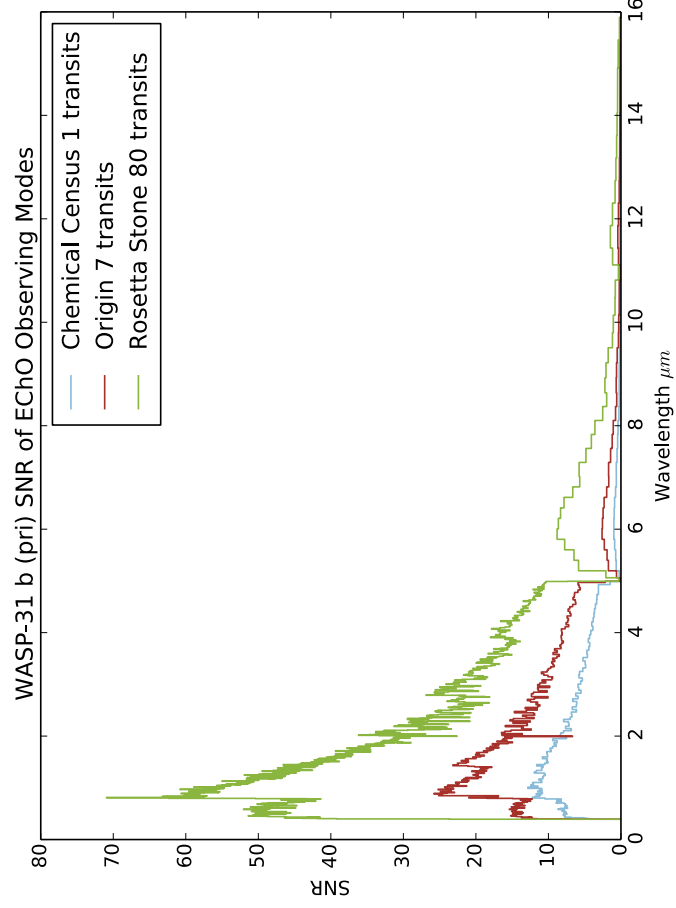
WASP-29 b (pri) SNR of EChO Observing Modes



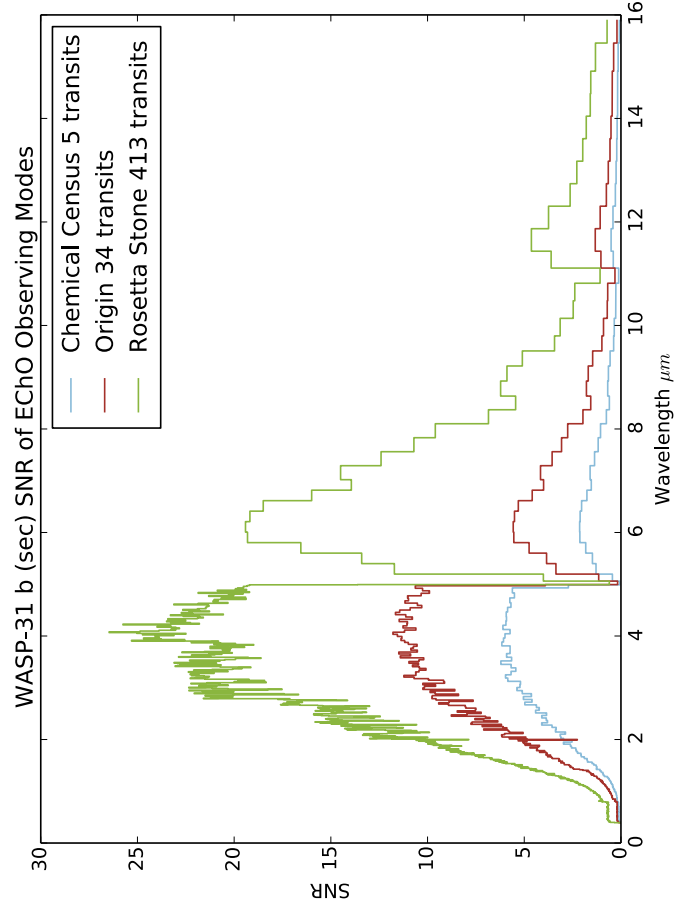
WASP-29 b (sec) SNR of EChO Observing Modes

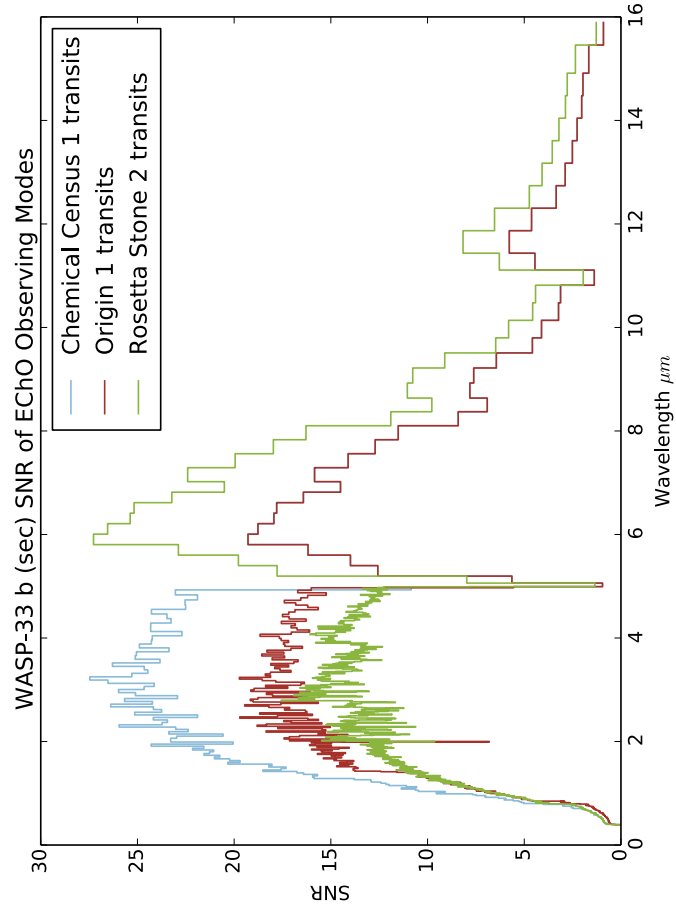
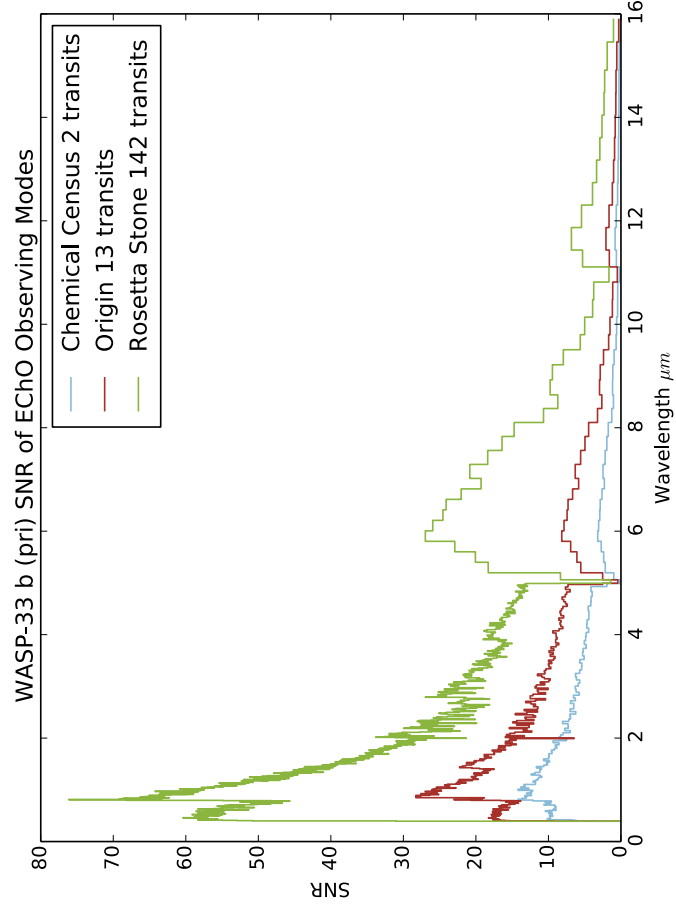
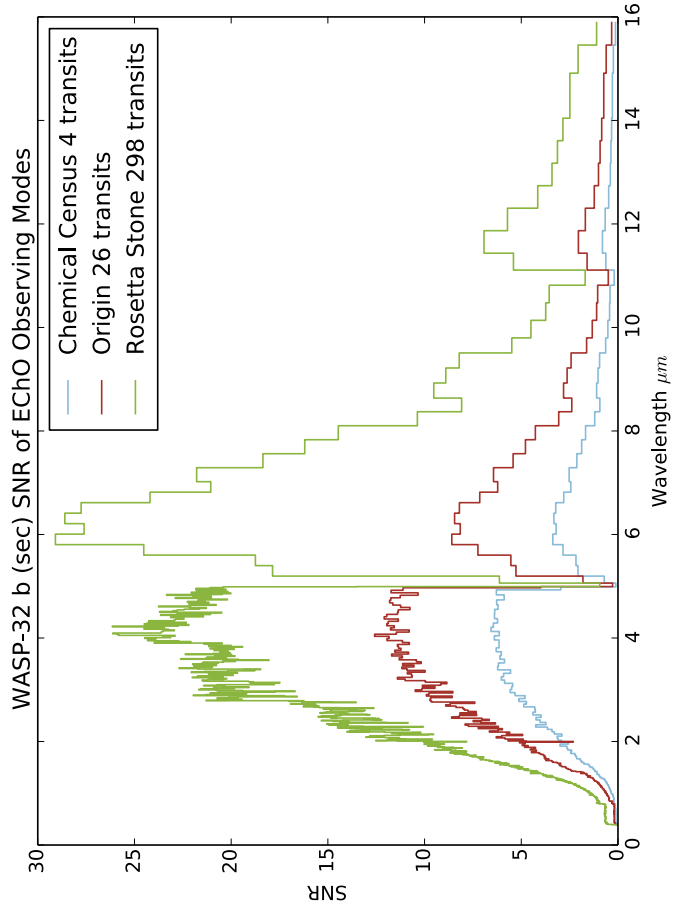
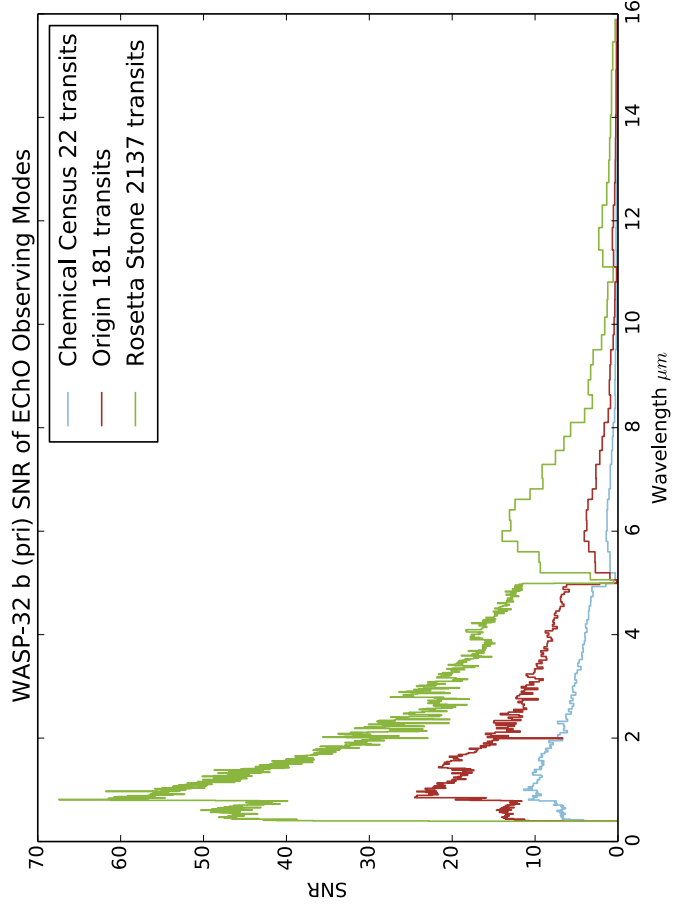


WASP-31 b (pri) SNR of EChO Observing Modes

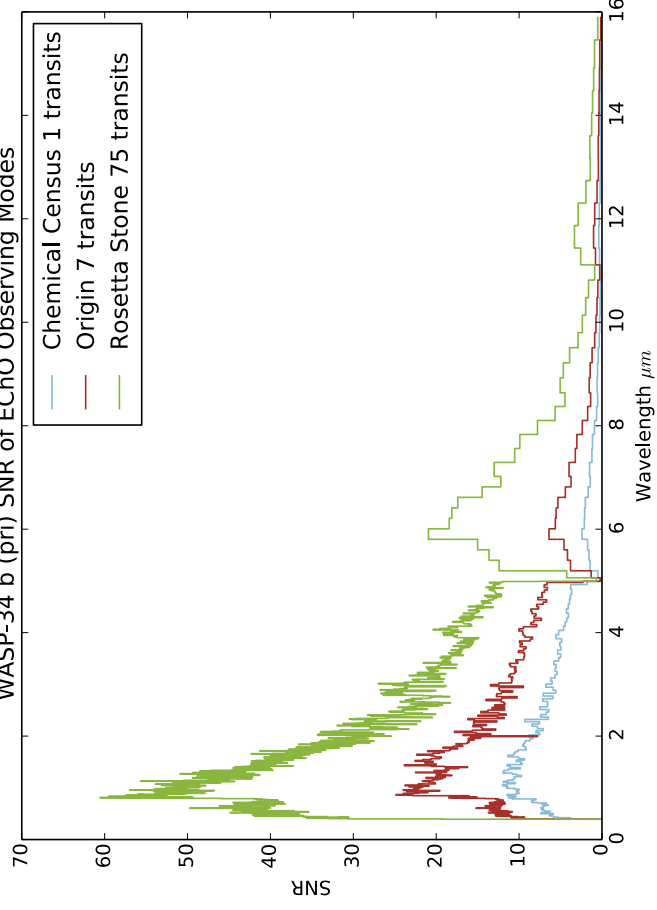


WASP-31 b (sec) SNR of EChO Observing Modes

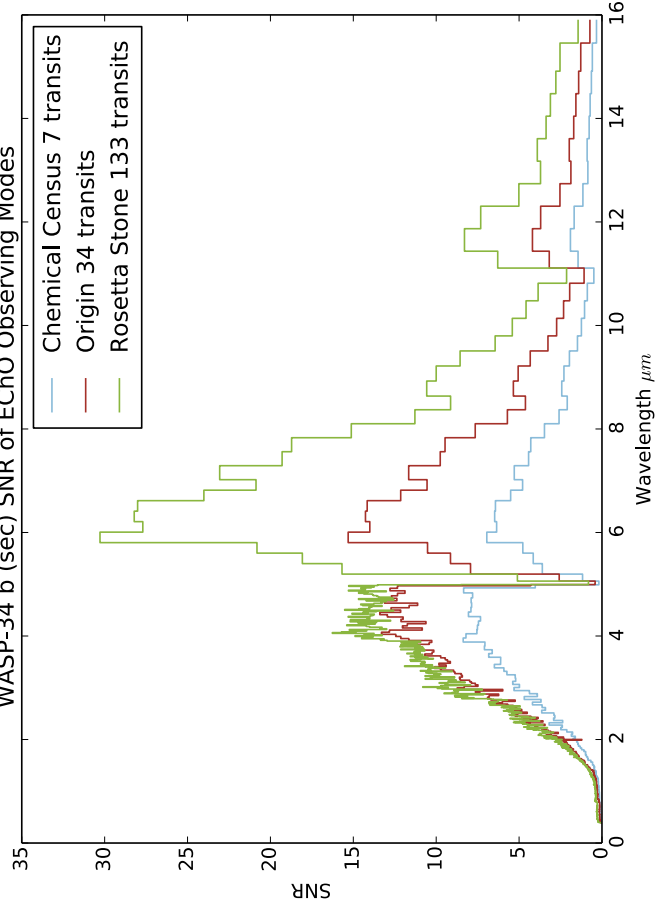




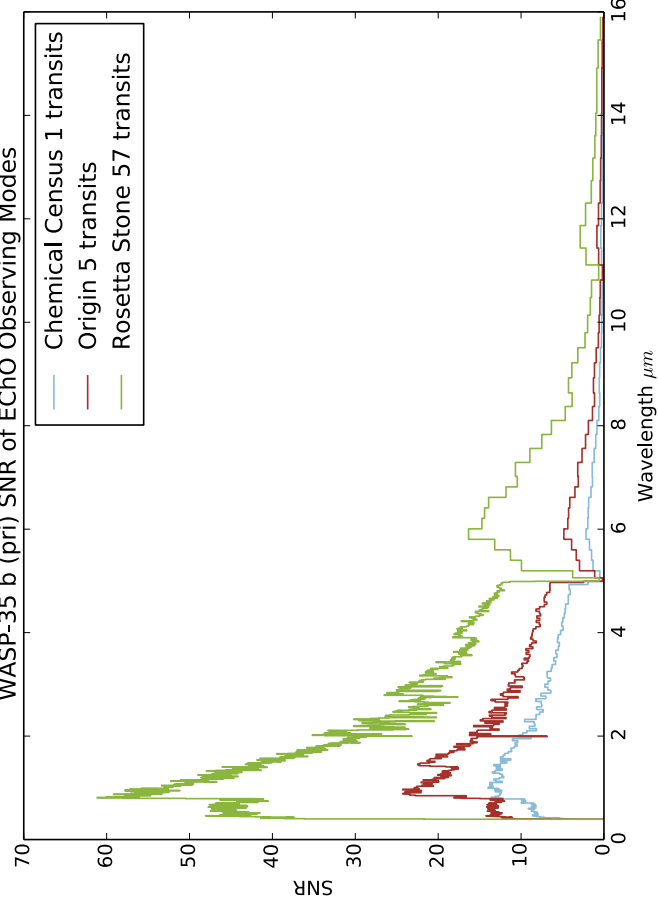
WASP-34 b (pri) SNR of EChO Observing Modes



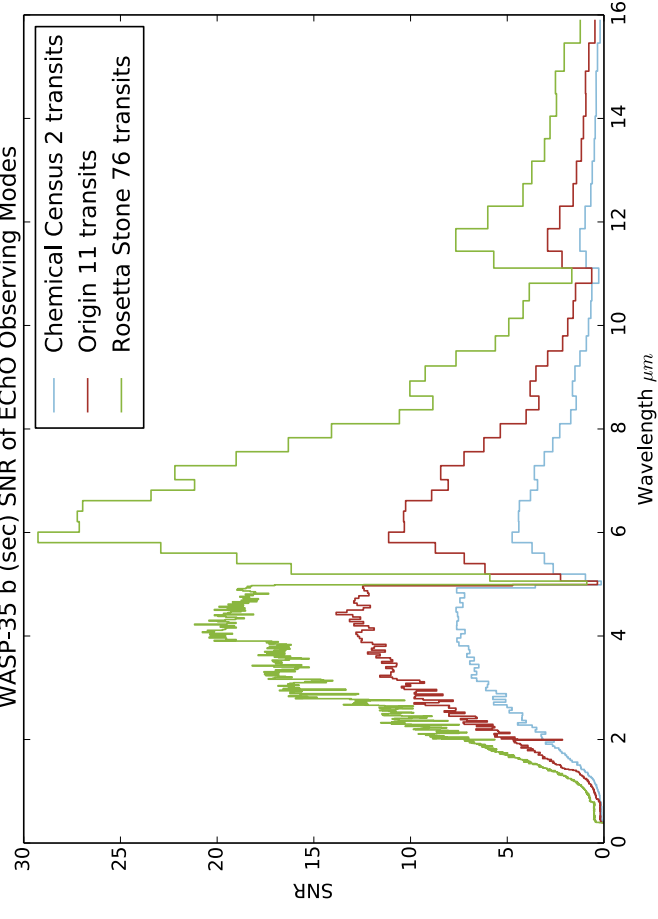
WASP-34 b (sec) SNR of EChO Observing Modes



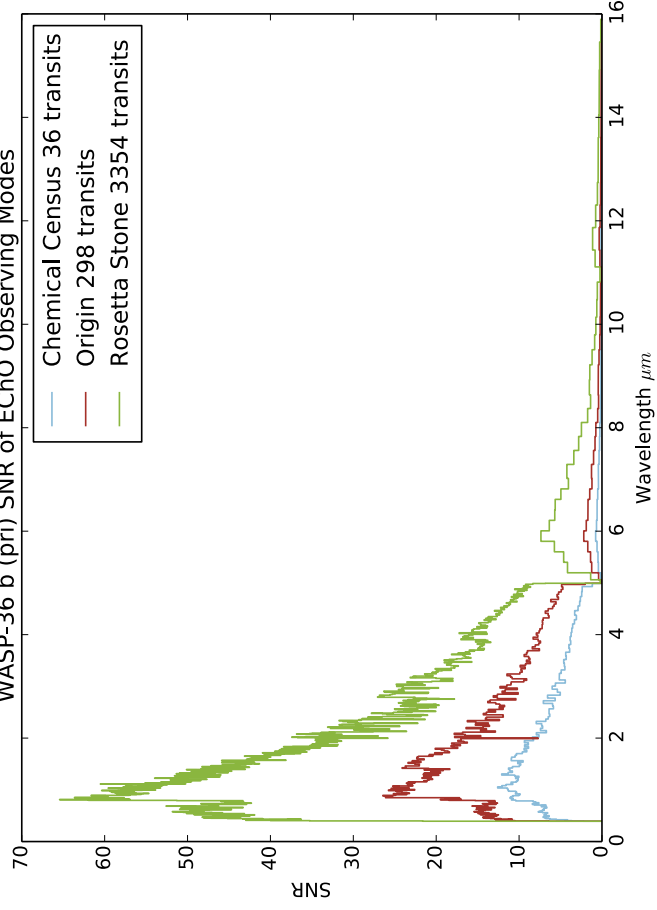
WASP-35 b (pri) SNR of EChO Observing Modes



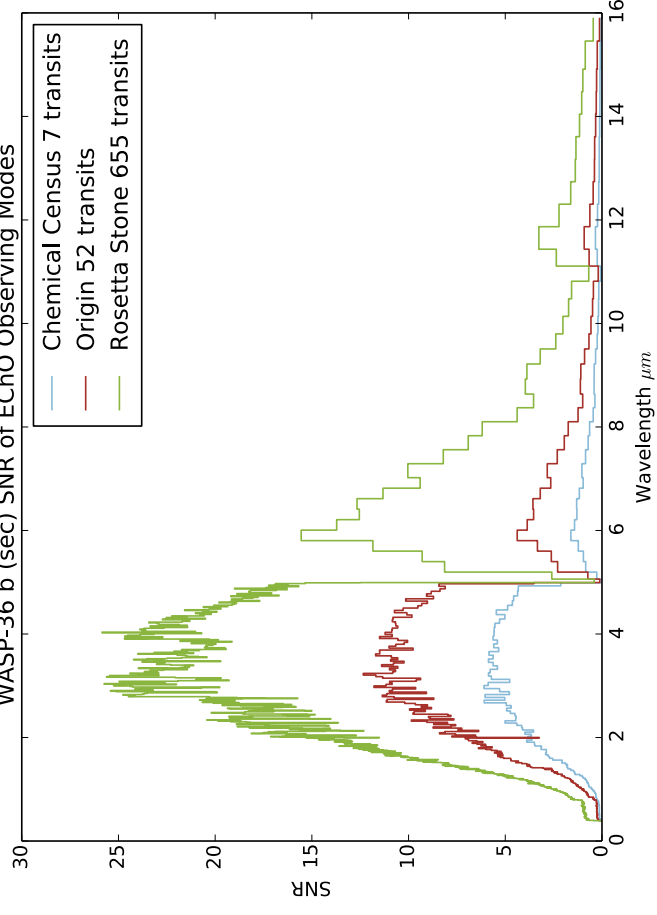
WASP-35 b (sec) SNR of EChO Observing Modes



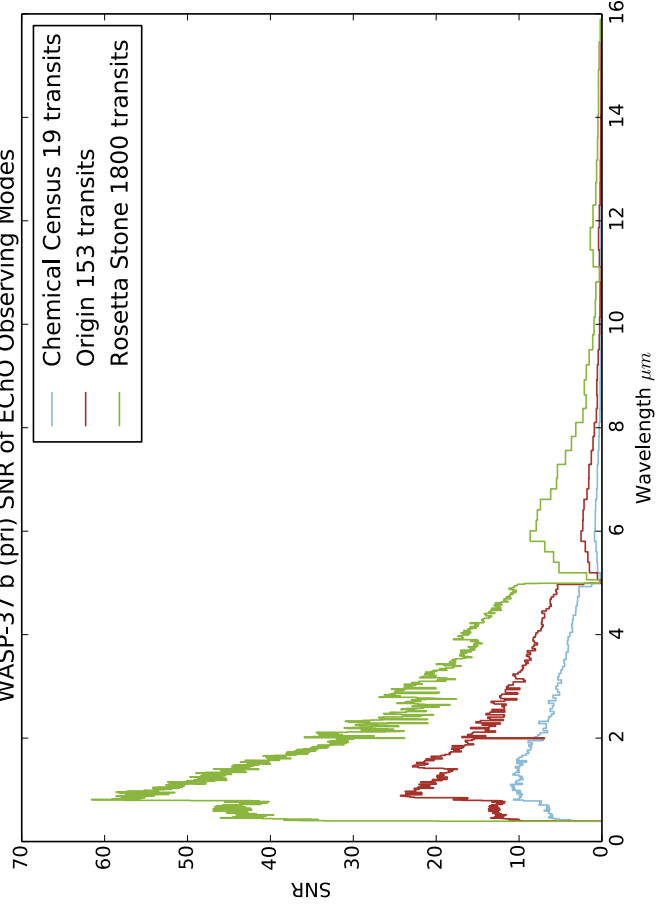
WASP-36 b (pri) SNR of EChO Observing Modes



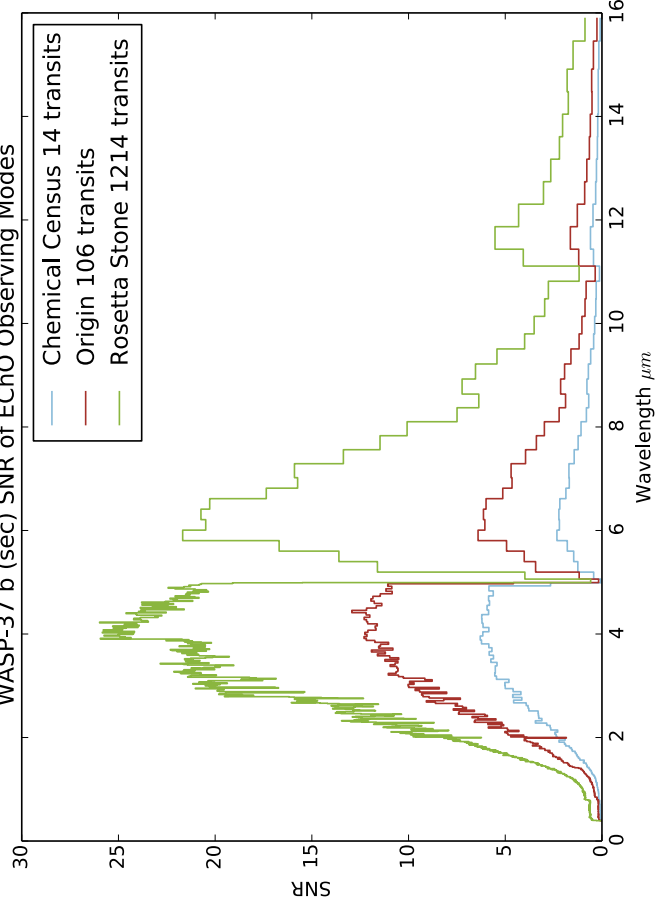
WASP-36 b (sec) SNR of EChO Observing Modes

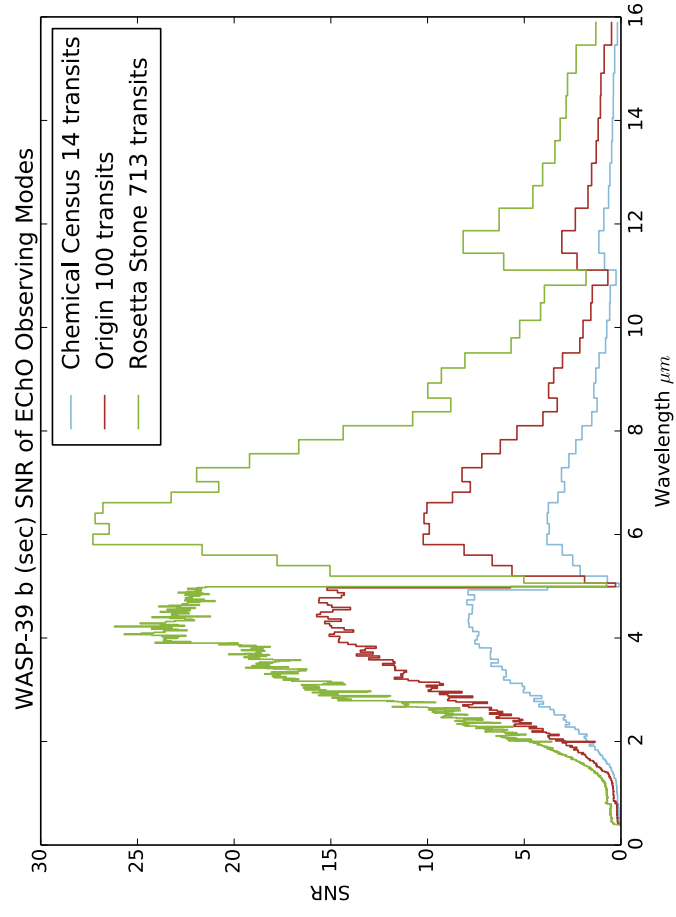
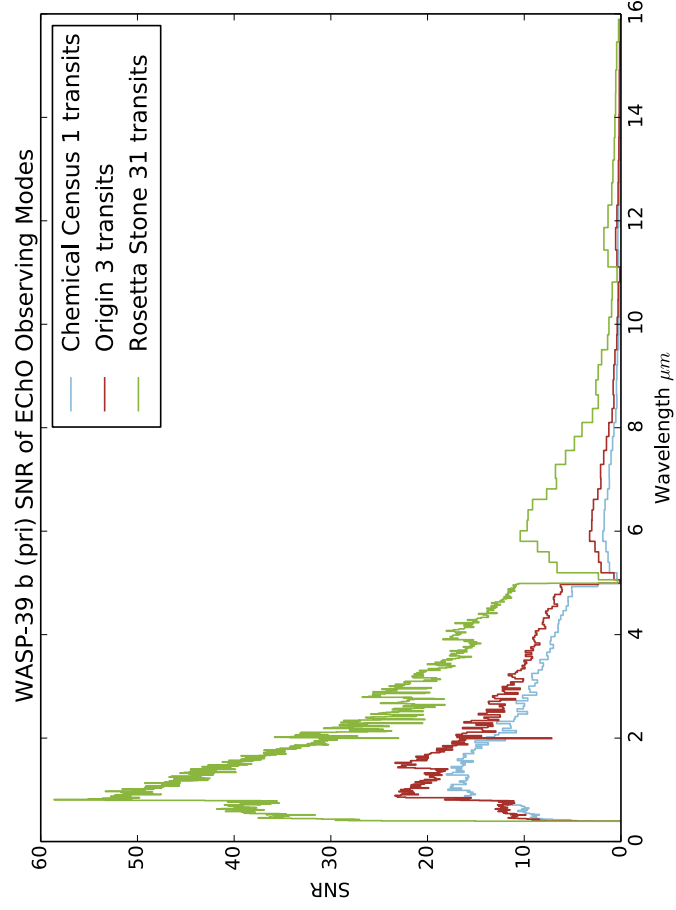
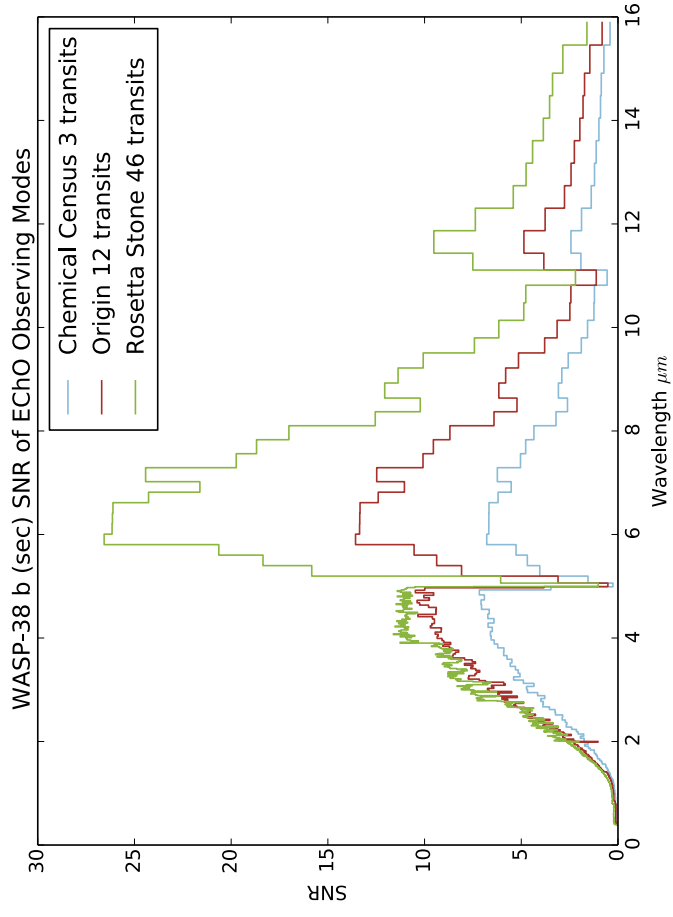
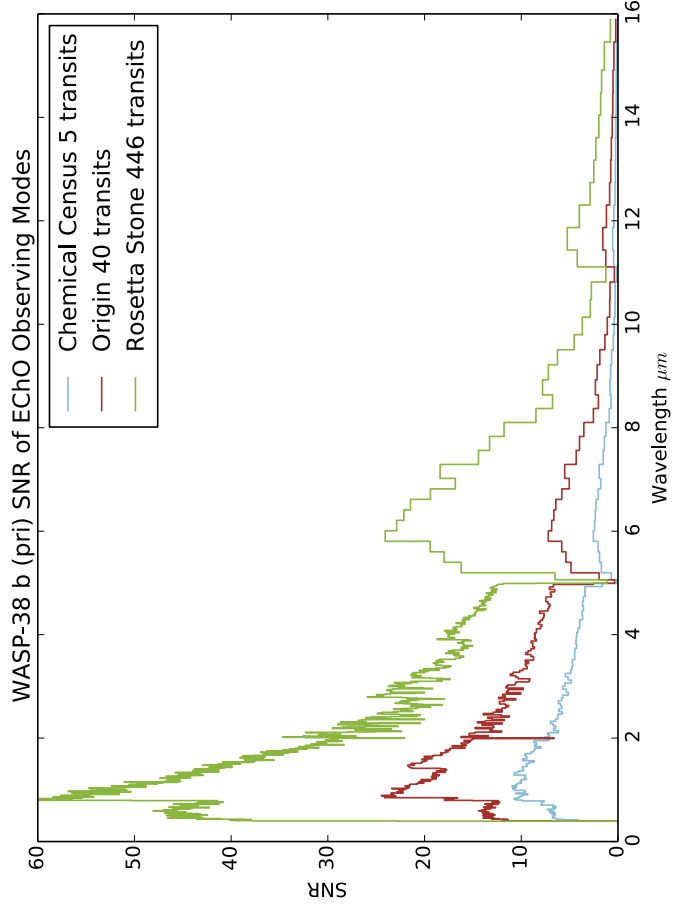


WASP-37 b (pri) SNR of EChO Observing Modes

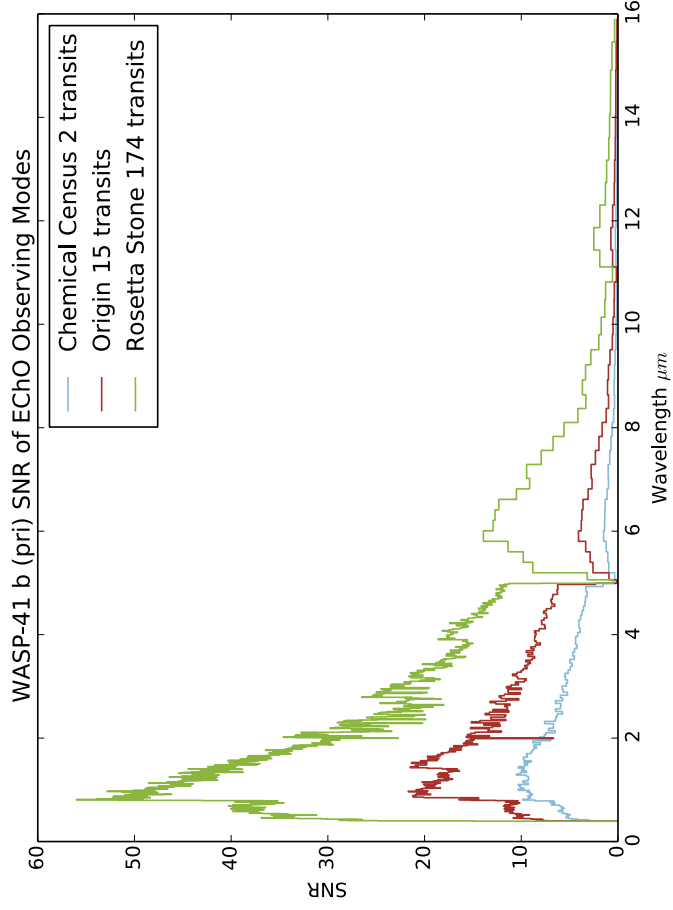


WASP-37 b (sec) SNR of EChO Observing Modes

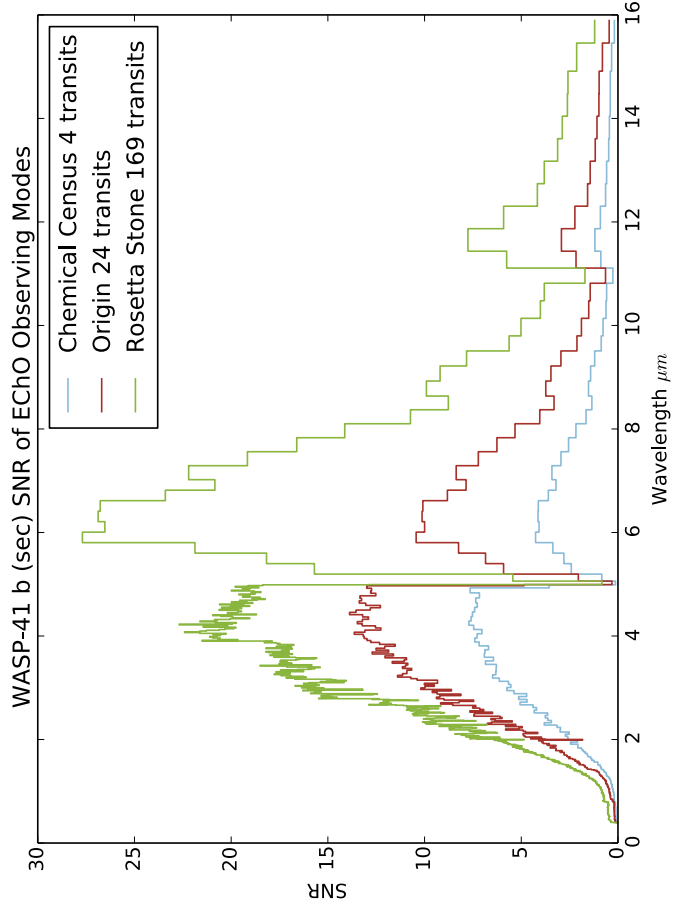




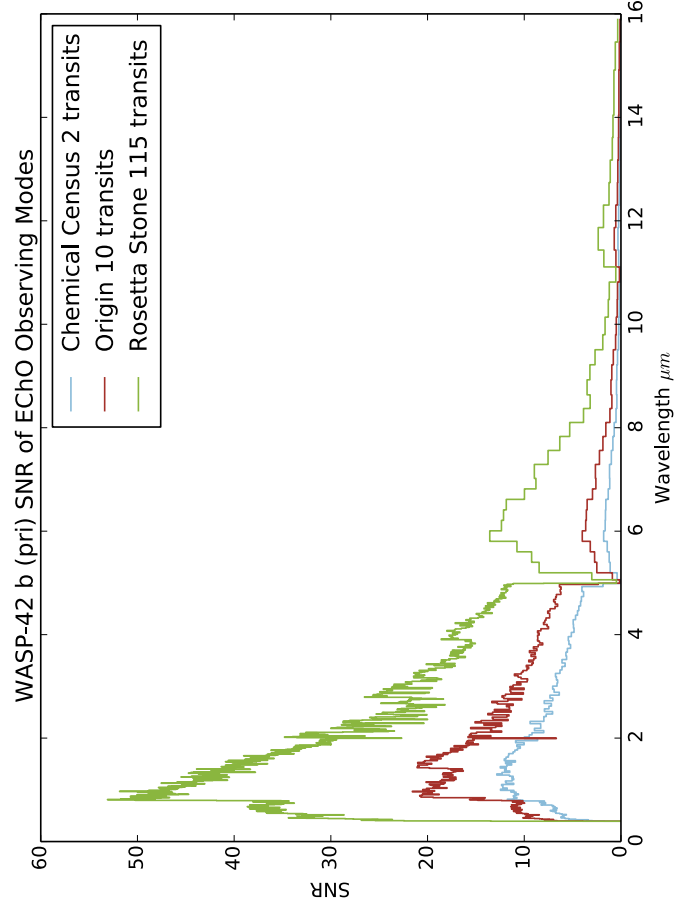
WASP-41 b (pri) SNR of EChO Observing Modes



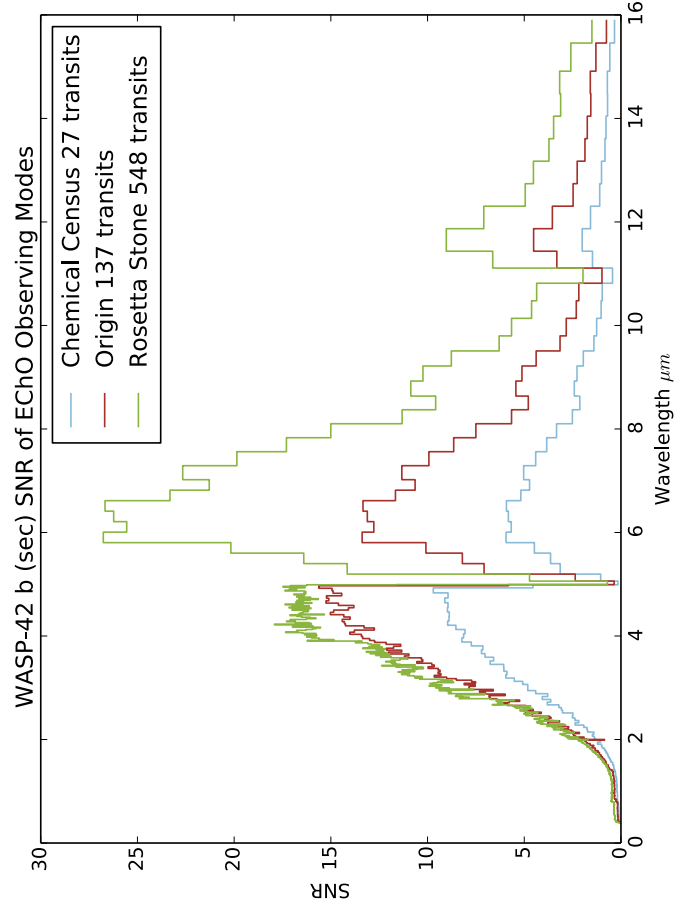
WASP-41 b (sec) SNR of EChO Observing Modes



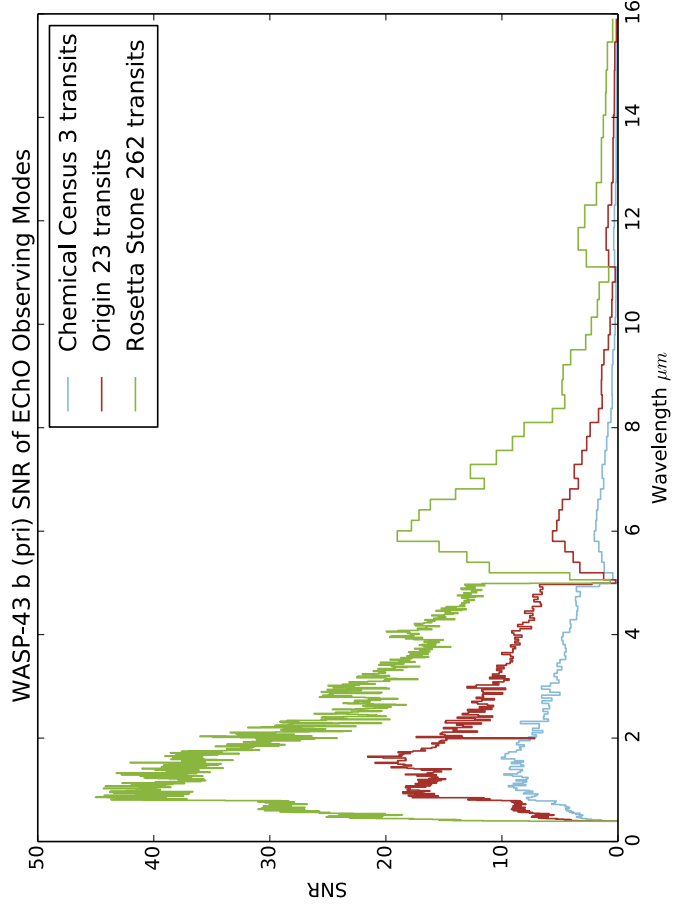
WASP-42 b (pri) SNR of EChO Observing Modes



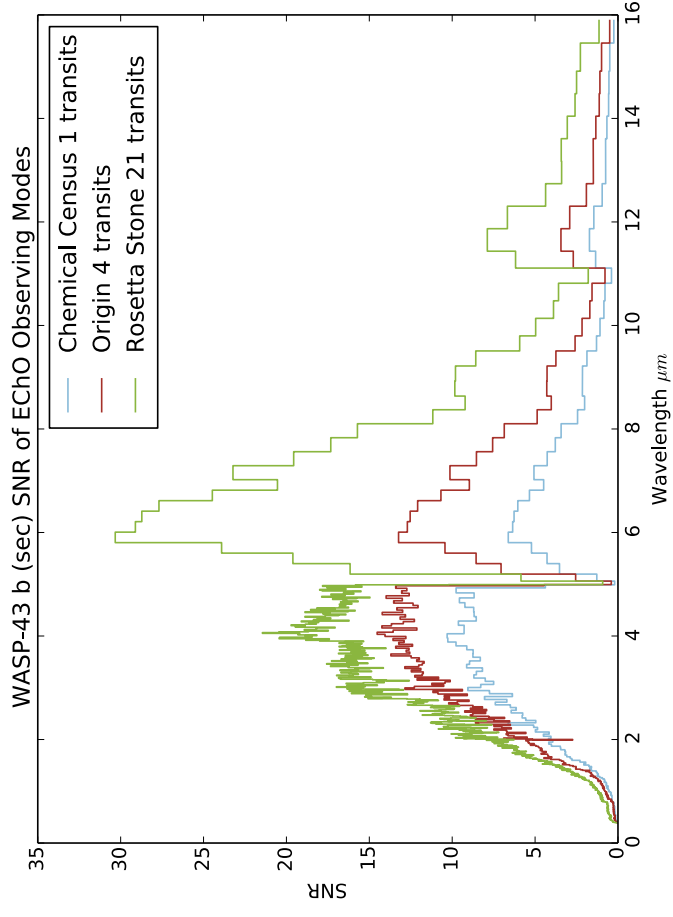
WASP-42 b (sec) SNR of EChO Observing Modes



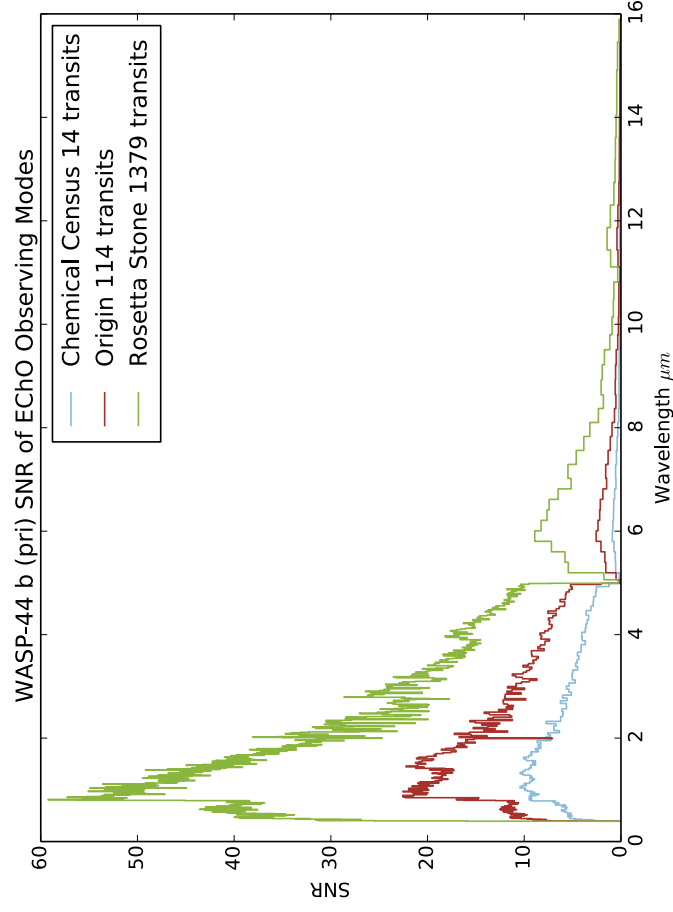
WASP-43 b (pri) SNR of EChO Observing Modes



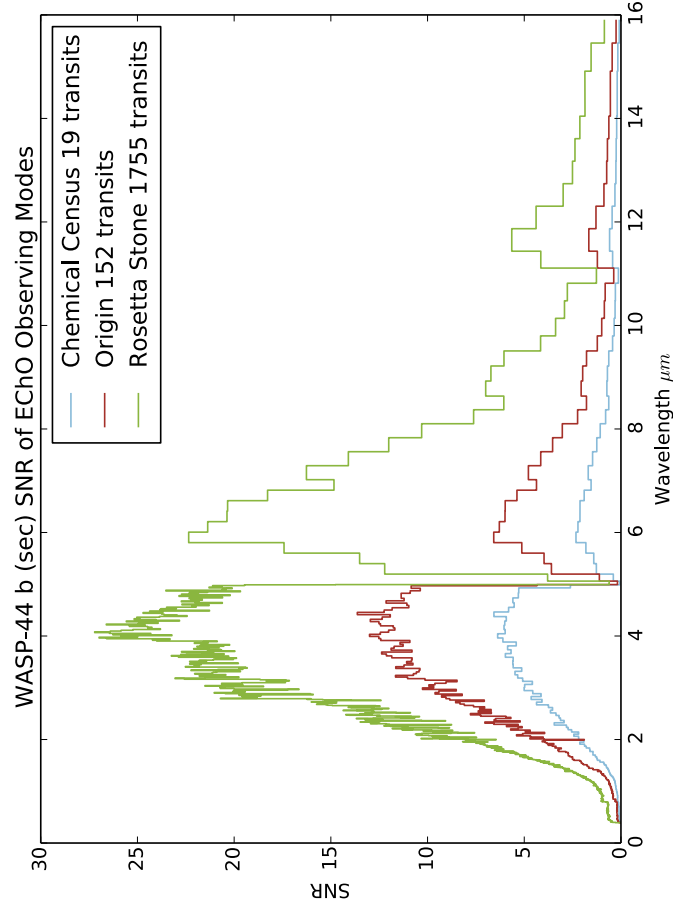
WASP-43 b (sec) SNR of EChO Observing Modes

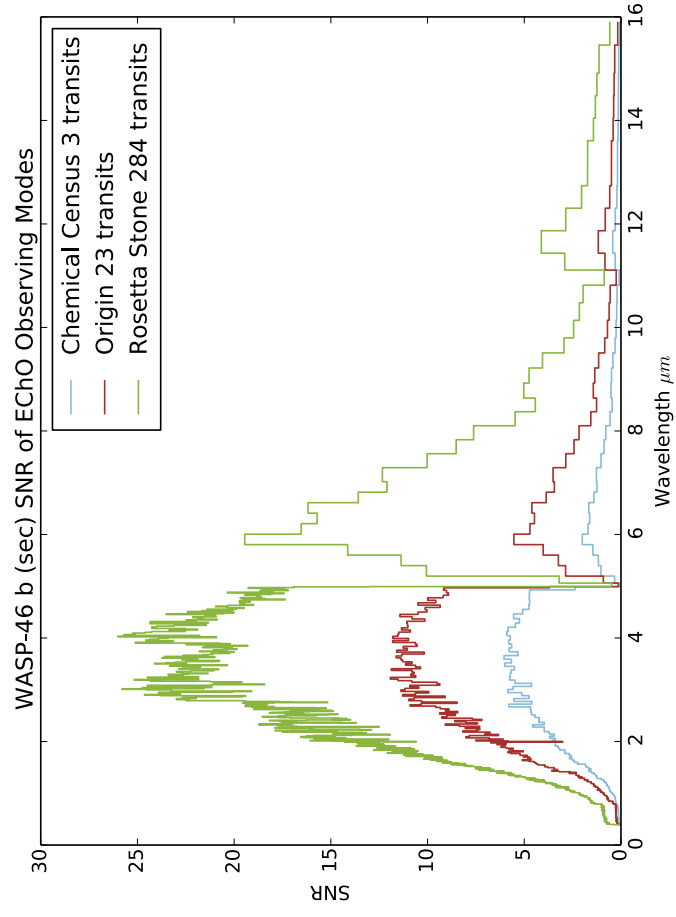
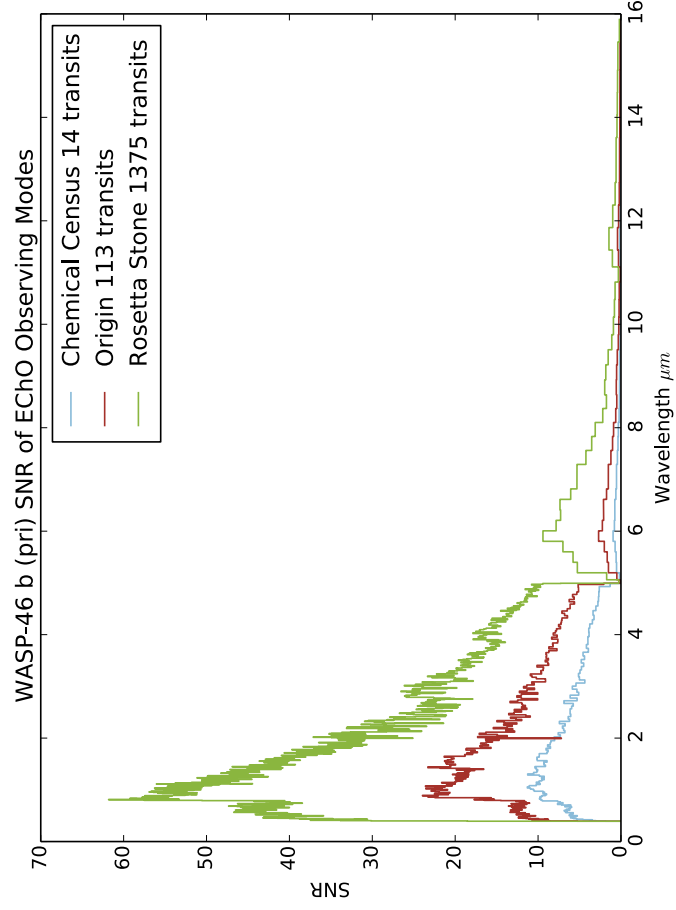
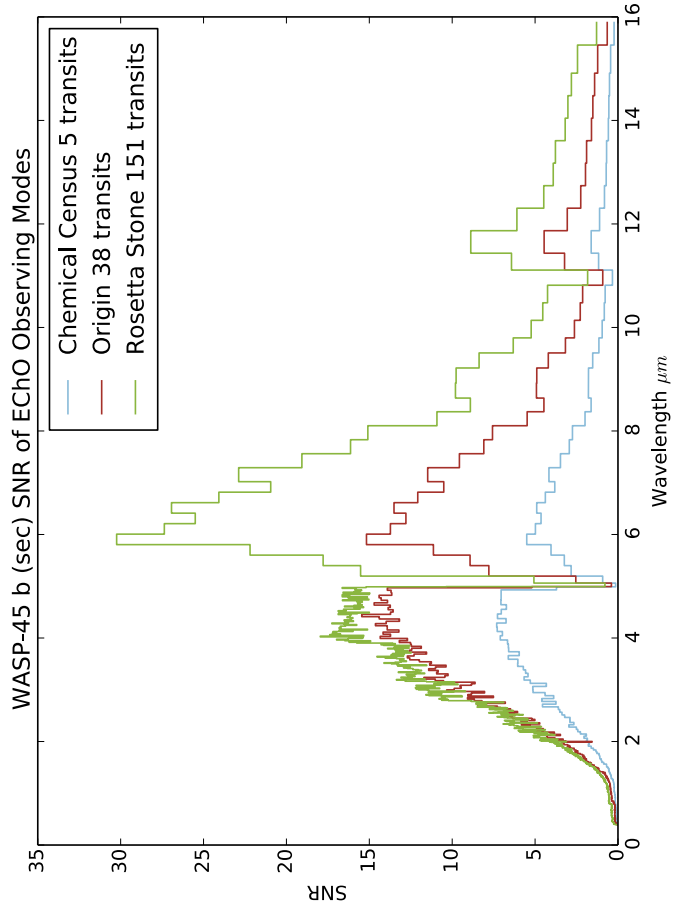
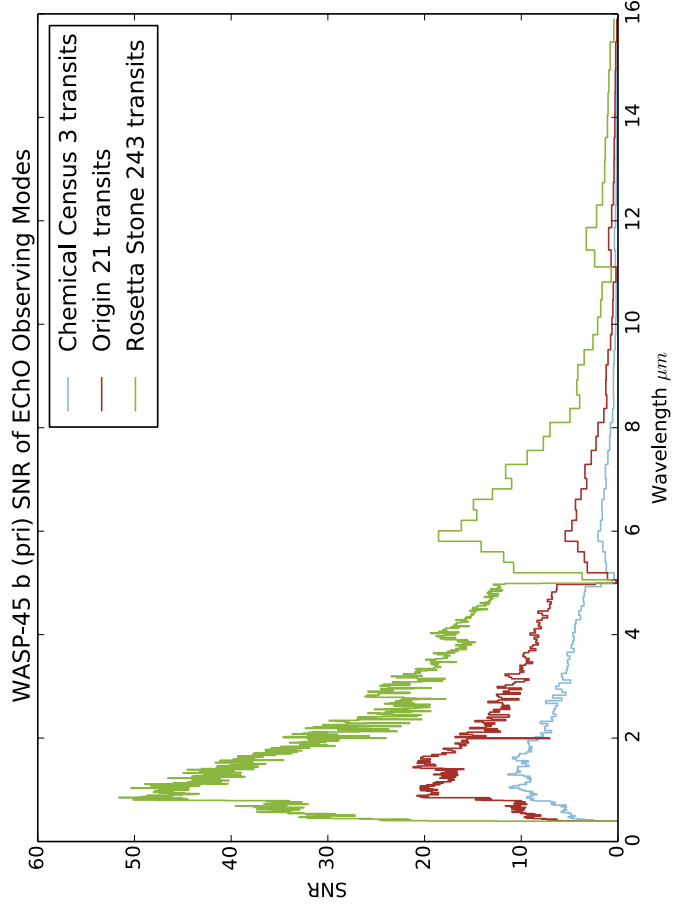


WASP-44 b (pri) SNR of EChO Observing Modes



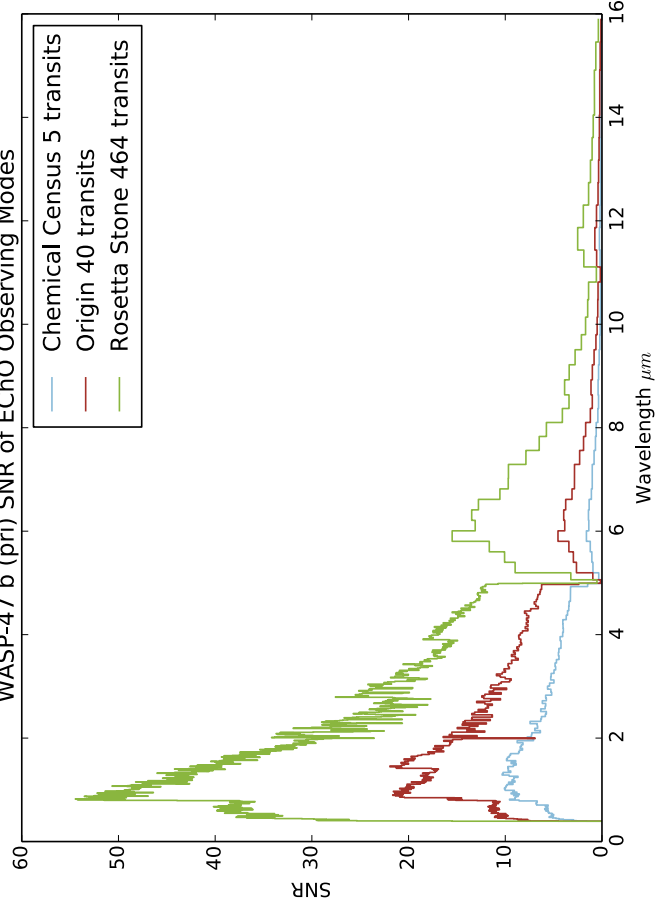
WASP-44 b (sec) SNR of EChO Observing Modes



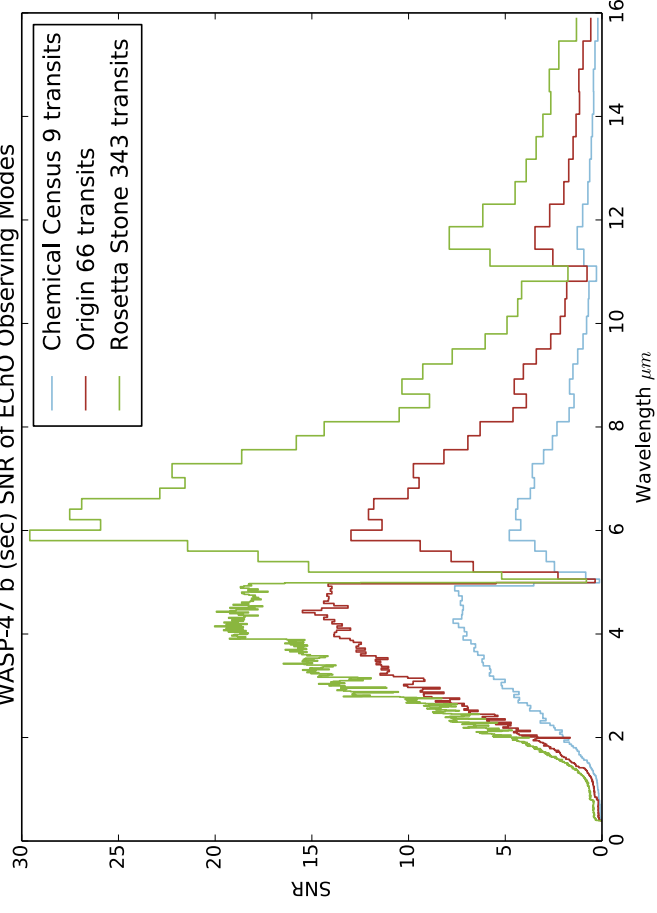




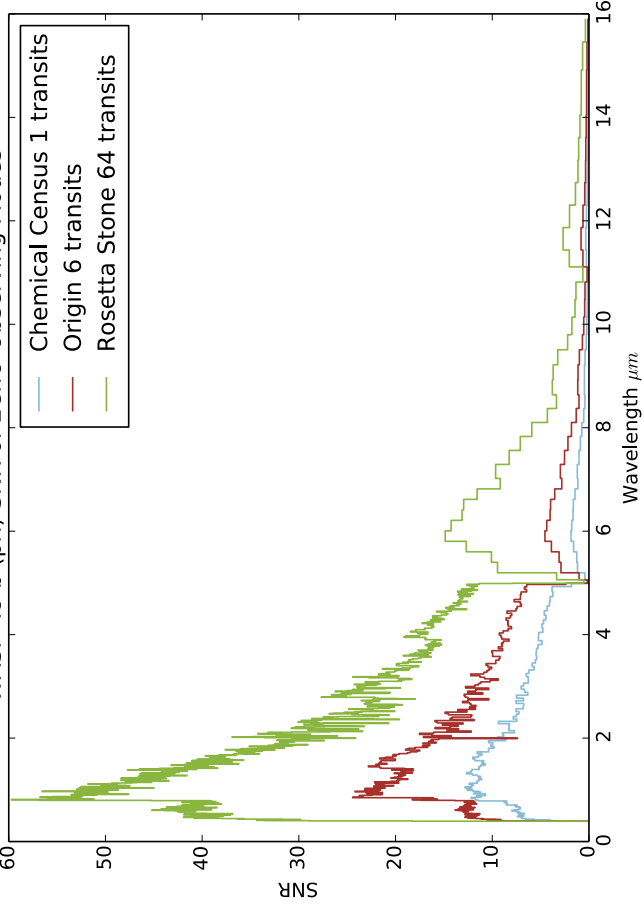
WASP-47 b (pri) SNR of EChO Observing Modes



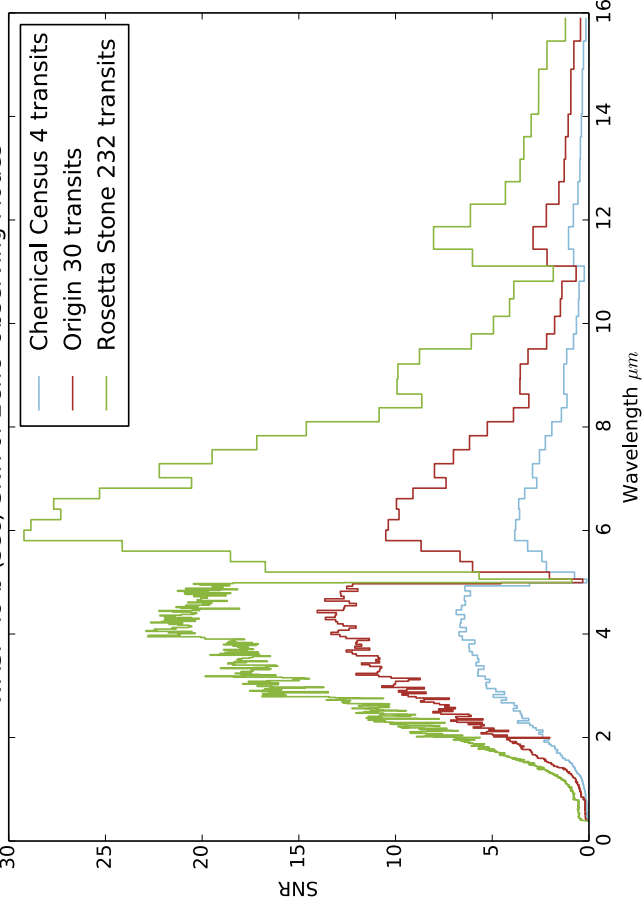
WASP-47 b (sec) SNR of EChO Observing Modes



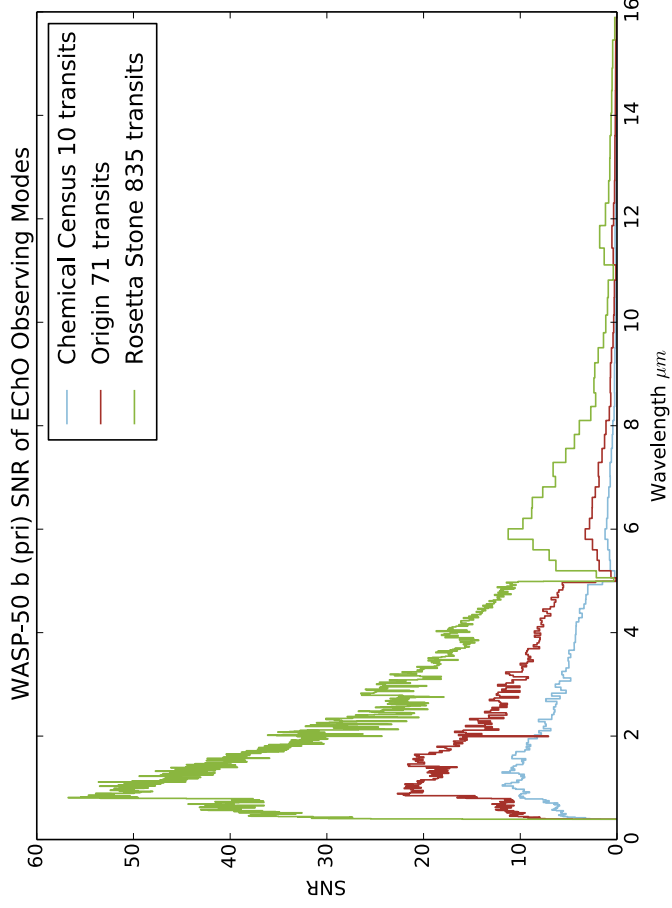
WASP-49 b (pri) SNR of EChO Observing Modes



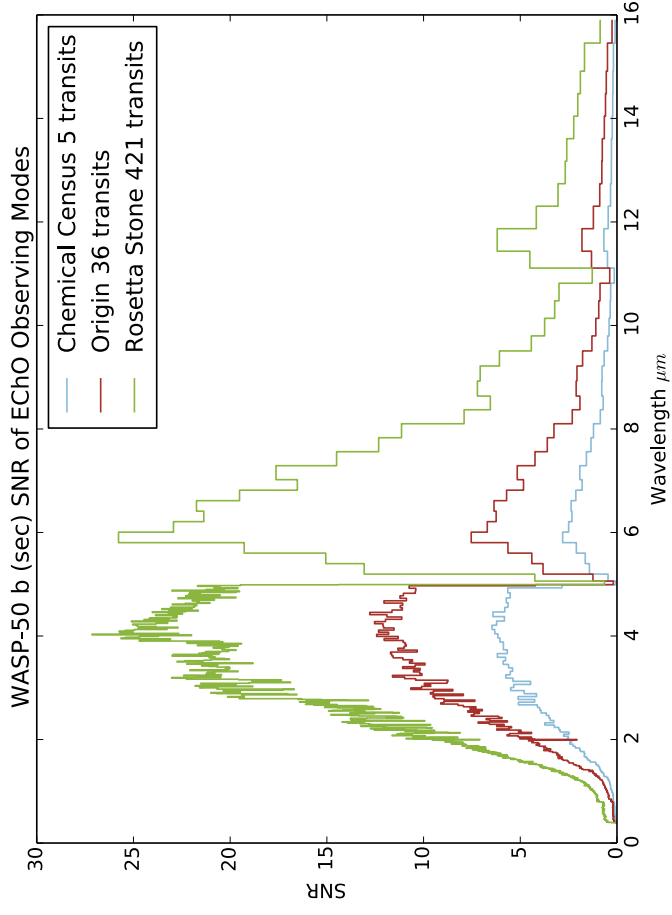
WASP-49 b (sec) SNR of EChO Observing Modes



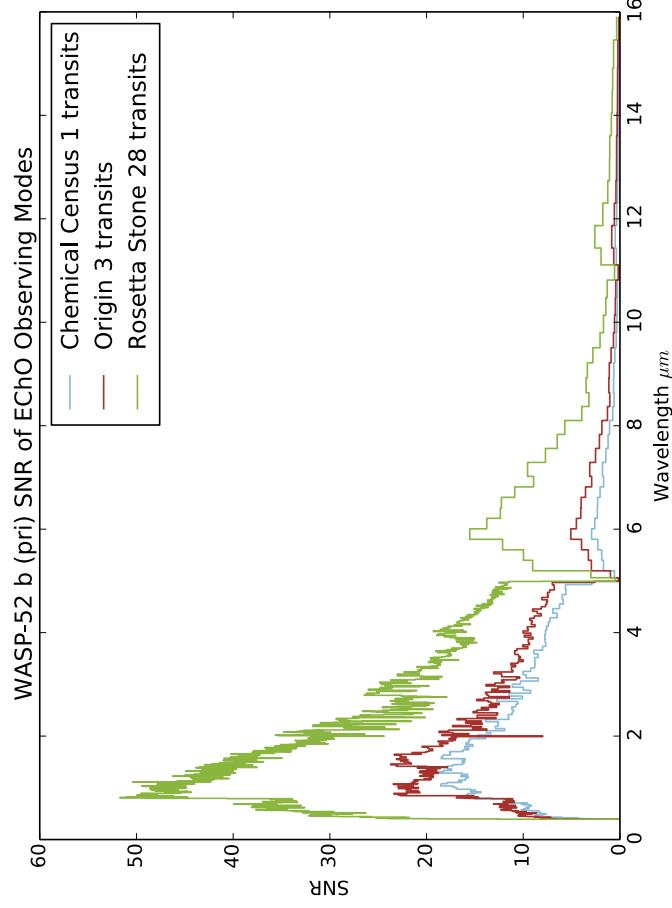
WASP-50 b (pri) SNR of EChO Observing Modes



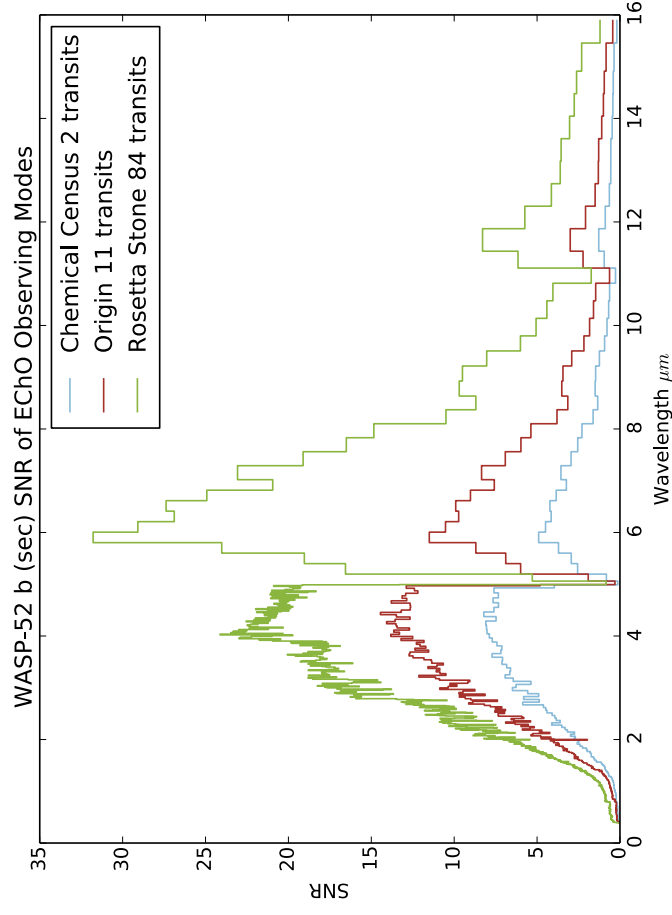
WASP-50 b (sec) SNR of EChO Observing Modes



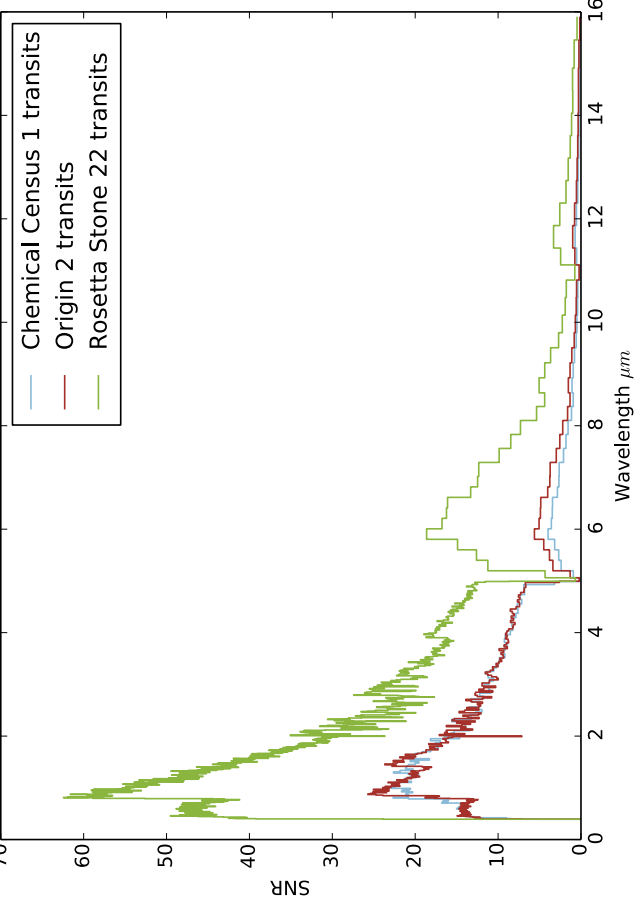
WASP-52 b (pri) SNR of EChO Observing Modes



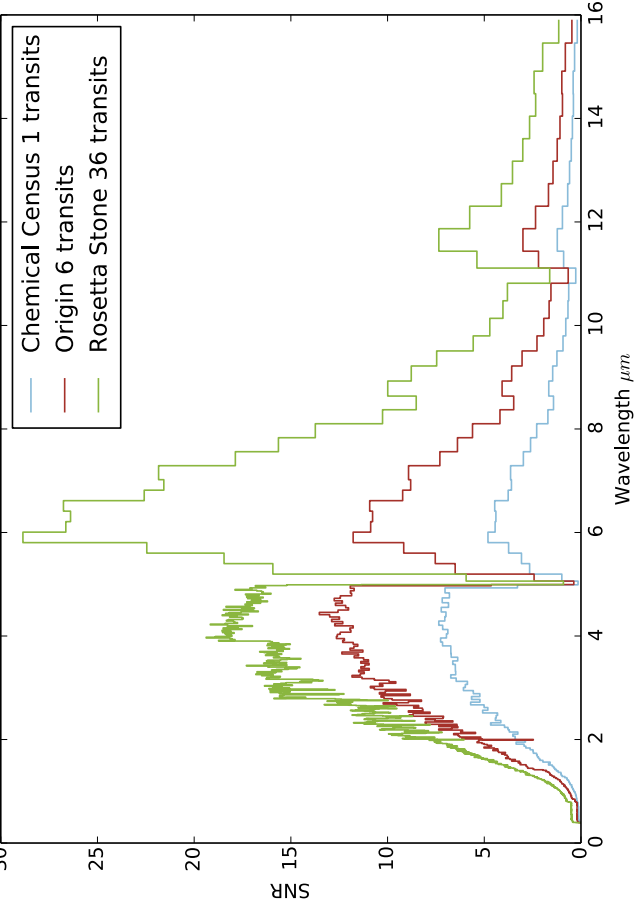
WASP-52 b (sec) SNR of EChO Observing Modes



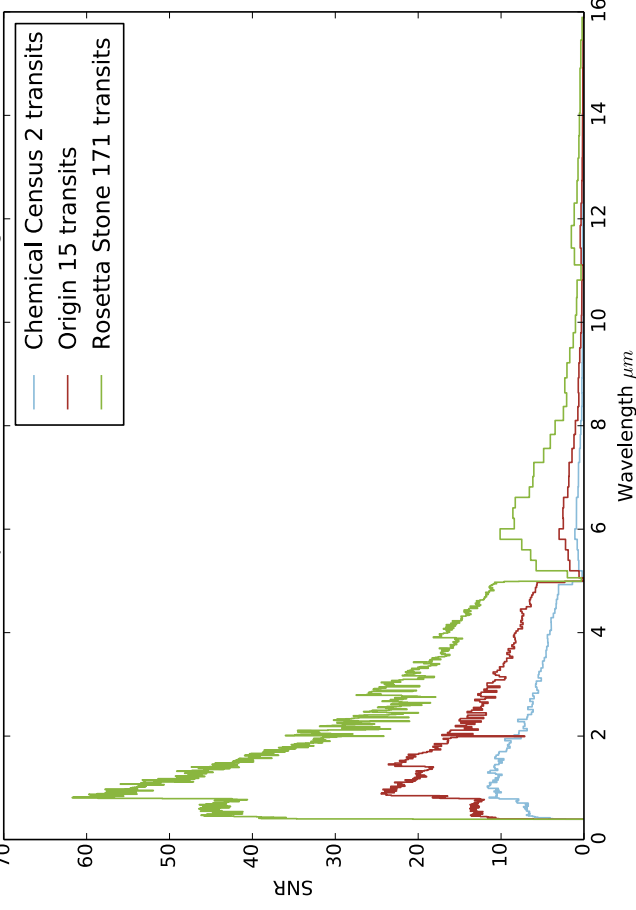
WASP-54 b (pri) SNR of EChO Observing Modes



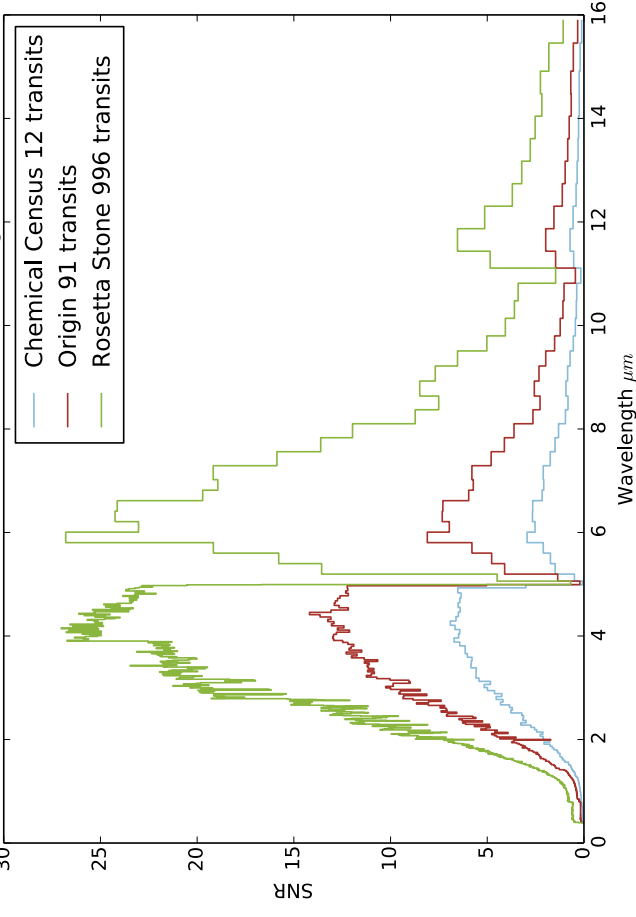
WASP-54 b (sec) SNR of EChO Observing Modes

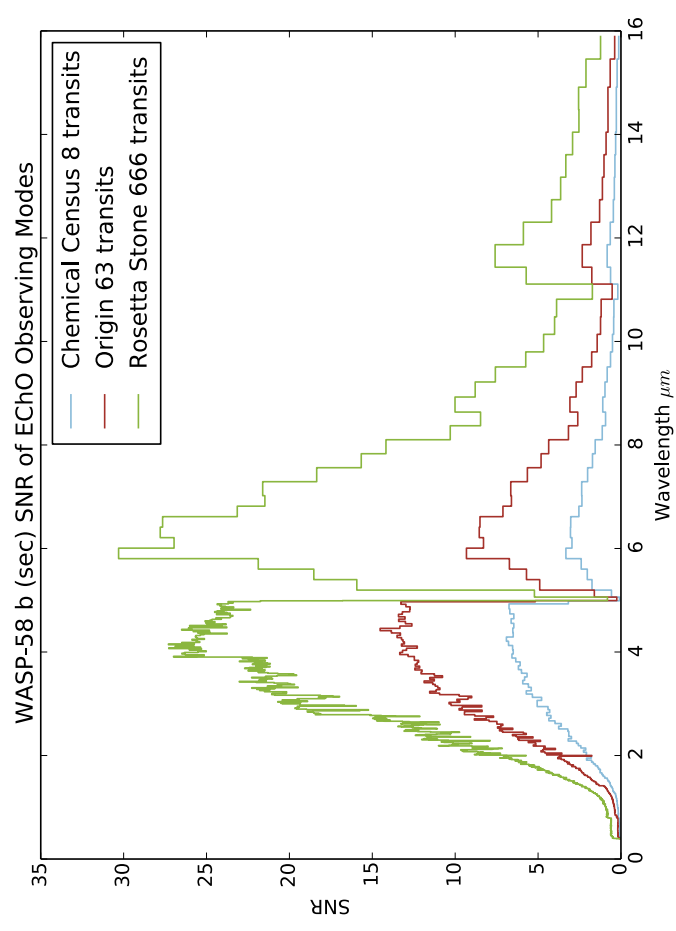
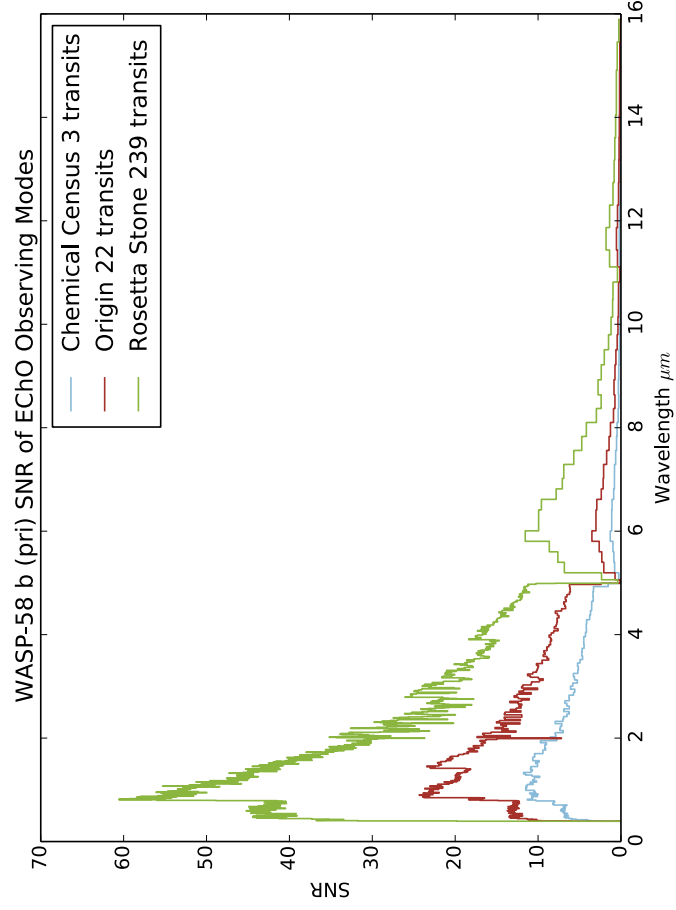
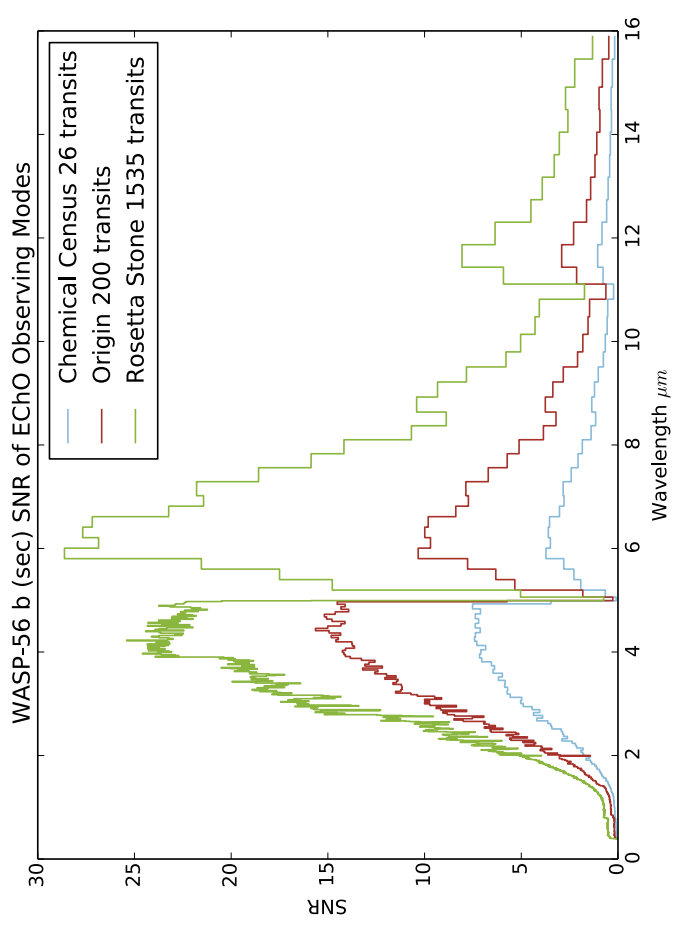
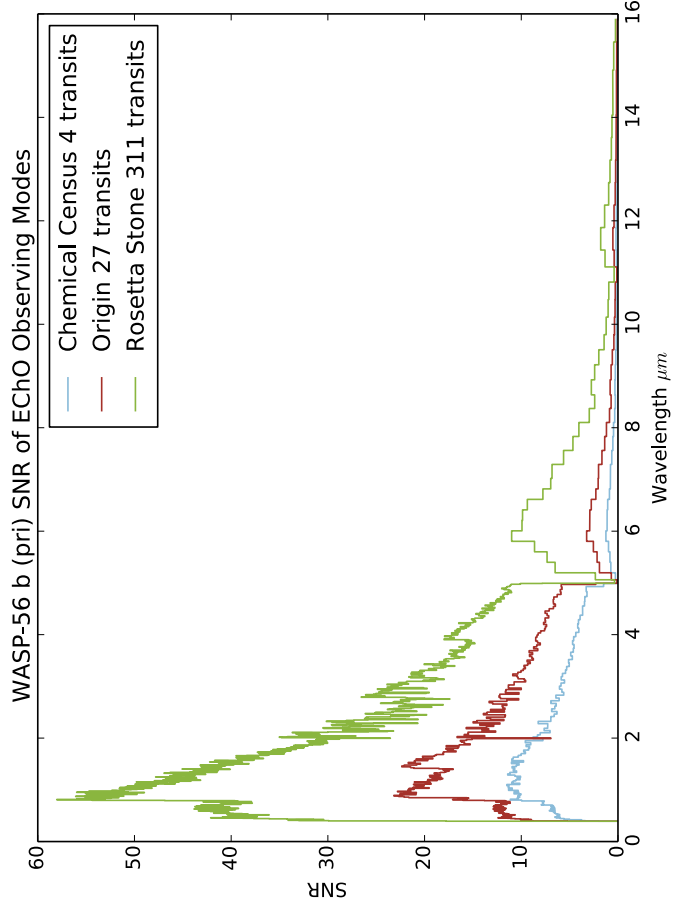


WASP-55 b (pri) SNR of EChO Observing Modes

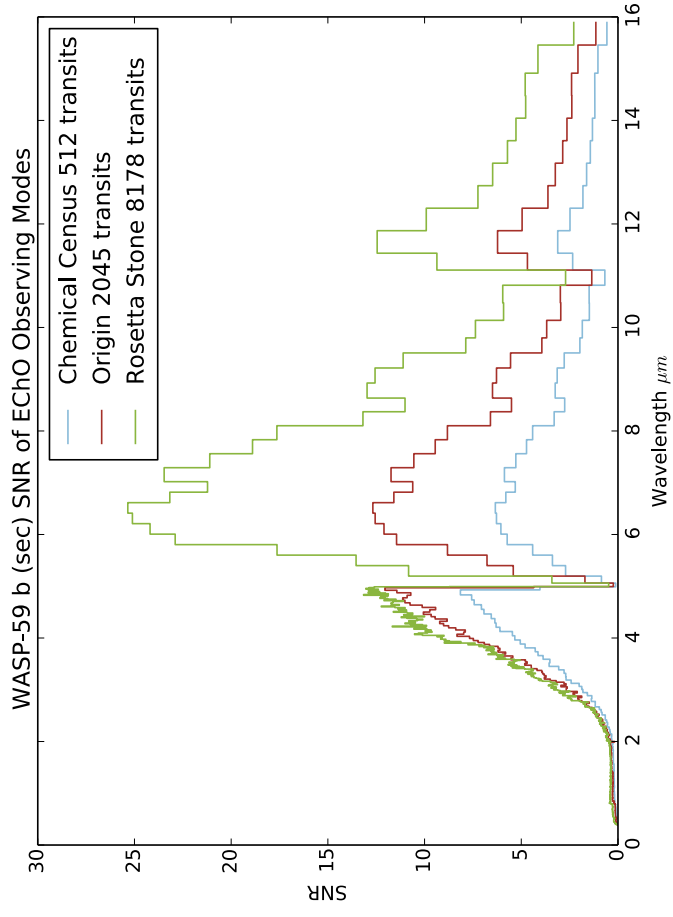
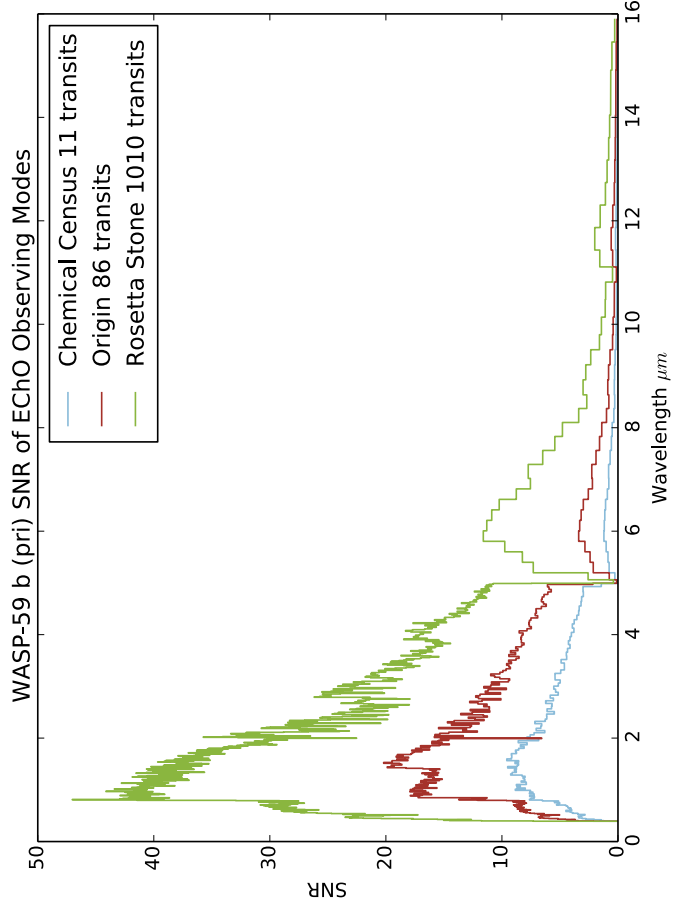


WASP-55 b (sec) SNR of EChO Observing Modes

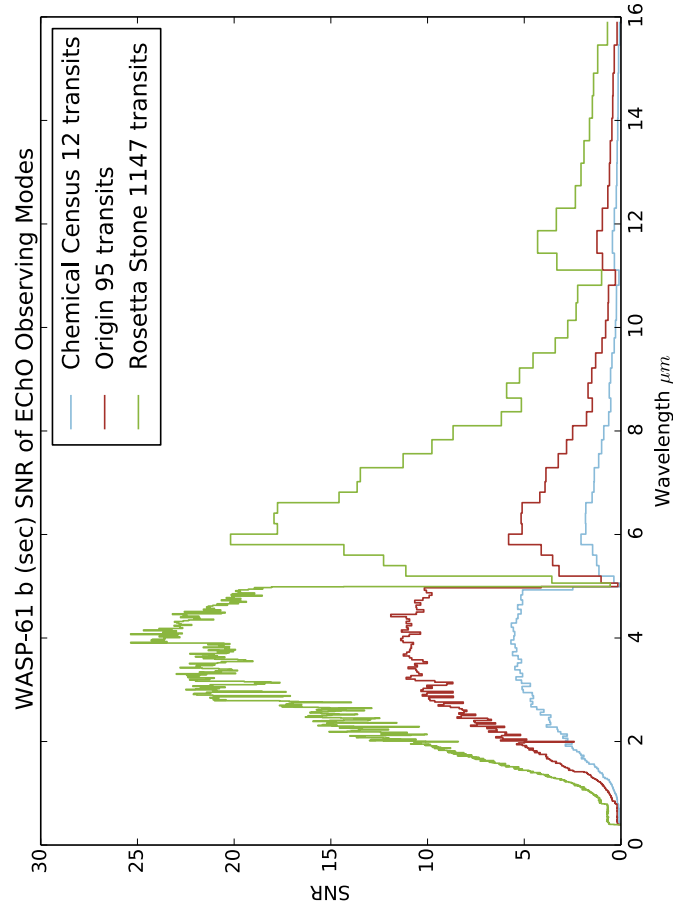
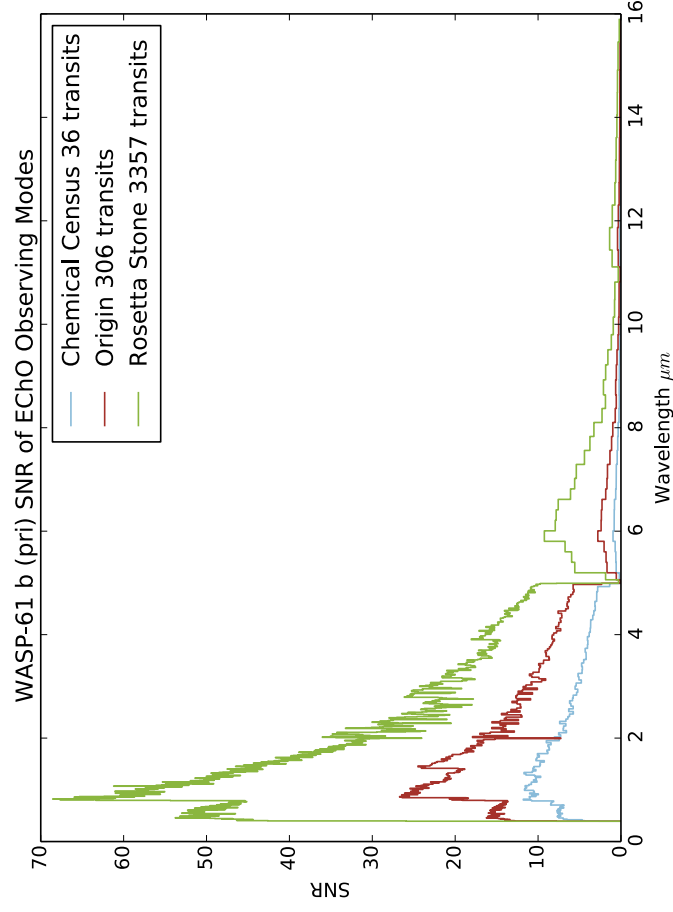




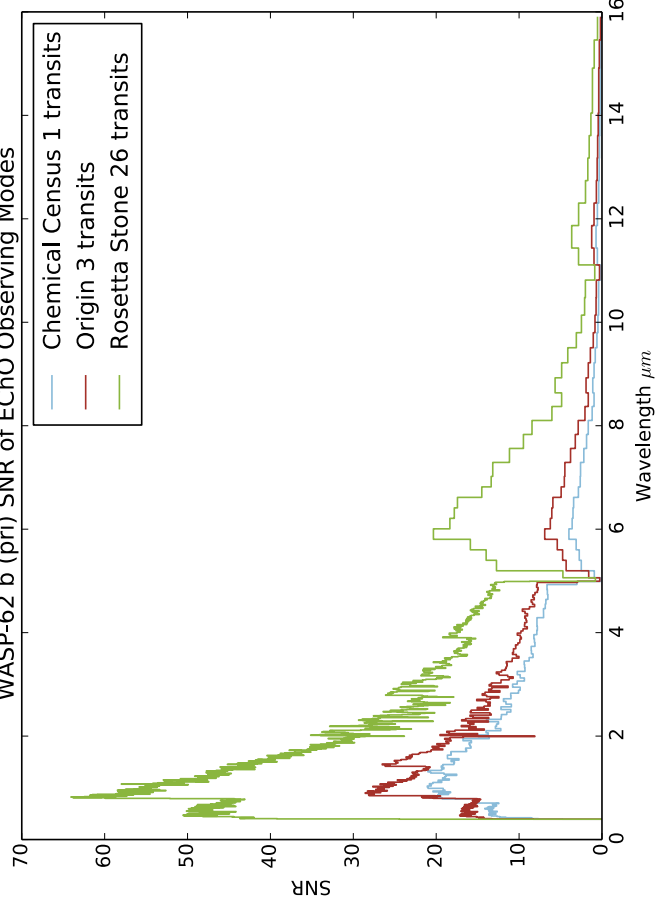
WASP-59 b (pri) SNR of EChO Observing Modes



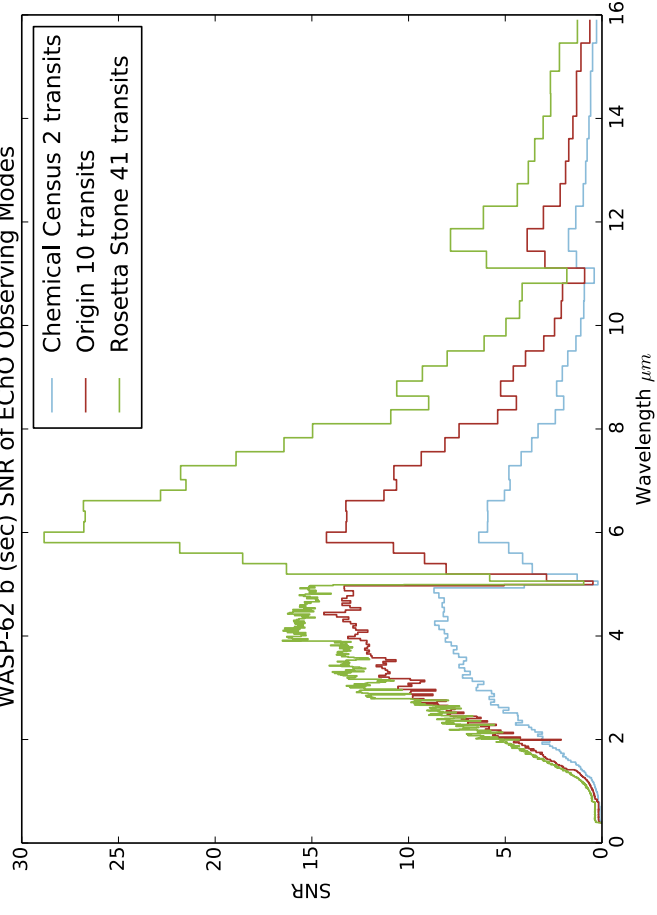
WASP-61 b (pri) SNR of EChO Observing Modes



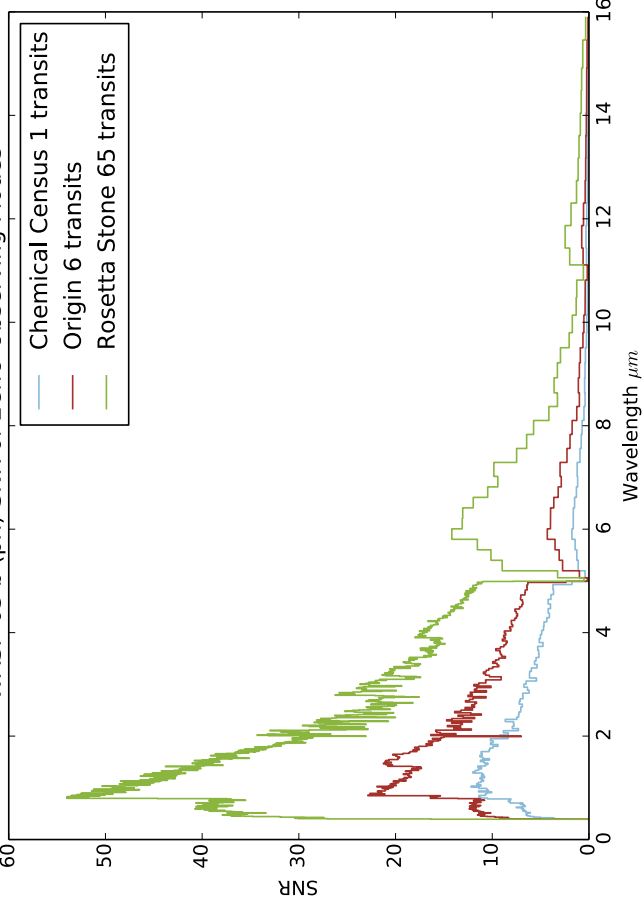
WASP-62 b (pri) SNR of EChO Observing Modes



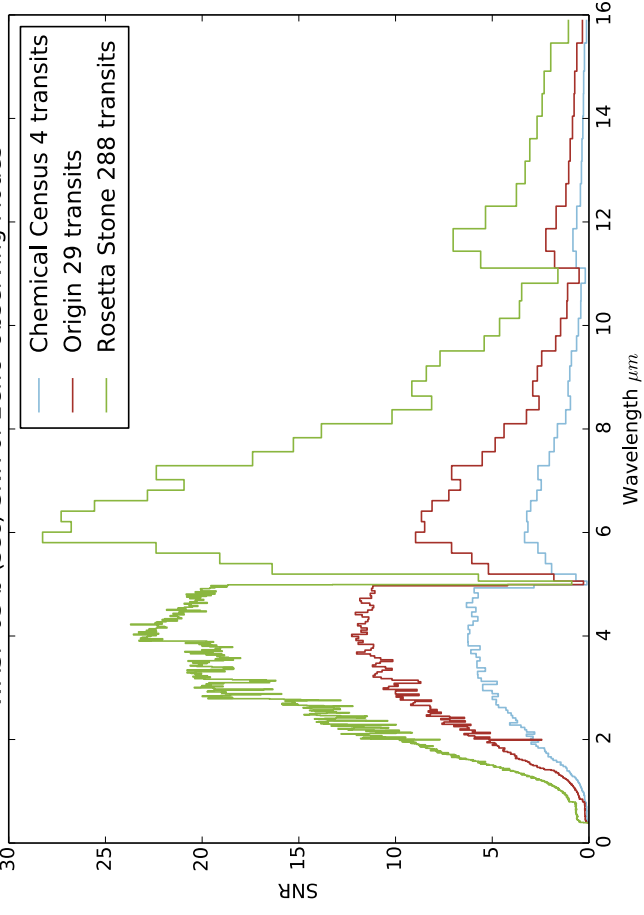
WASP-62 b (sec) SNR of EChO Observing Modes



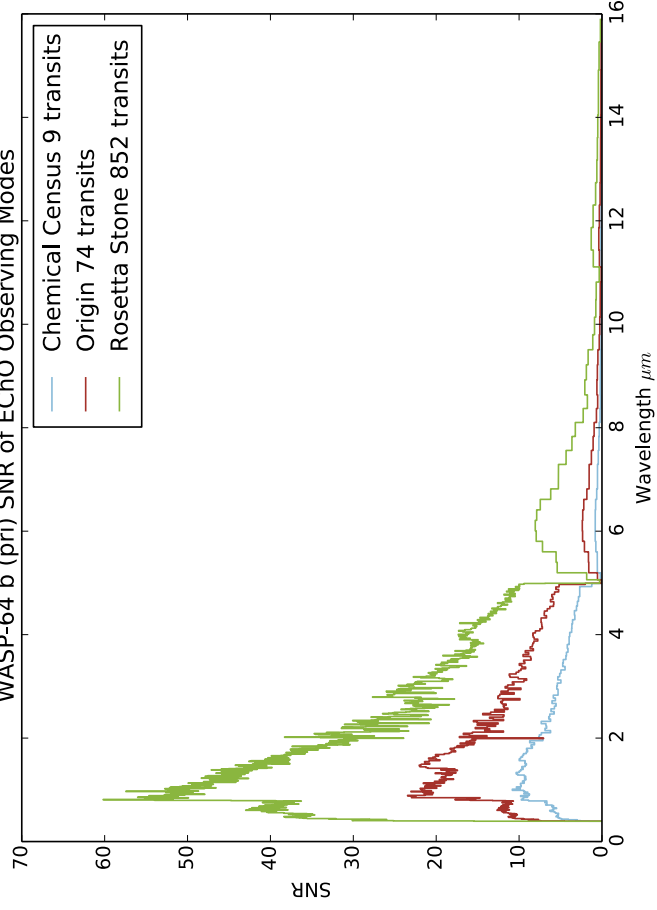
WASP-63 b (pri) SNR of EChO Observing Modes



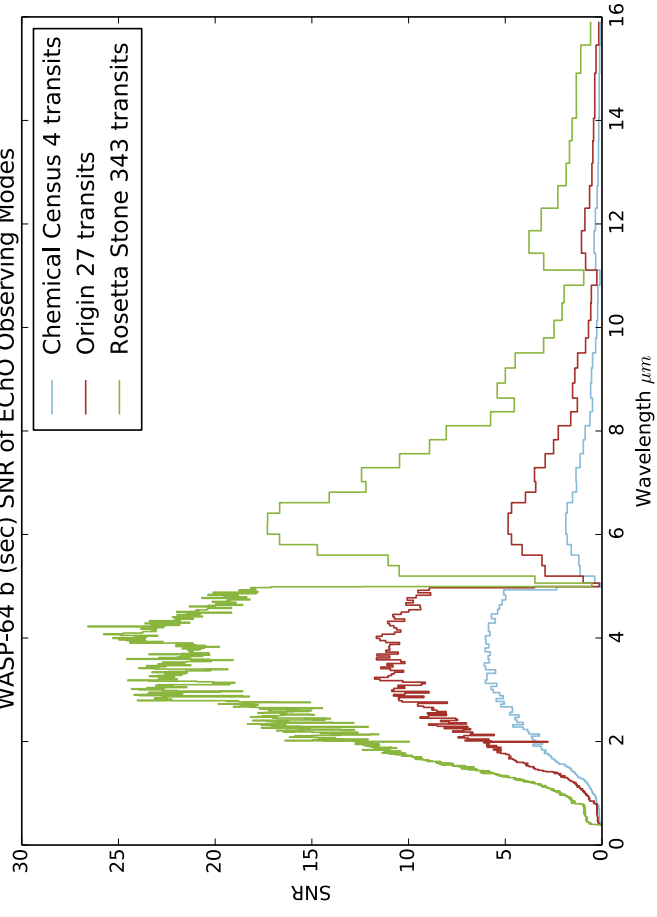
WASP-63 b (sec) SNR of EChO Observing Modes



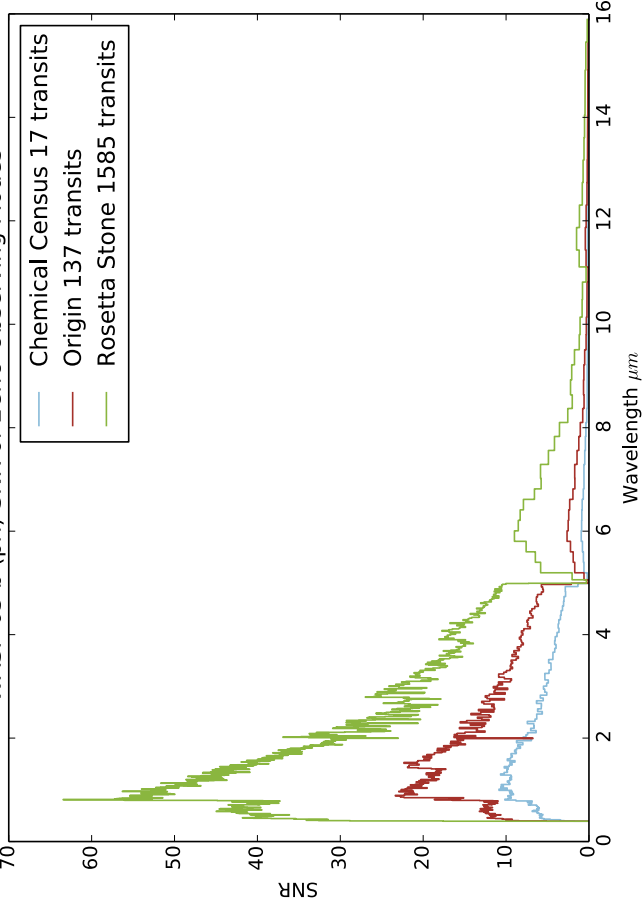
WASP-64 b (pri) SNR of EChO Observing Modes



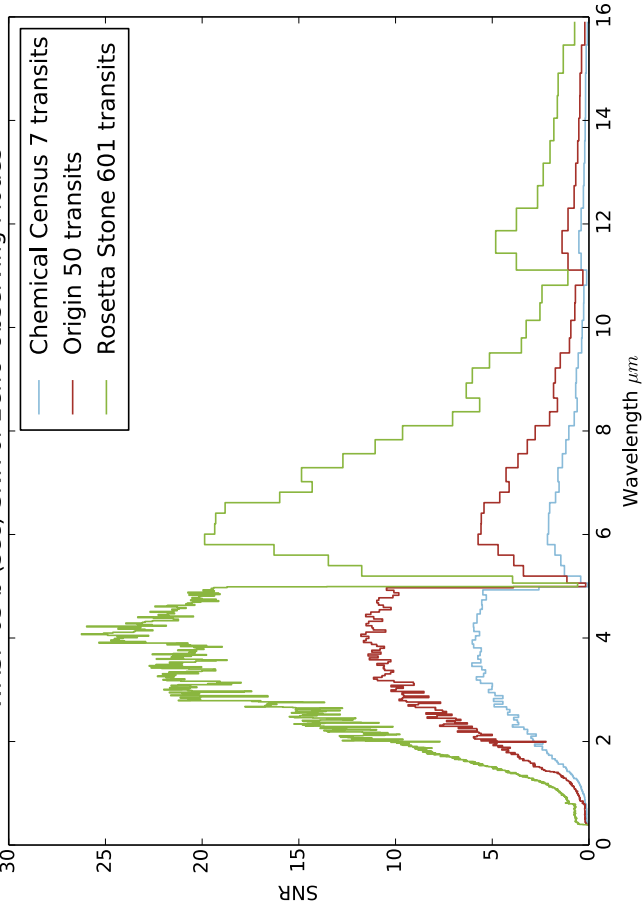
WASP-64 b (sec) SNR of EChO Observing Modes



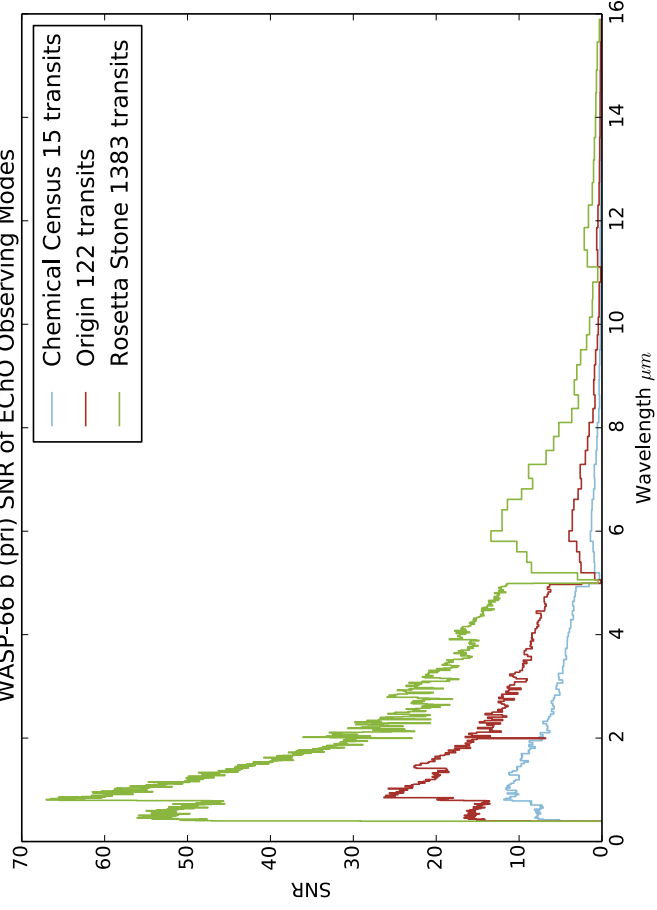
WASP-65 b (pri) SNR of EChO Observing Modes



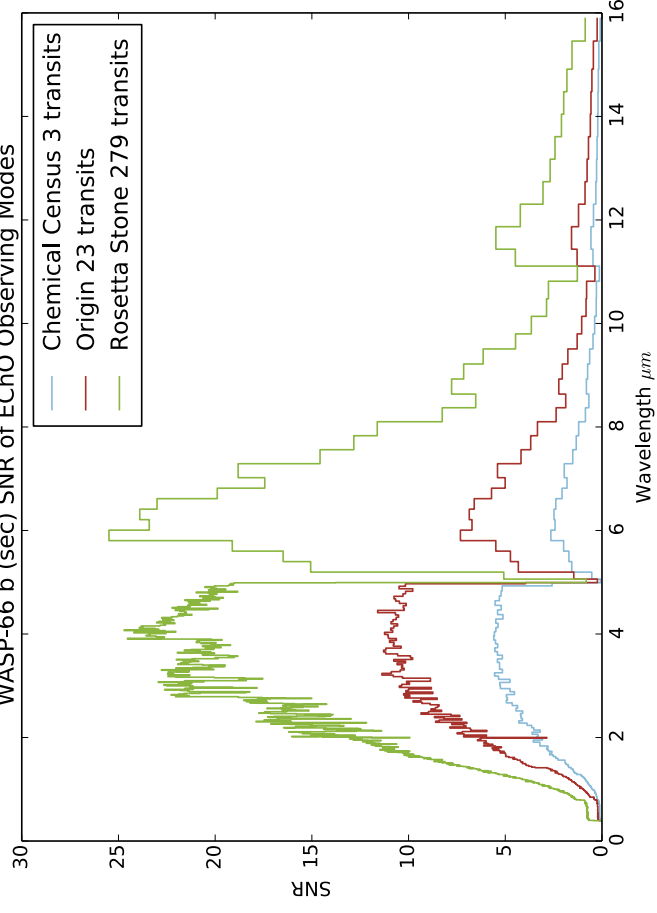
WASP-65 b (sec) SNR of EChO Observing Modes



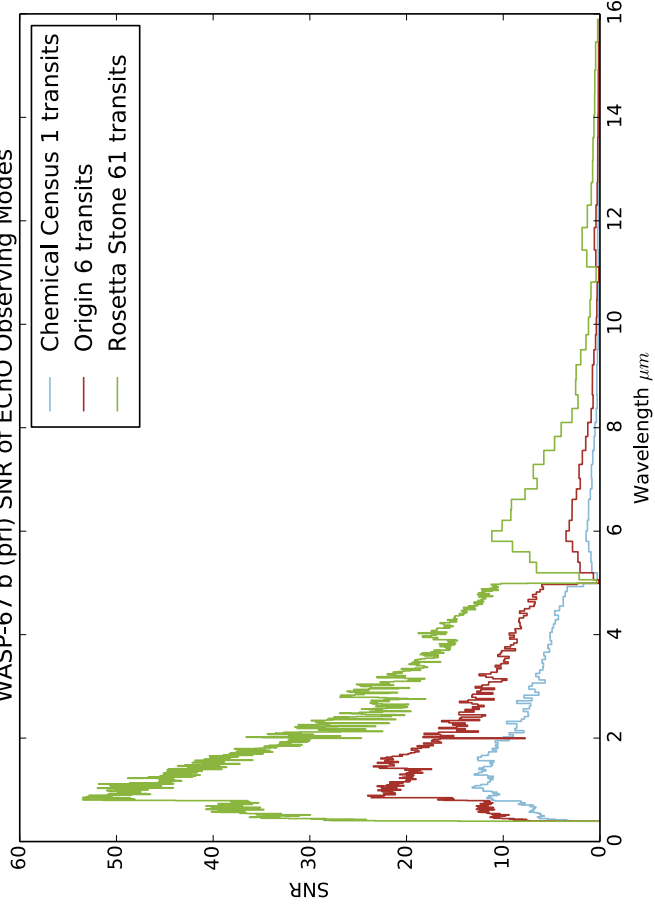
WASP-66 b (pri) SNR of EChO Observing Modes



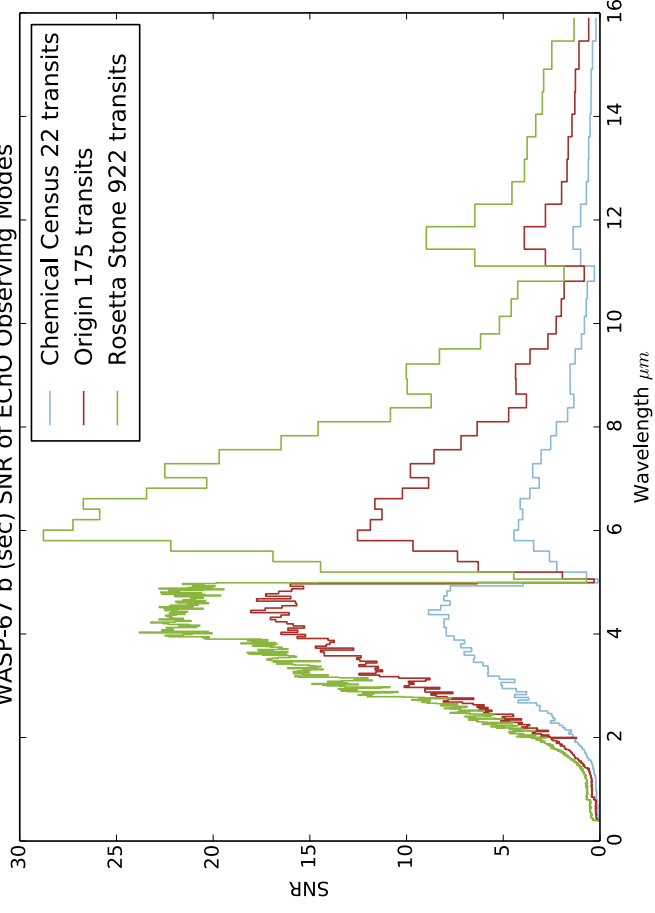
WASP-66 b (sec) SNR of EChO Observing Modes



WASP-67 b (pri) SNR of EChO Observing Modes

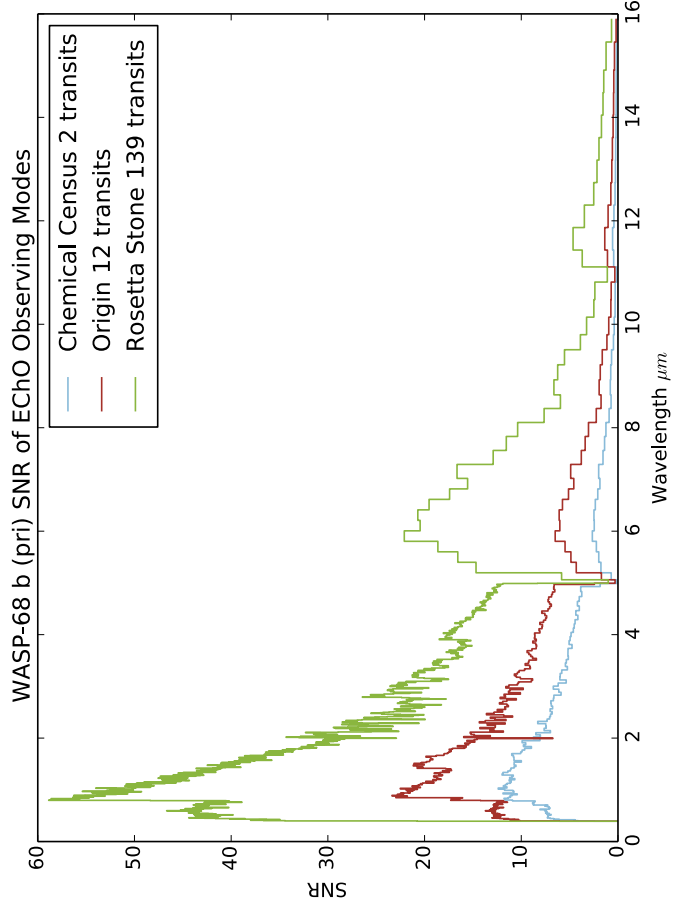


WASP-67 b (sec) SNR of EChO Observing Modes

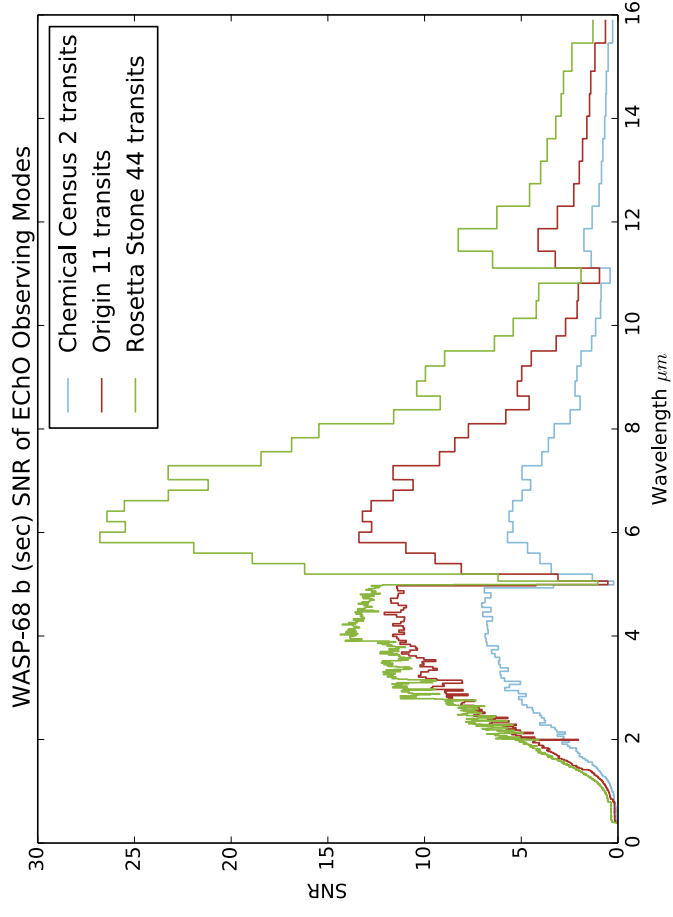




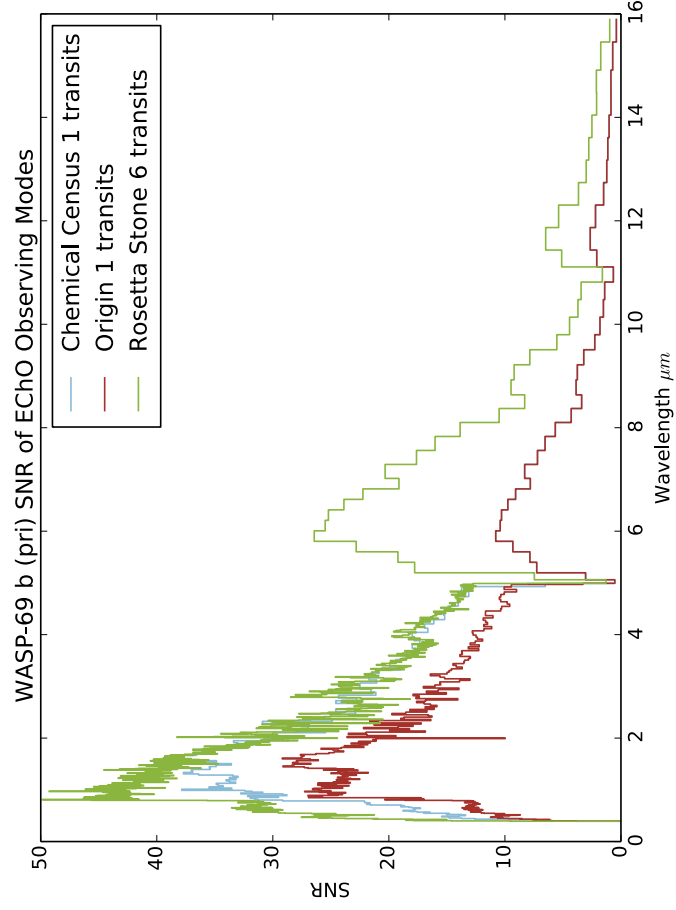
WASP-68 b (pri) SNR of EChO Observing Modes



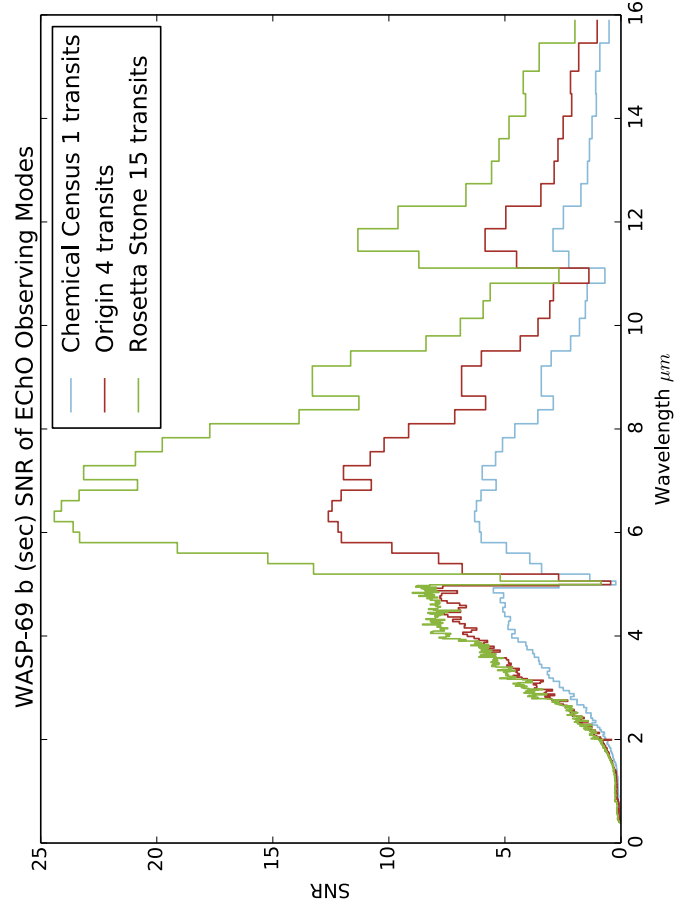
WASP-68 b (sec) SNR of EChO Observing Modes

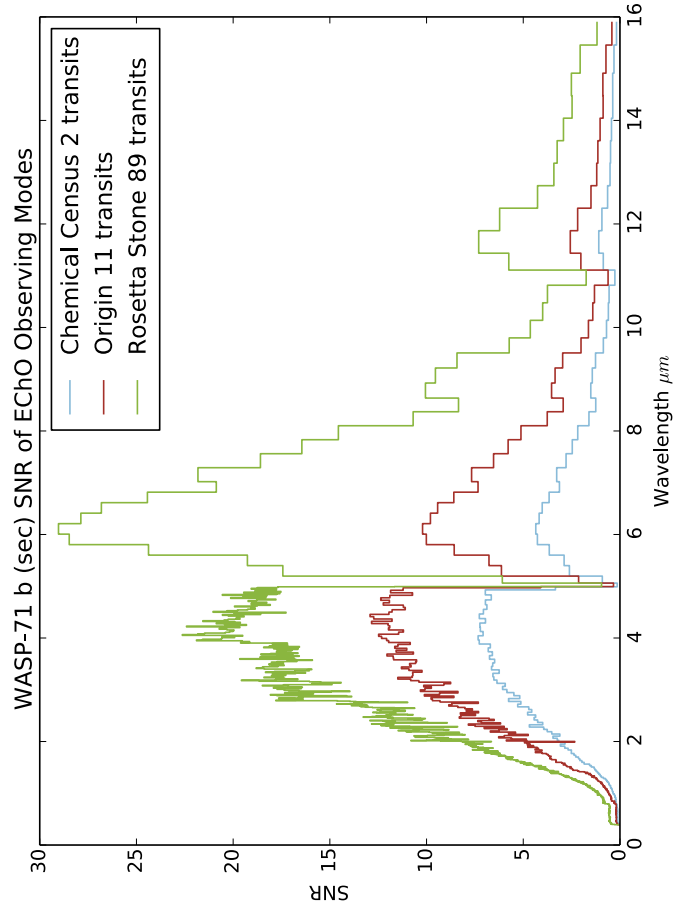
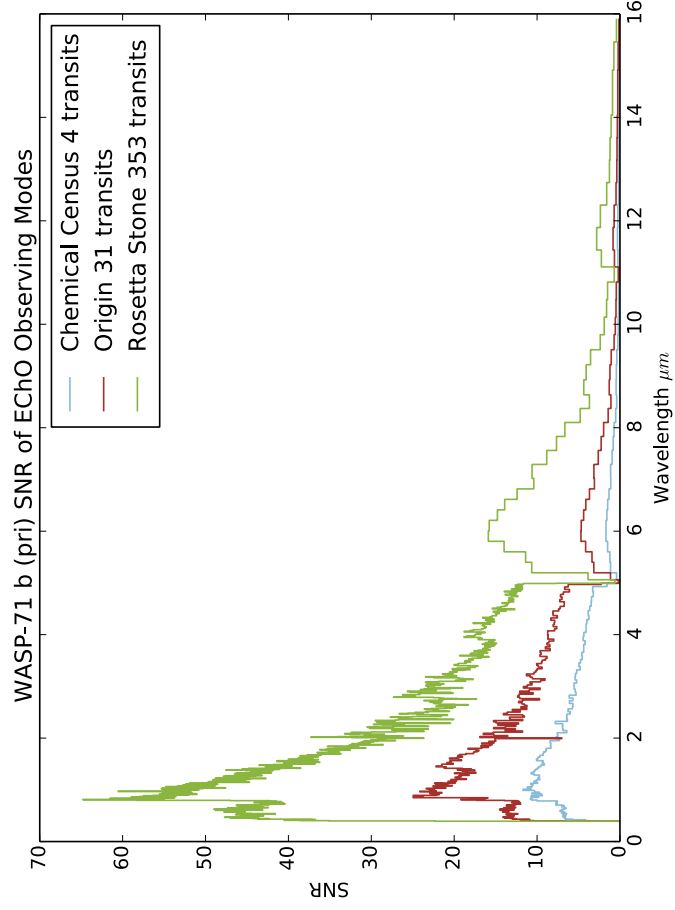
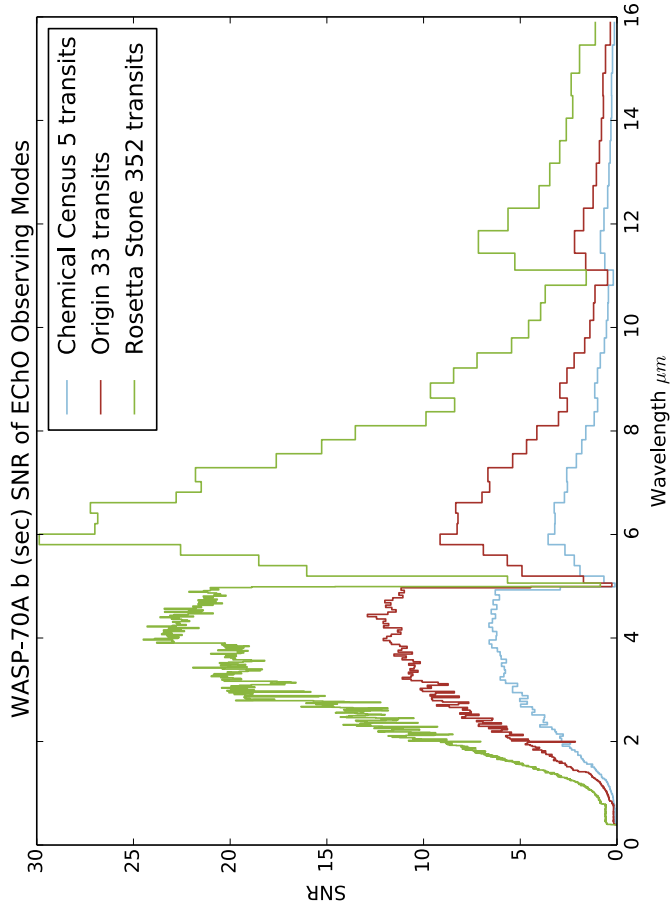
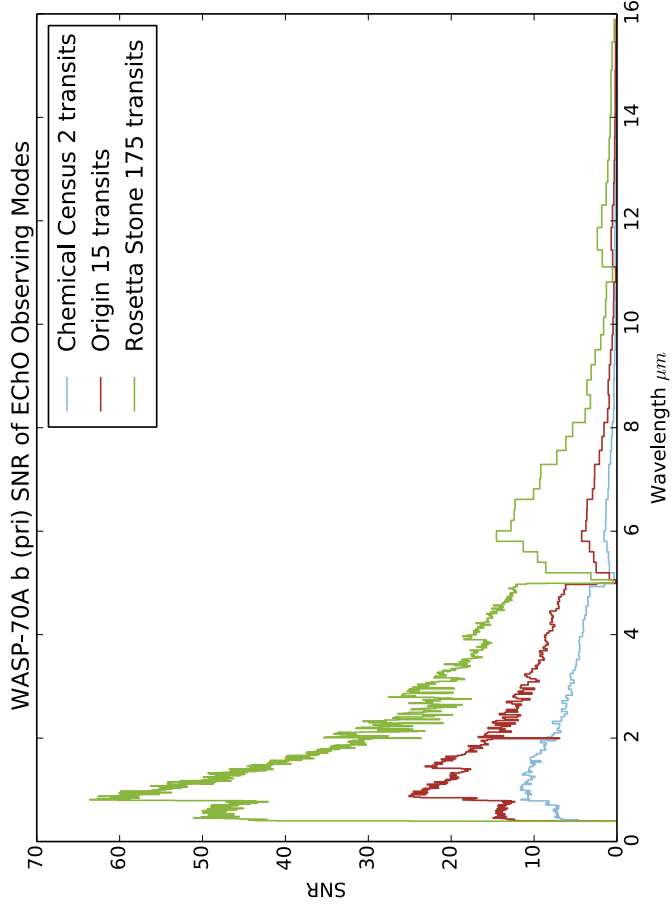


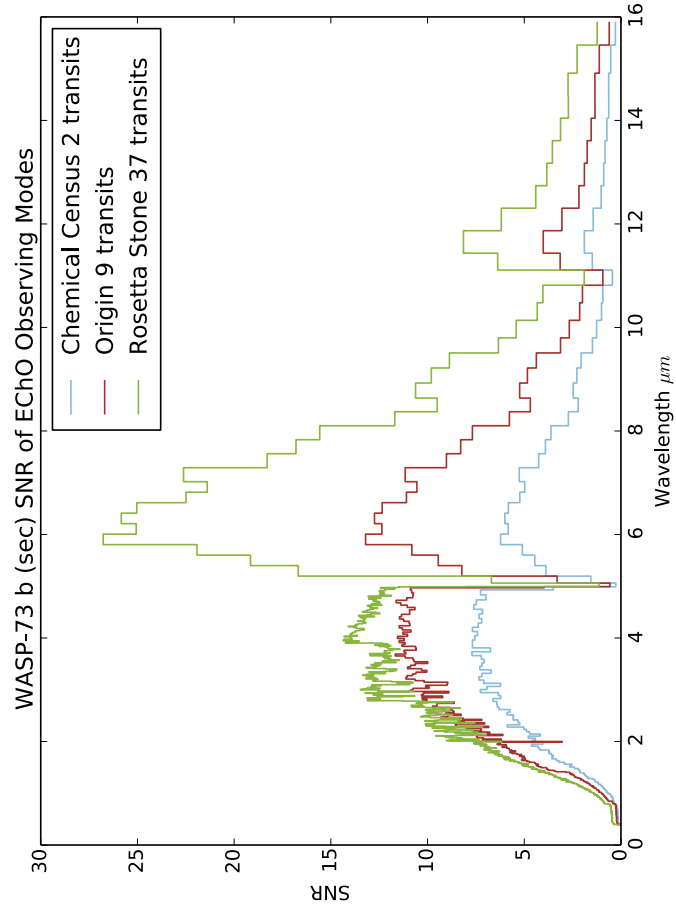
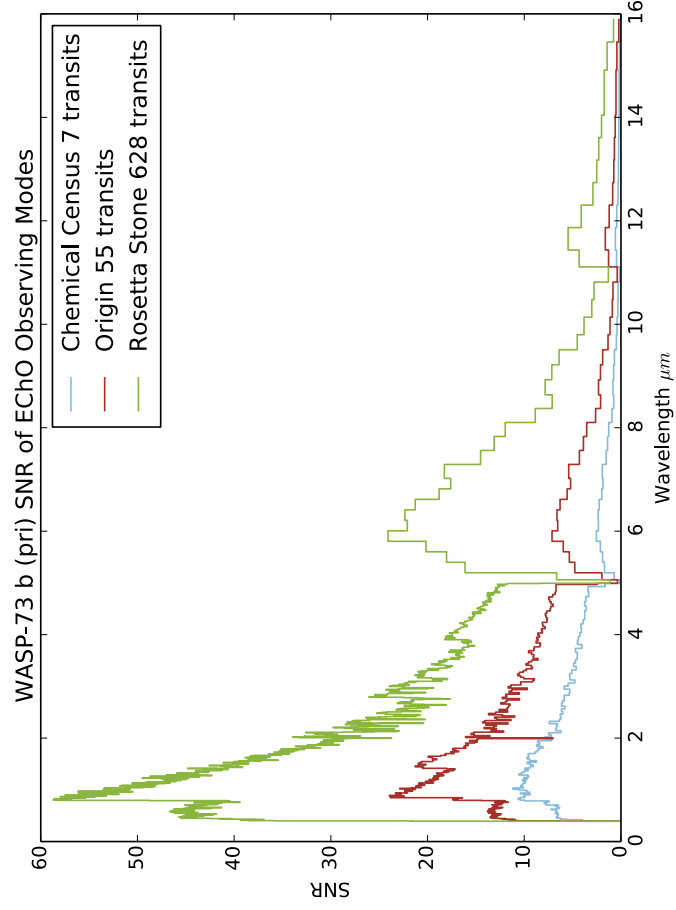
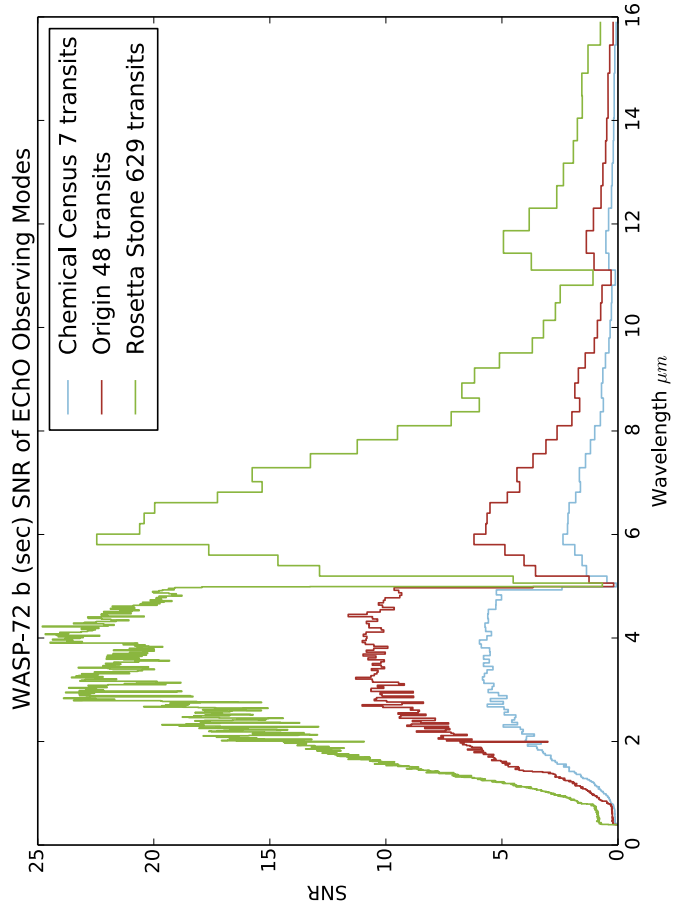
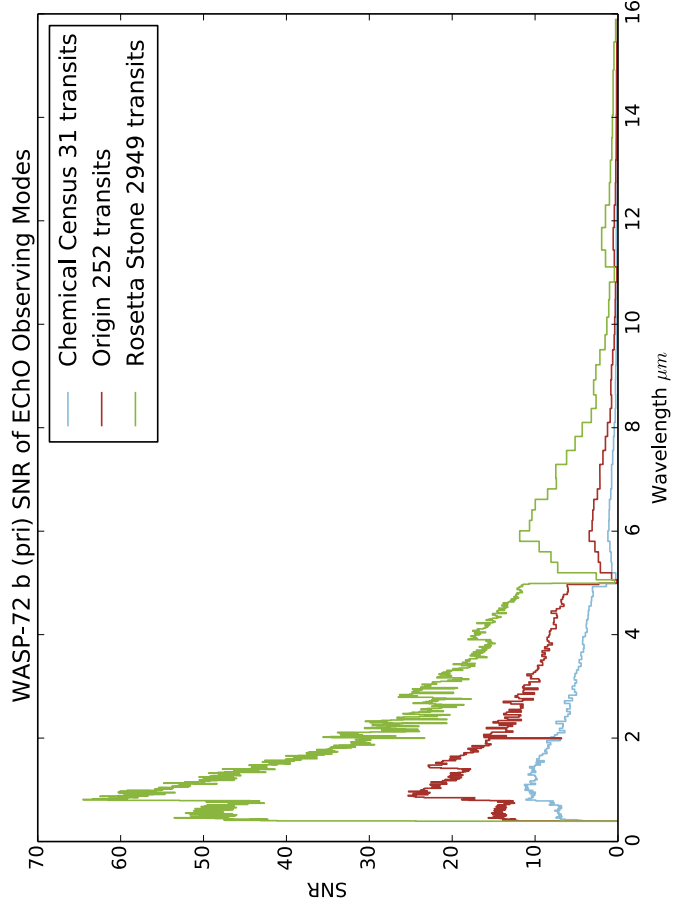
WASP-69 b (pri) SNR of EChO Observing Modes

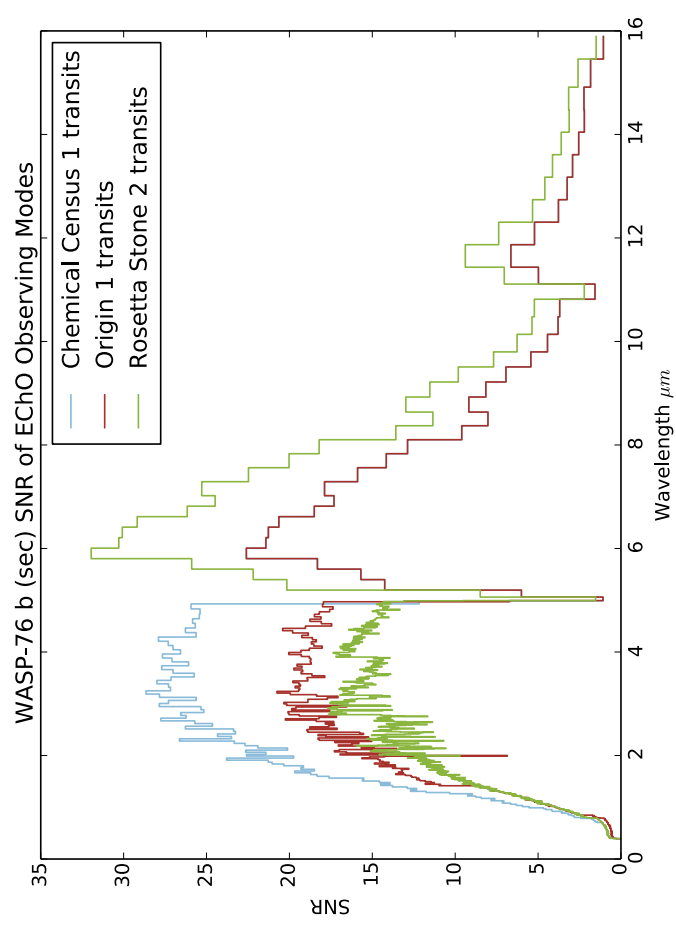
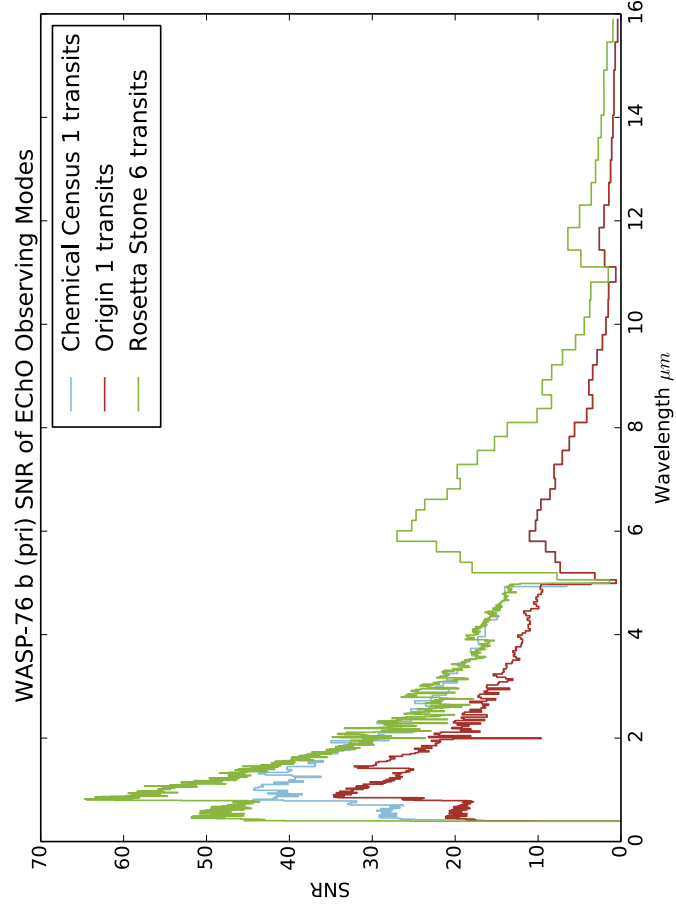
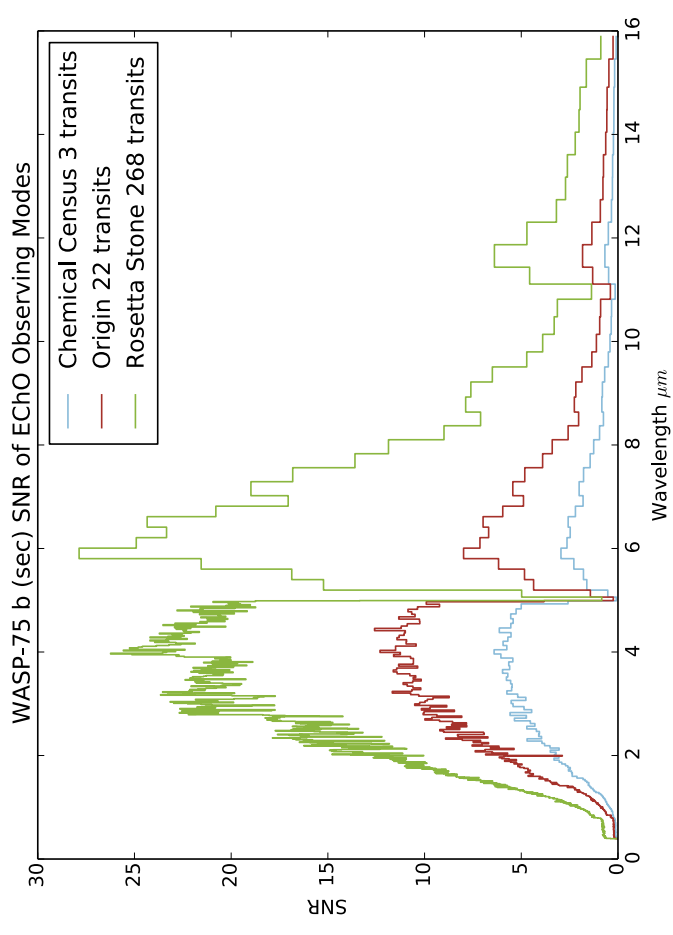
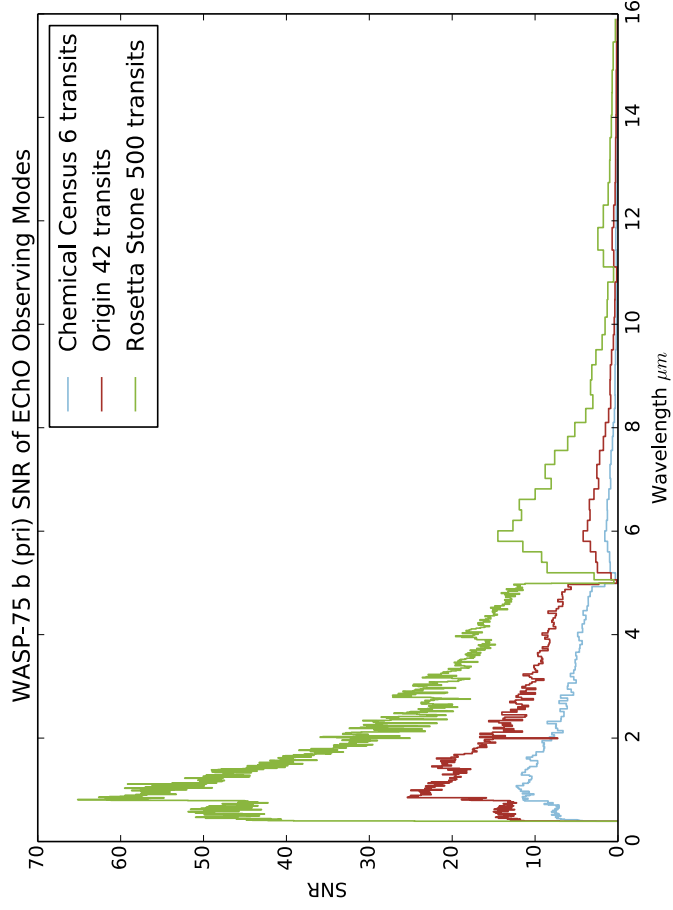


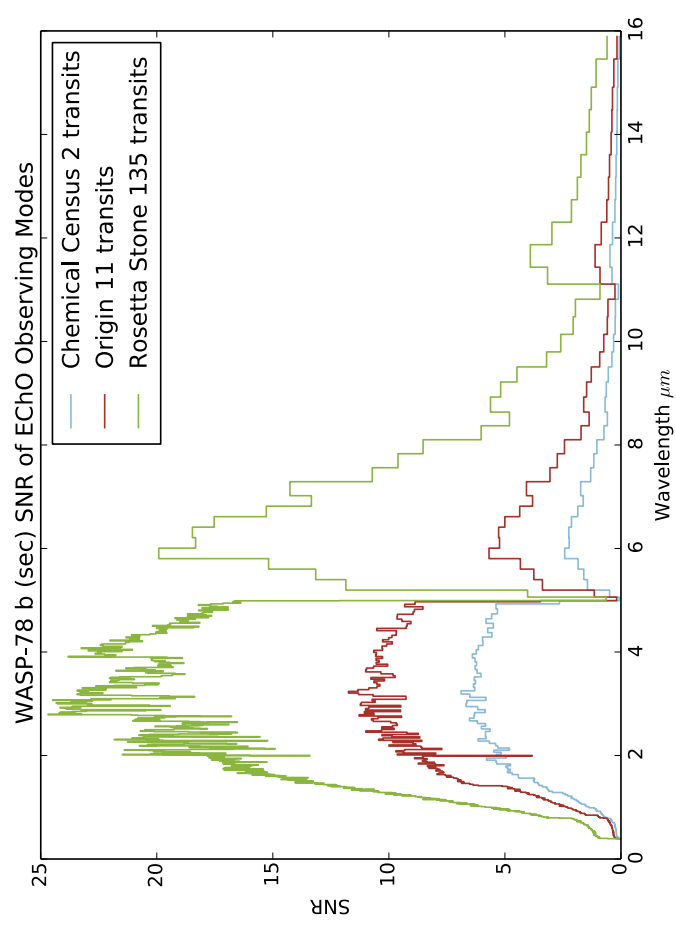
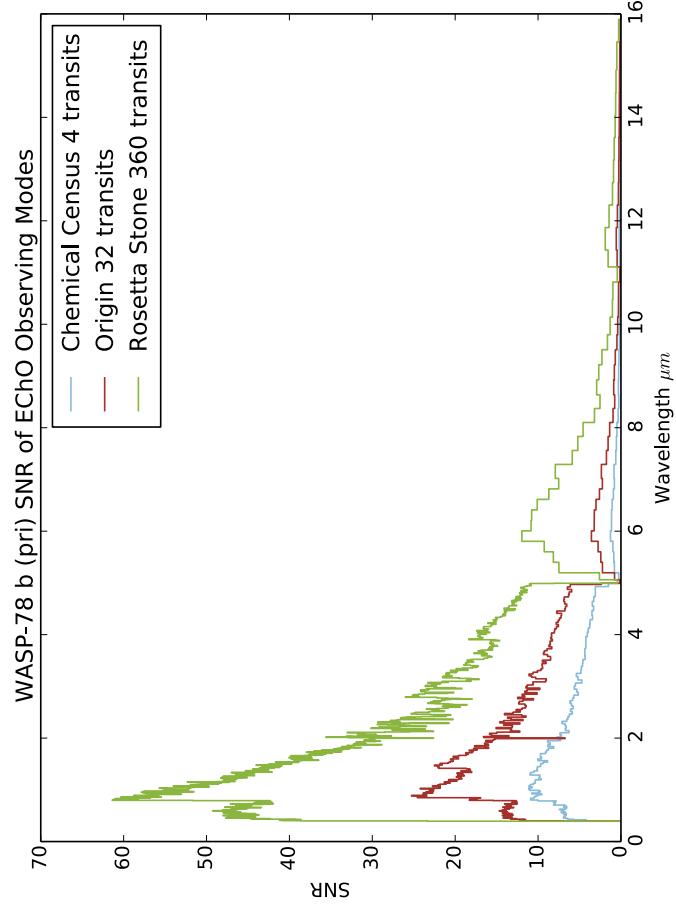
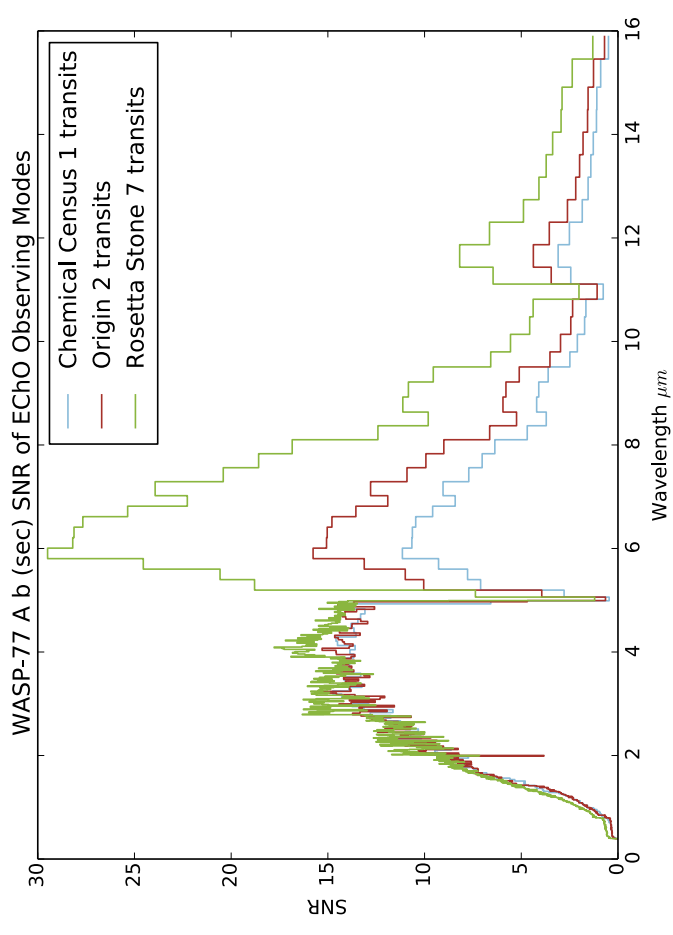
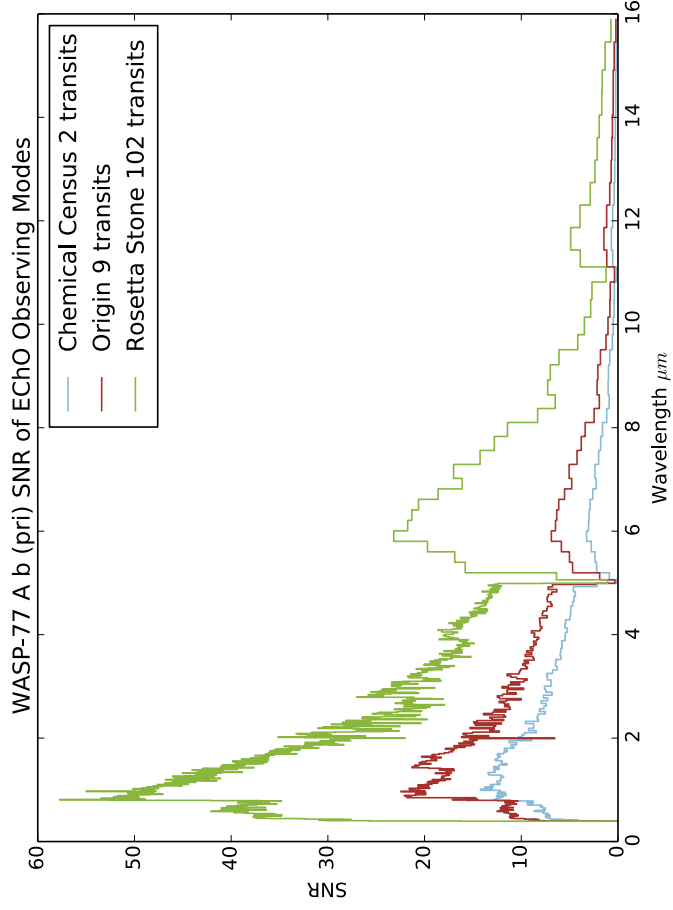
WASP-69 b (sec) SNR of EChO Observing Modes



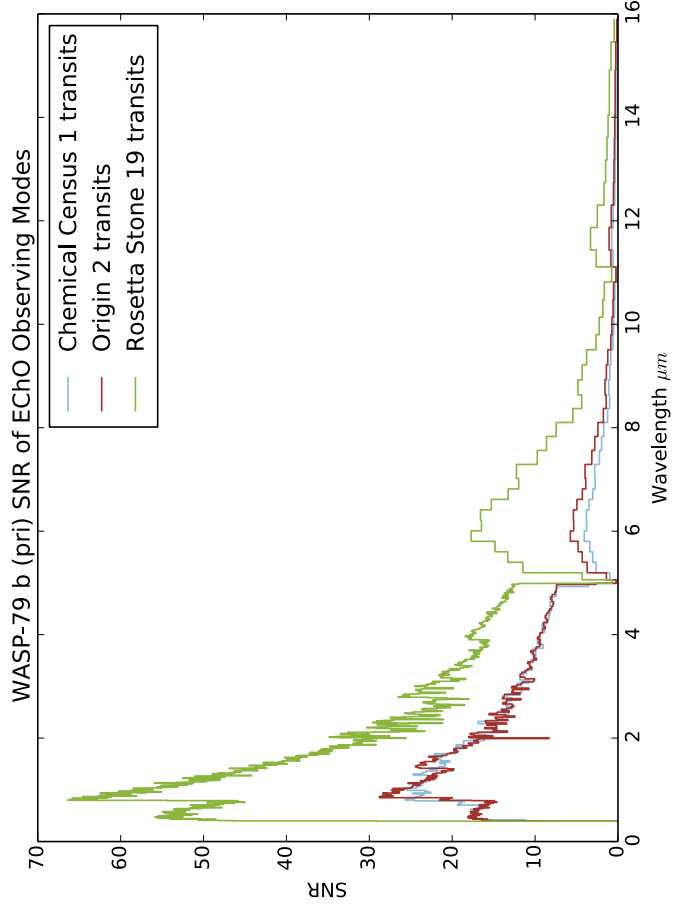




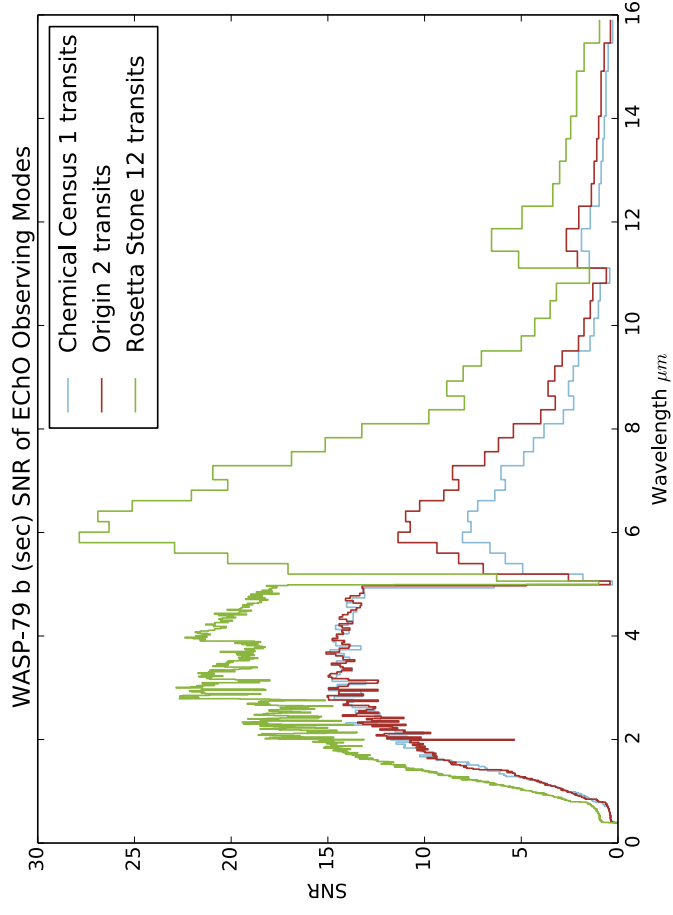




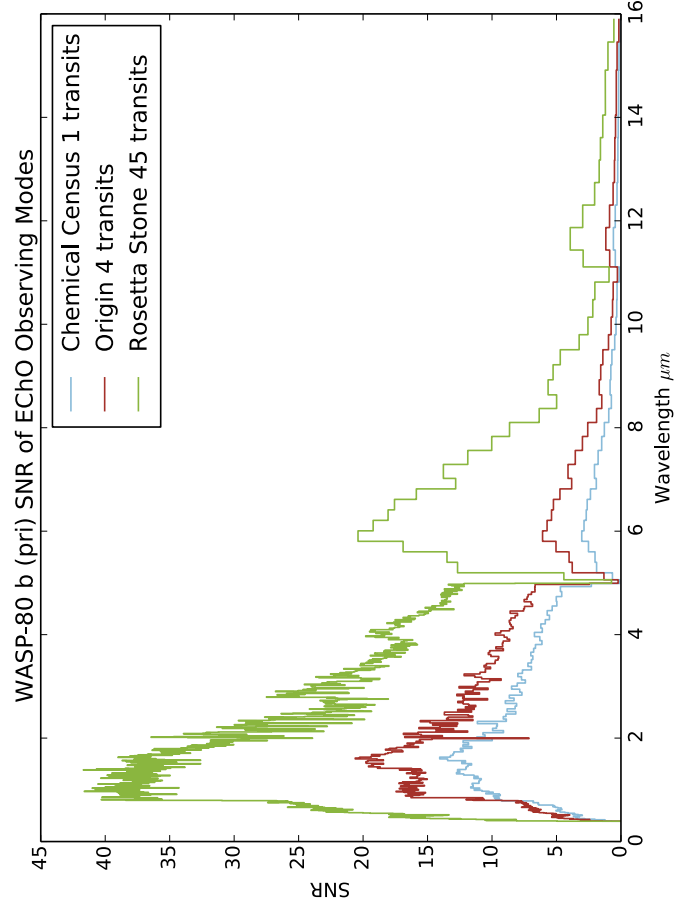
WASP-79 b (pri) SNR of EChO Observing Modes



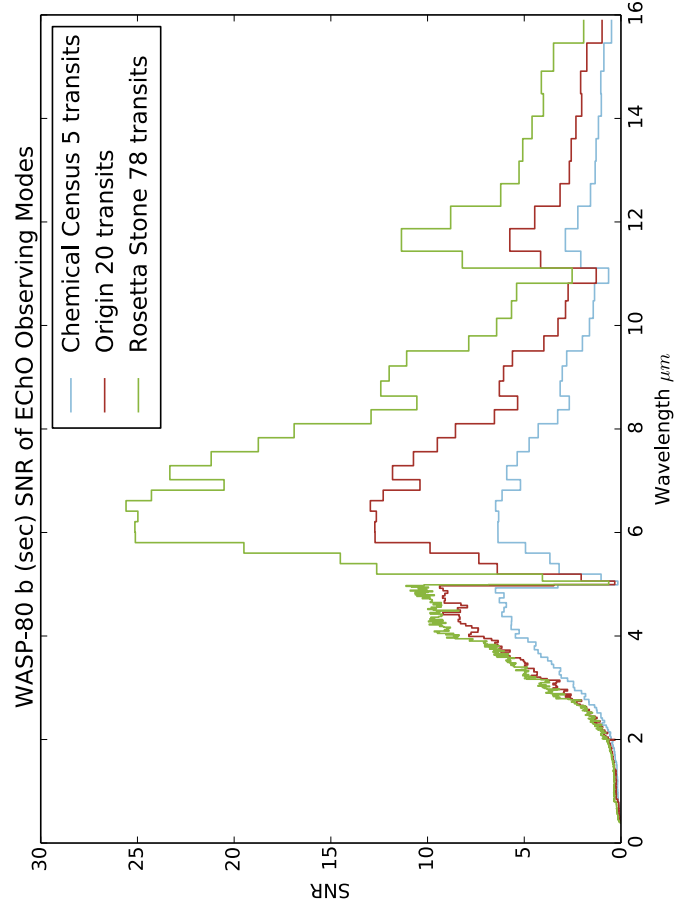
WASP-79 b (sec) SNR of EChO Observing Modes



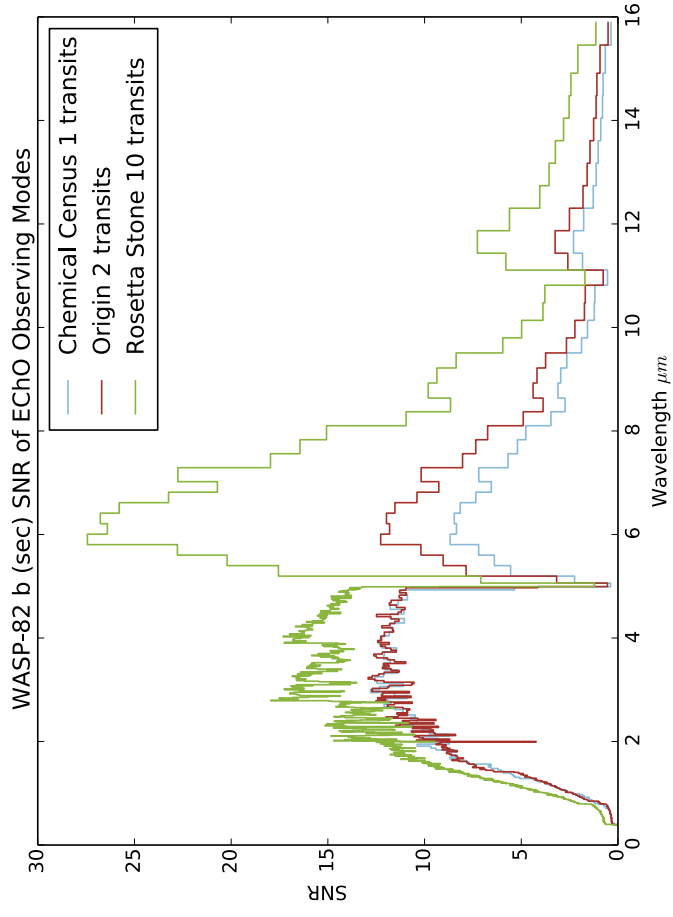
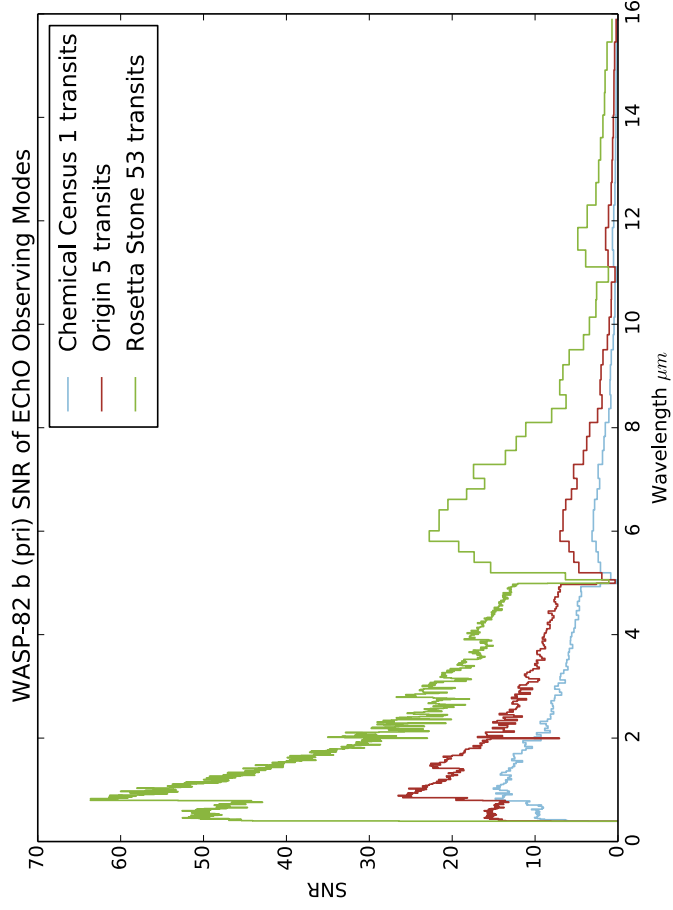
WASP-80 b (pri) SNR of EChO Observing Modes



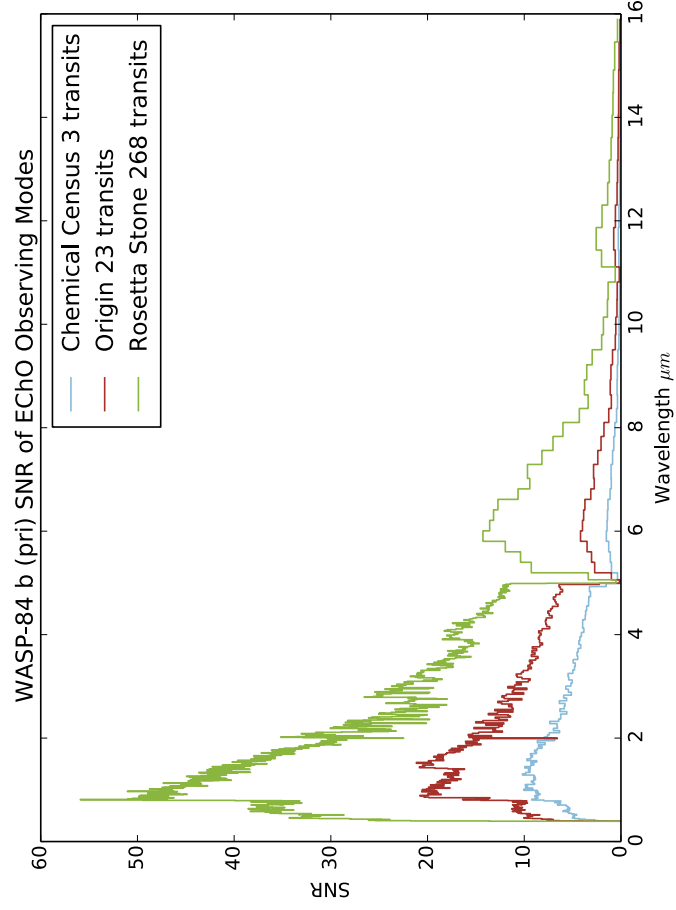
WASP-80 b (sec) SNR of EChO Observing Modes



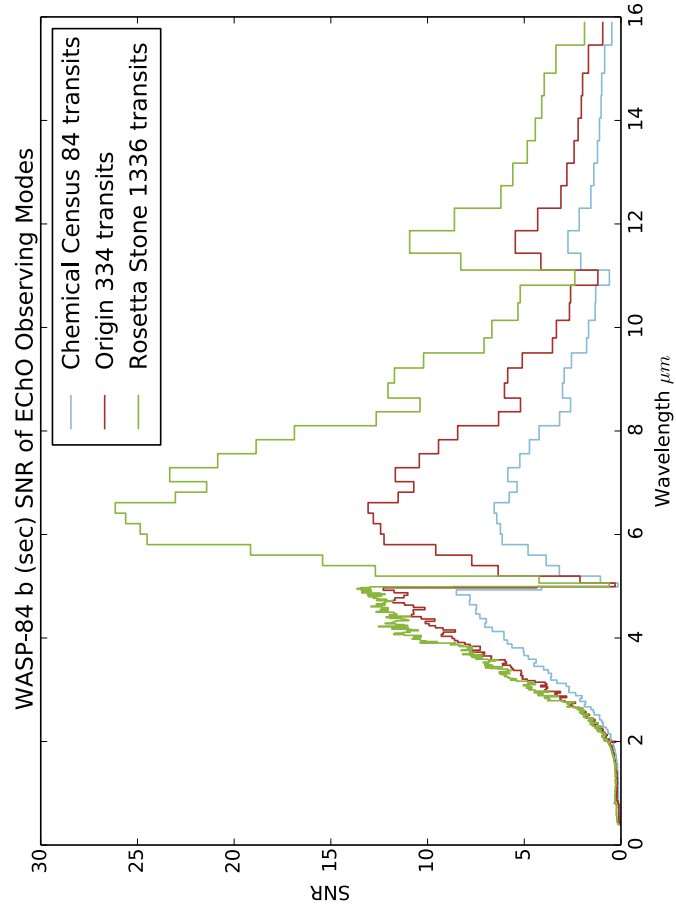
WASP-82 b (pri) SNR of EChO Observing Modes



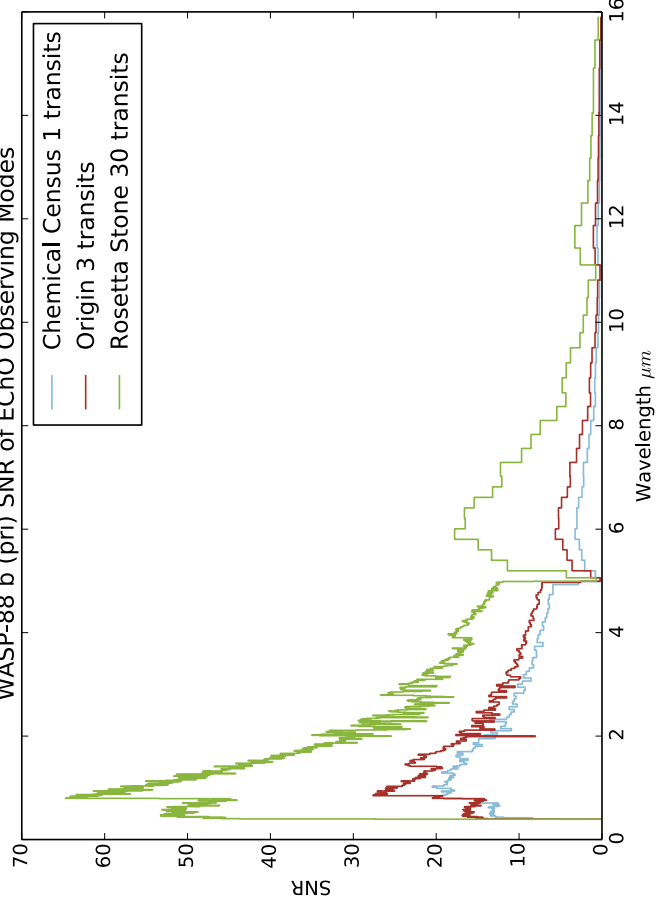
WASP-84 b (pri) SNR of EChO Observing Modes



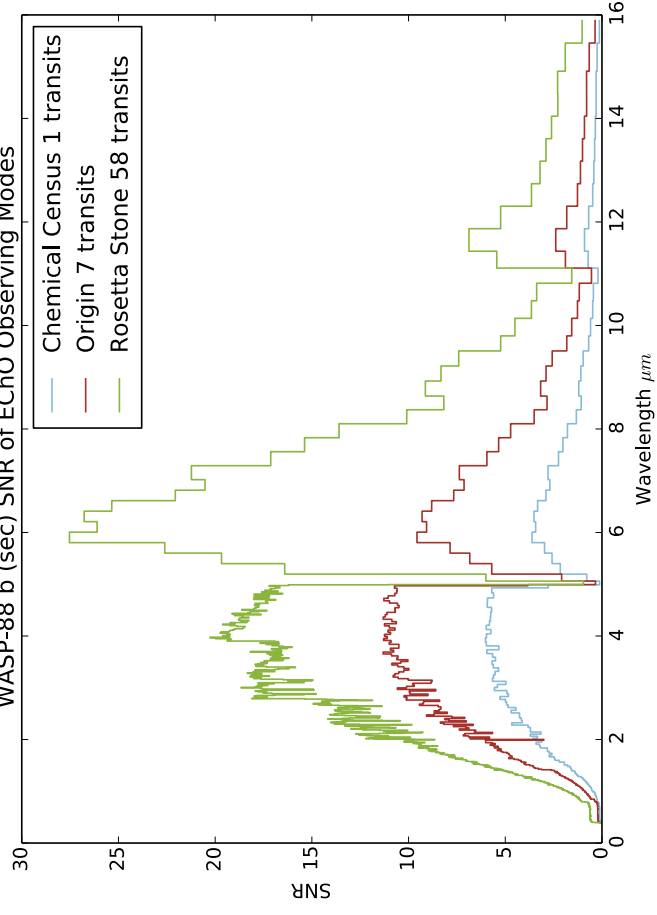
WASP-84 b (sec) SNR of EChO Observing Modes



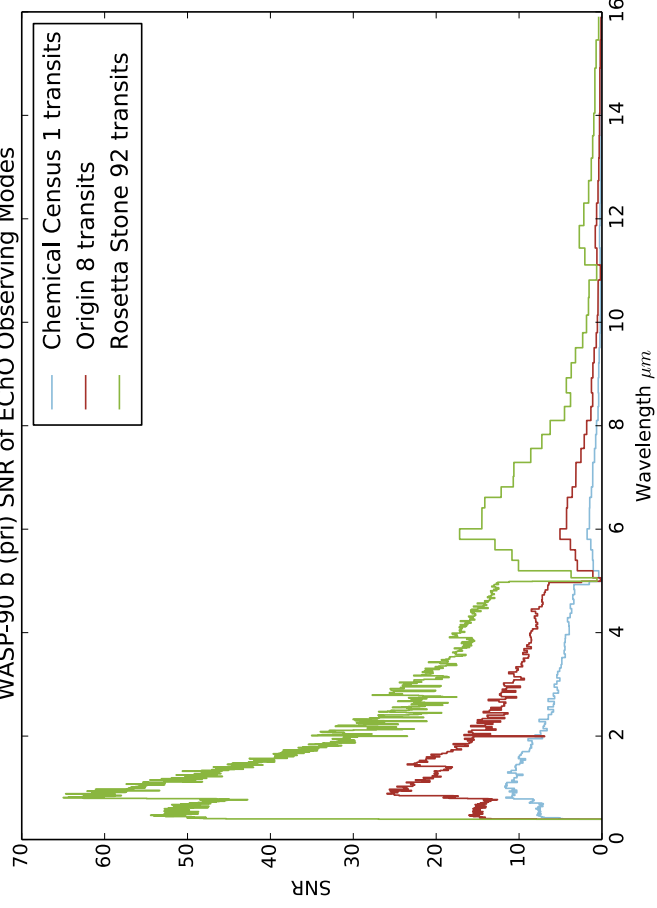
WASP-88 b (pri) SNR of EChO Observing Modes



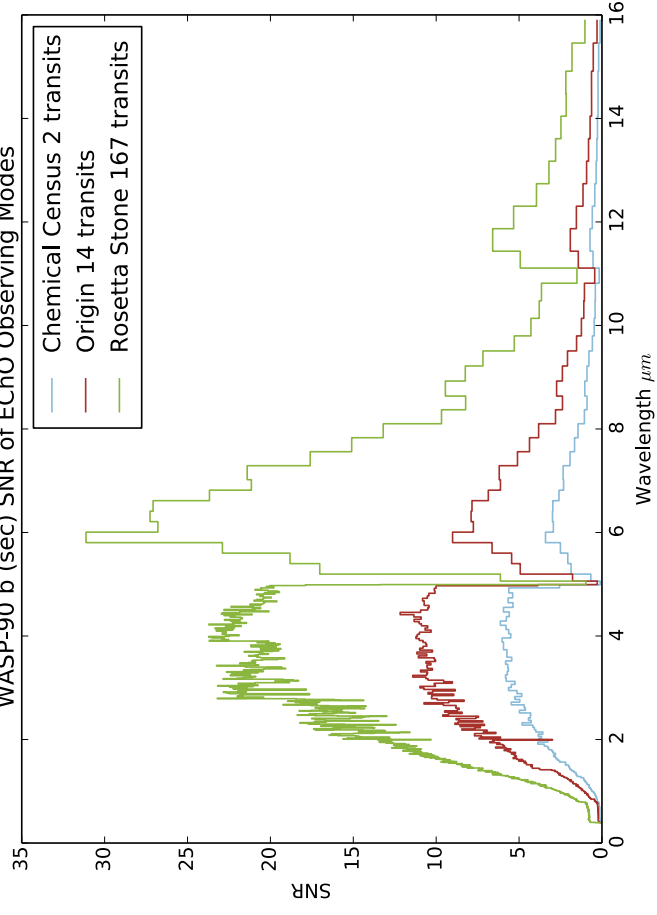
WASP-88 b (sec) SNR of EChO Observing Modes



WASP-90 b (pri) SNR of EChO Observing Modes

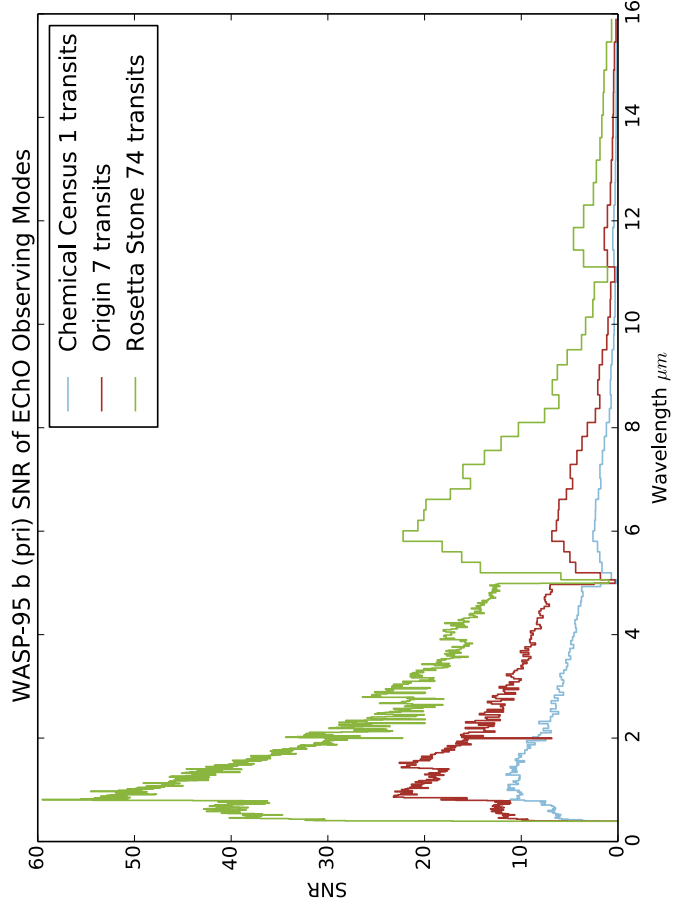


WASP-90 b (sec) SNR of EChO Observing Modes

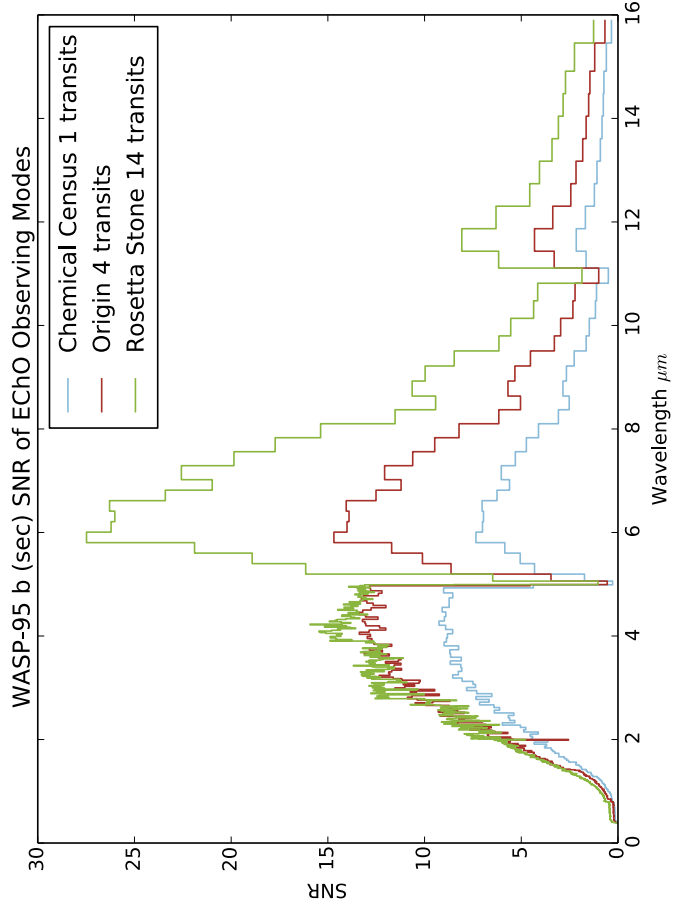




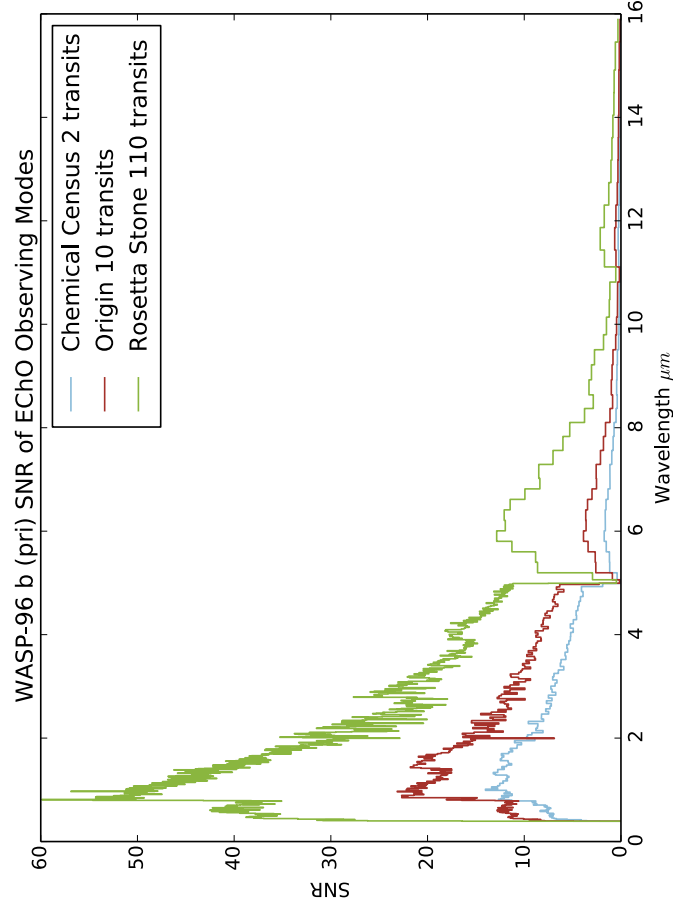
WASP-95 b (pri) SNR of EChO Observing Modes



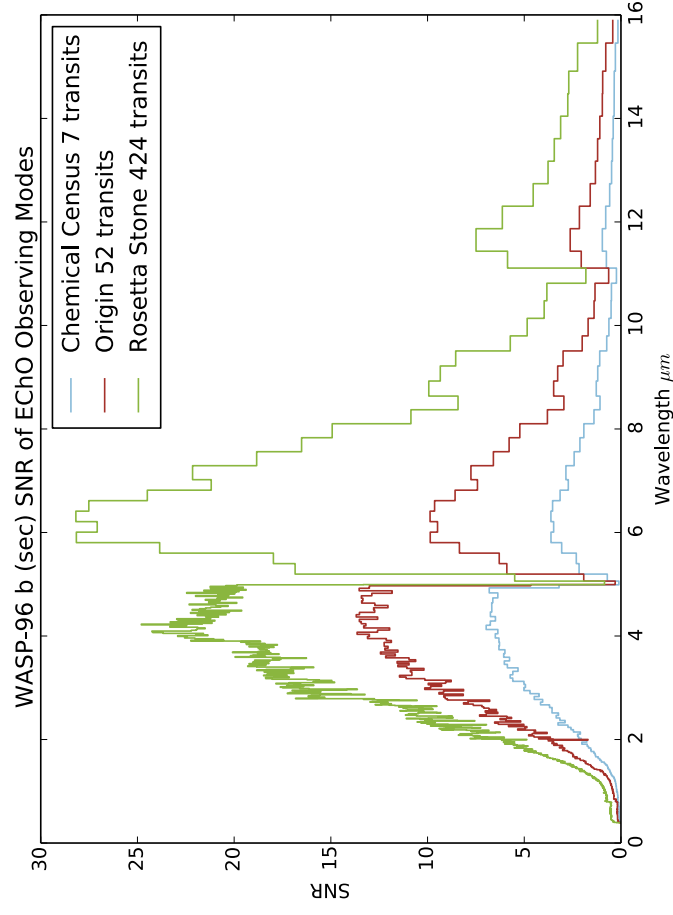
WASP-95 b (sec) SNR of EChO Observing Modes



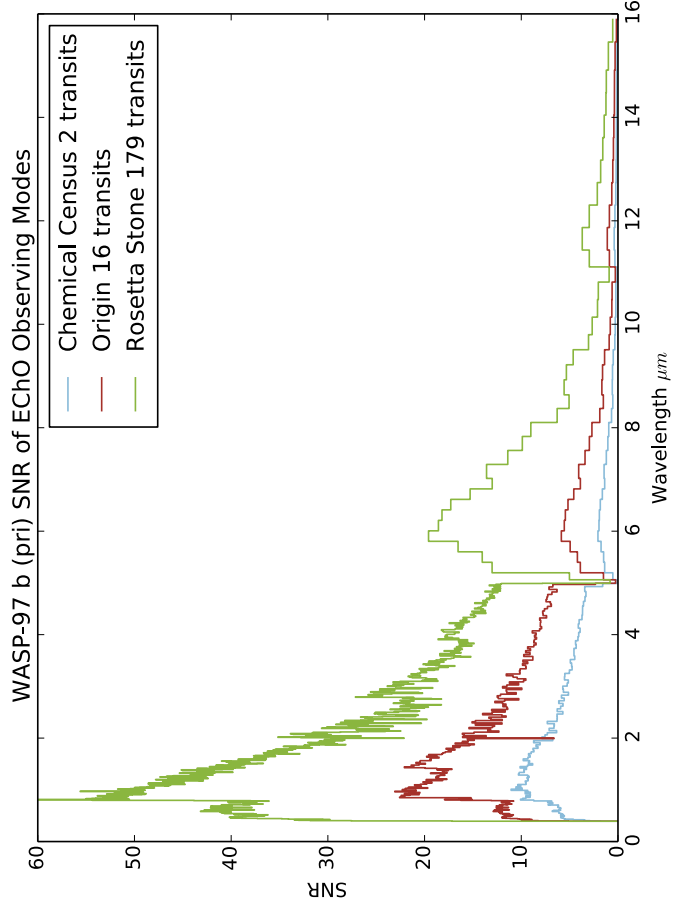
WASP-96 b (pri) SNR of EChO Observing Modes



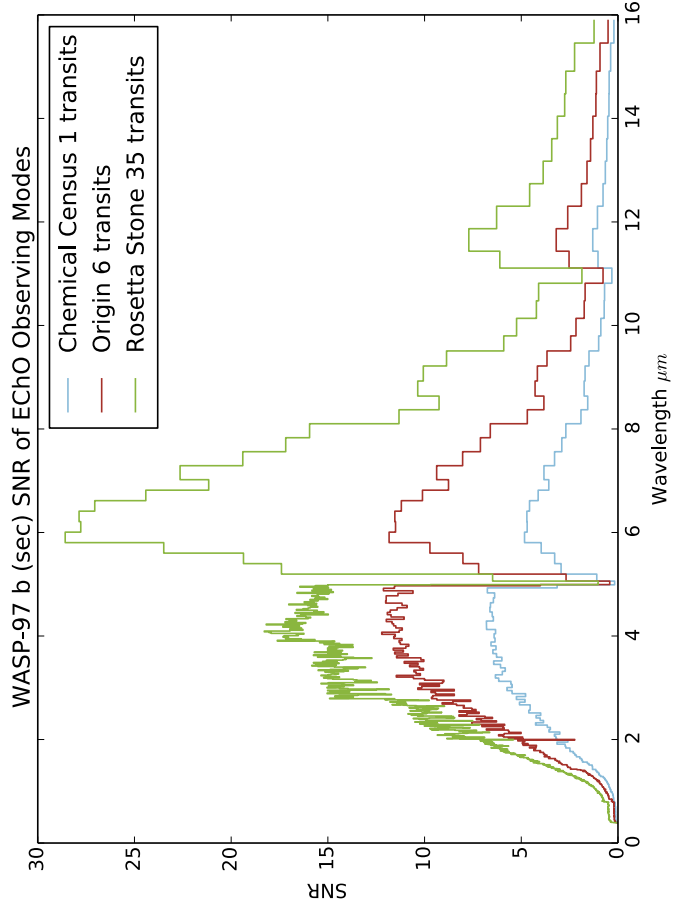
WASP-96 b (sec) SNR of EChO Observing Modes



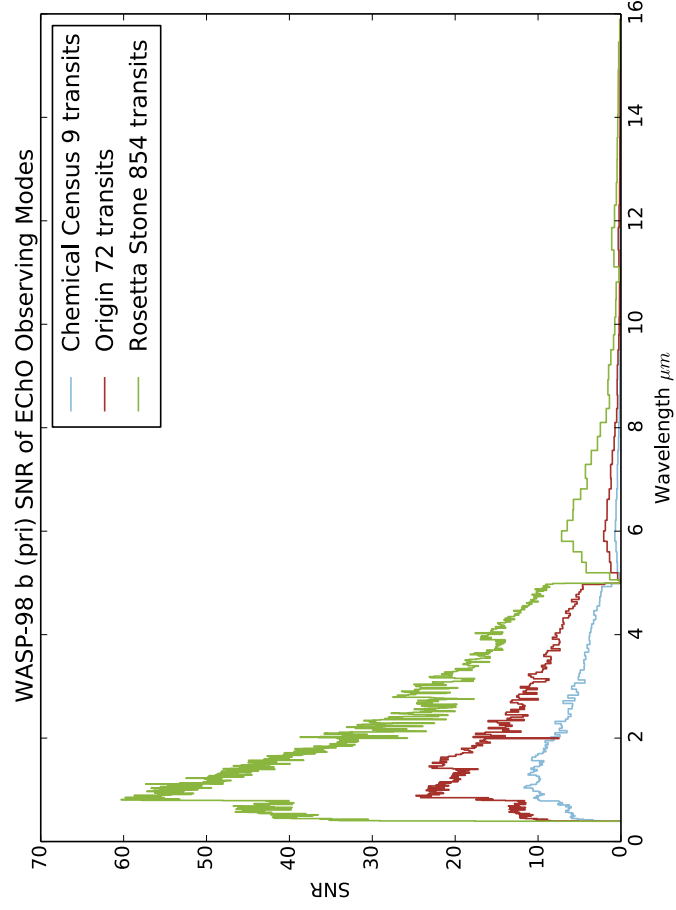
WASP-97 b (pri) SNR of EChO Observing Modes



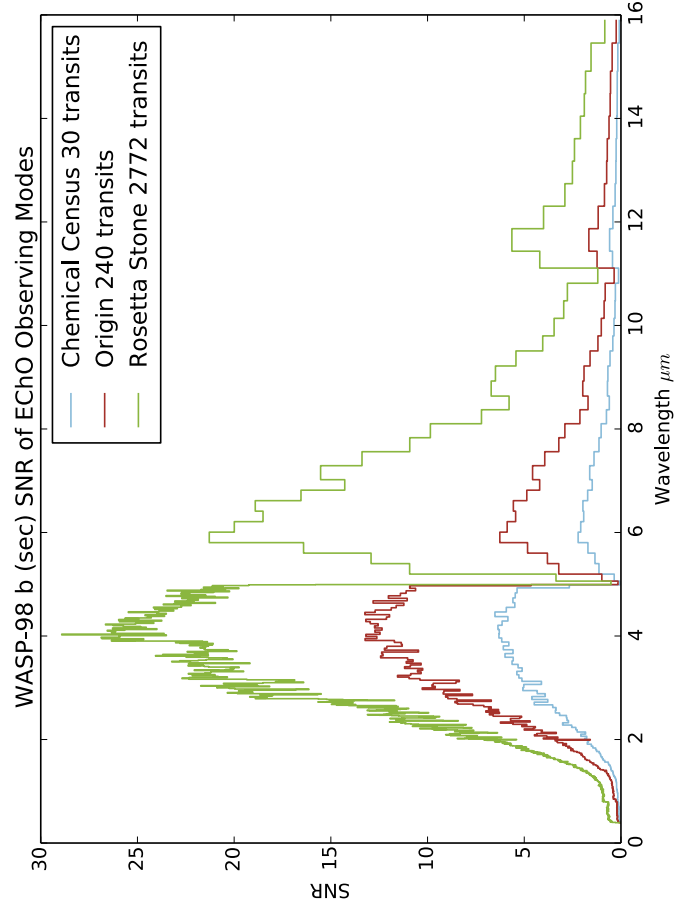
WASP-97 b (sec) SNR of EChO Observing Modes

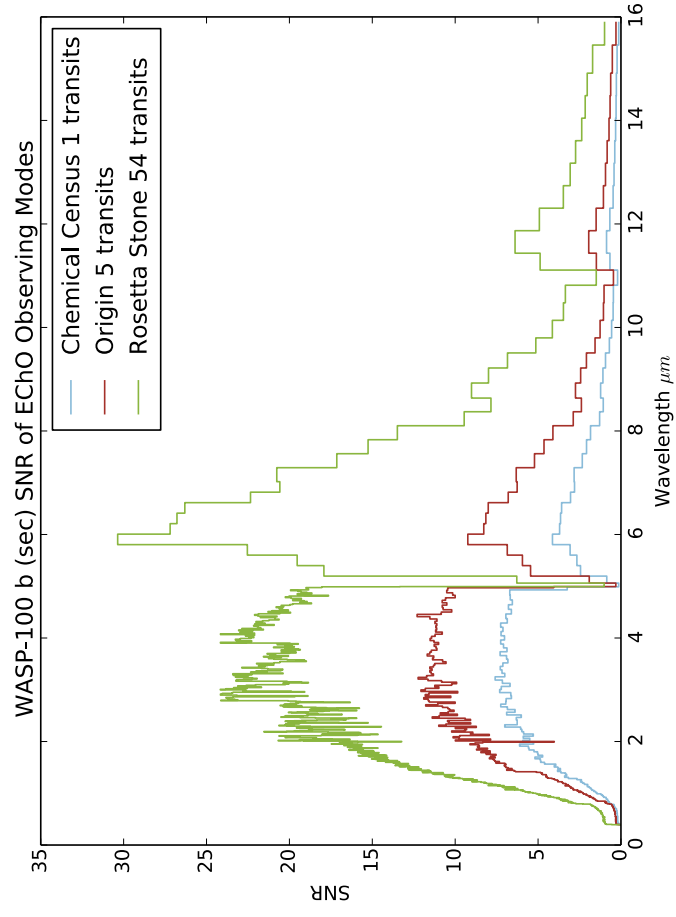
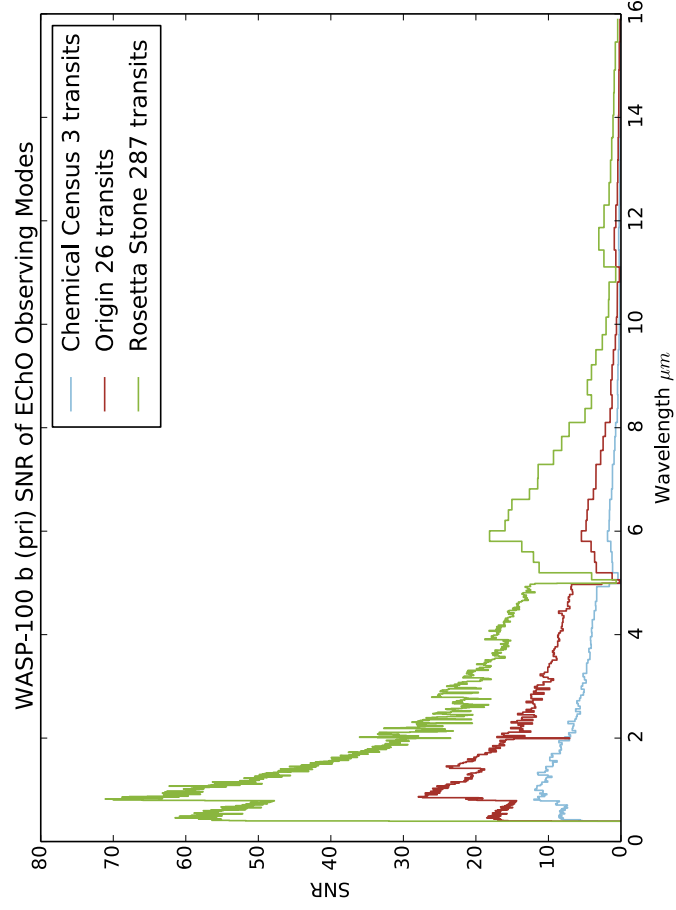
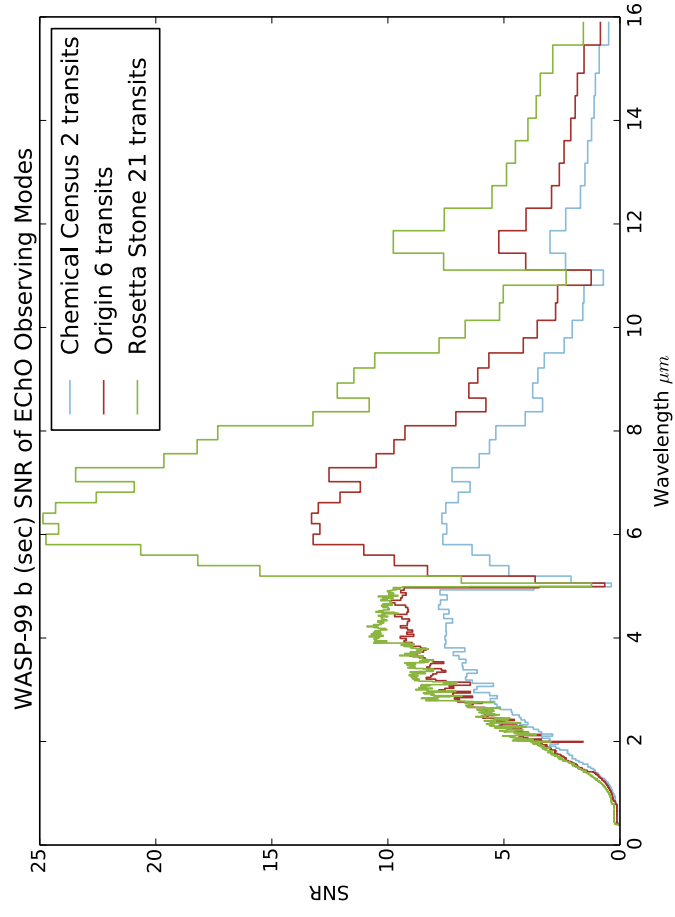
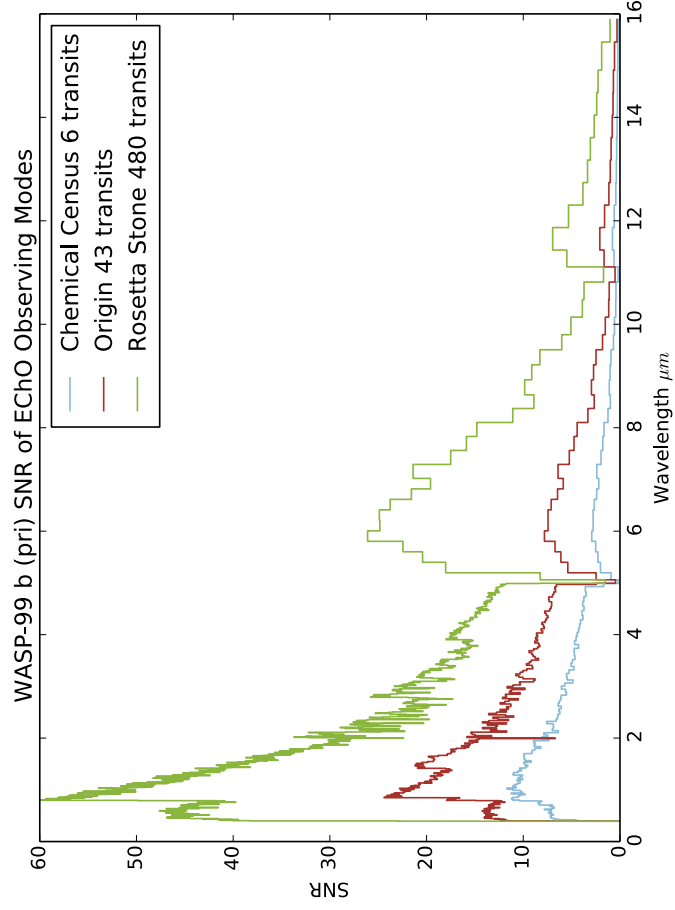


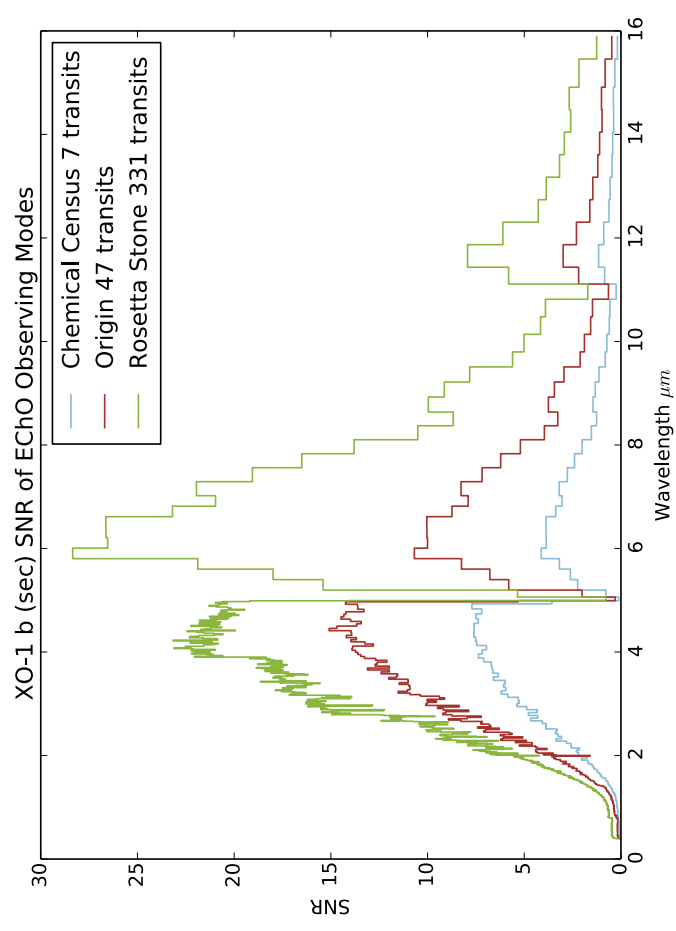
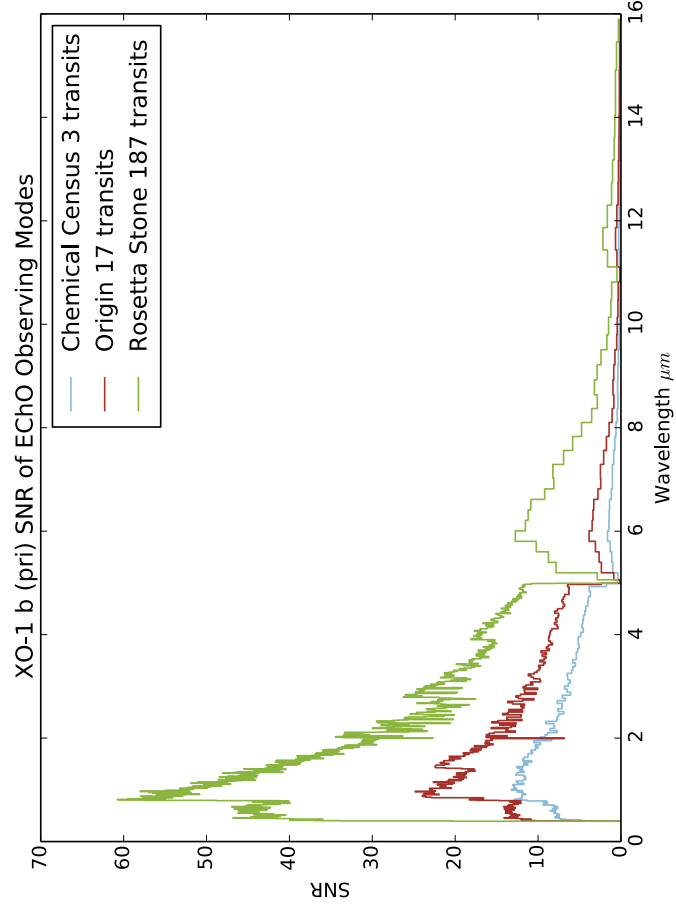
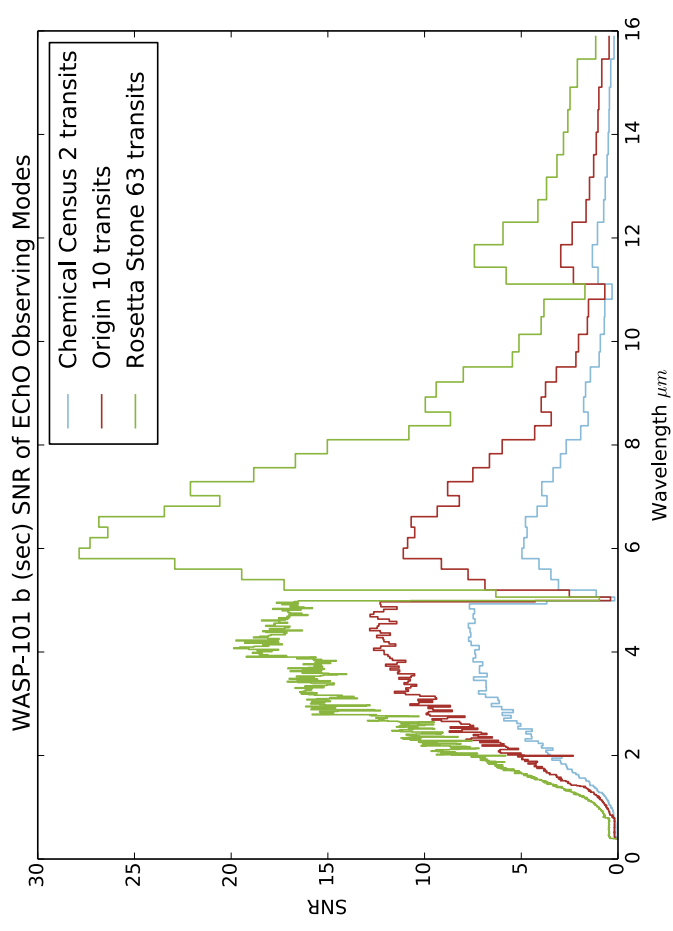
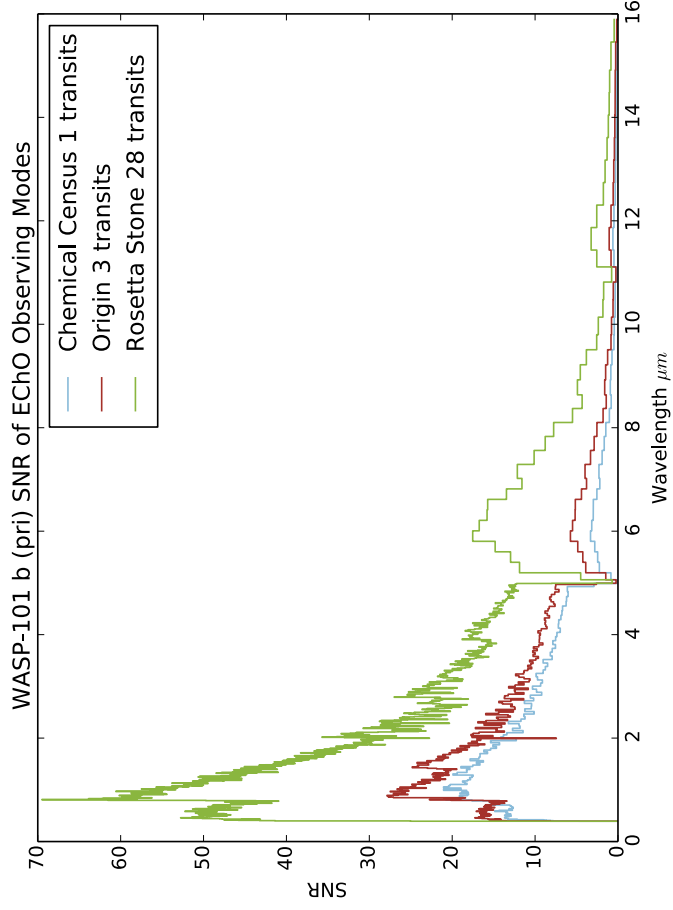
WASP-98 b (pri) SNR of EChO Observing Modes



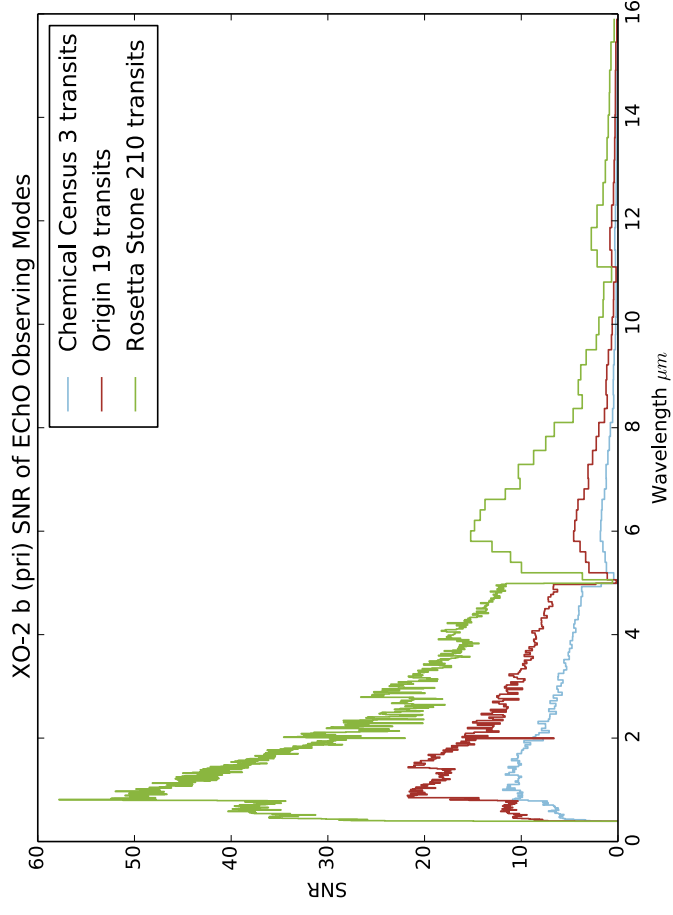
WASP-98 b (sec) SNR of EChO Observing Modes



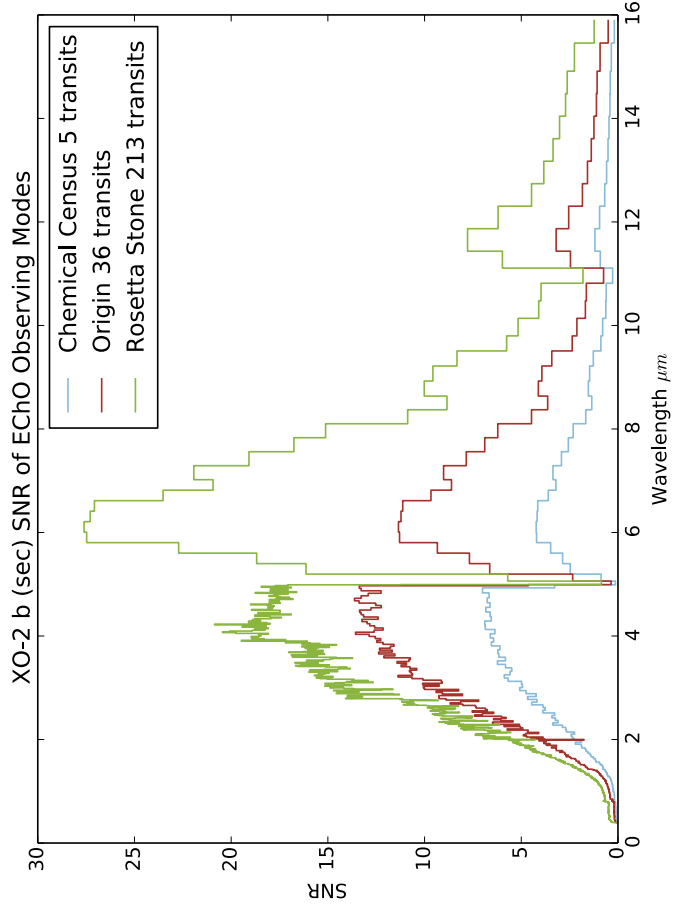




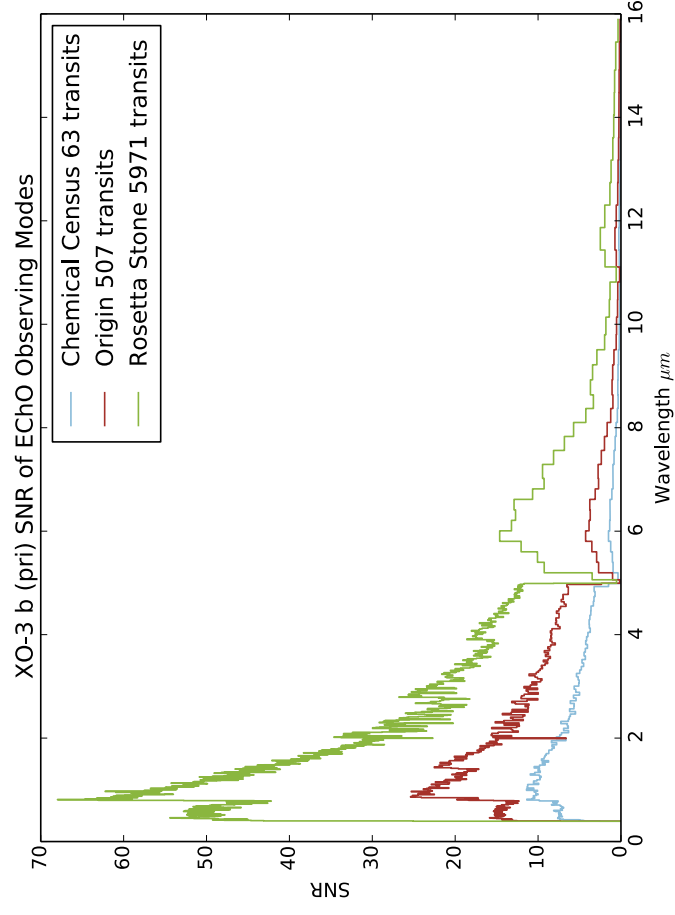
XO-2 b (pri) SNR of EChO Observing Modes



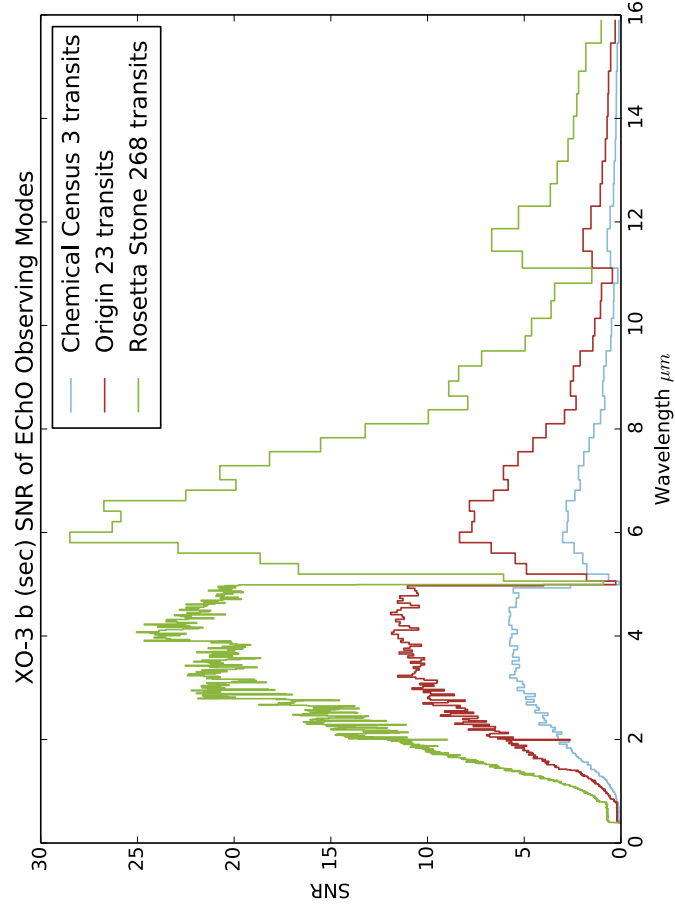
XO-2 b (sec) SNR of EChO Observing Modes



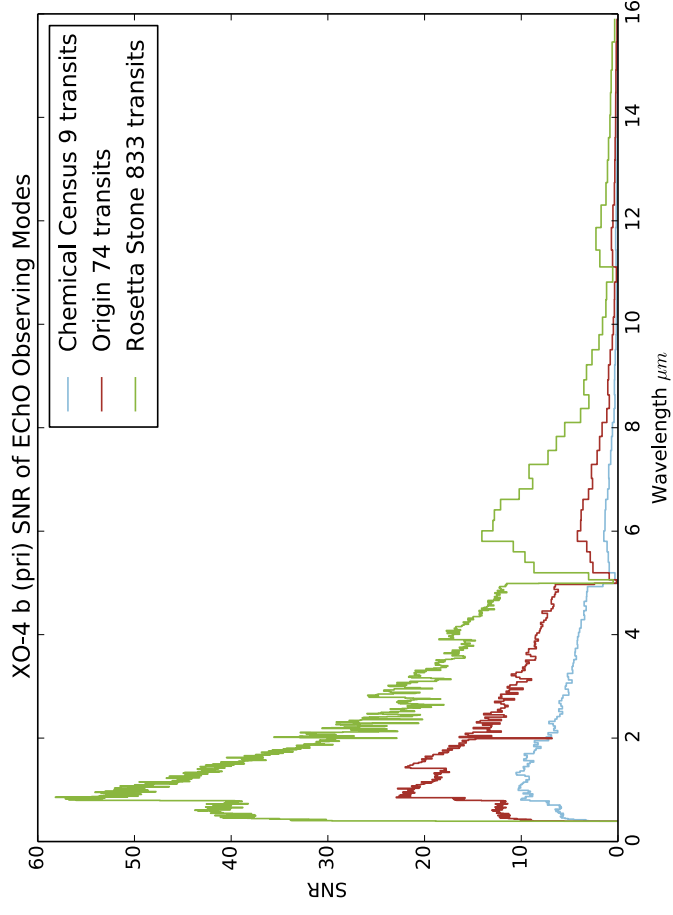
XO-3 b (pri) SNR of EChO Observing Modes



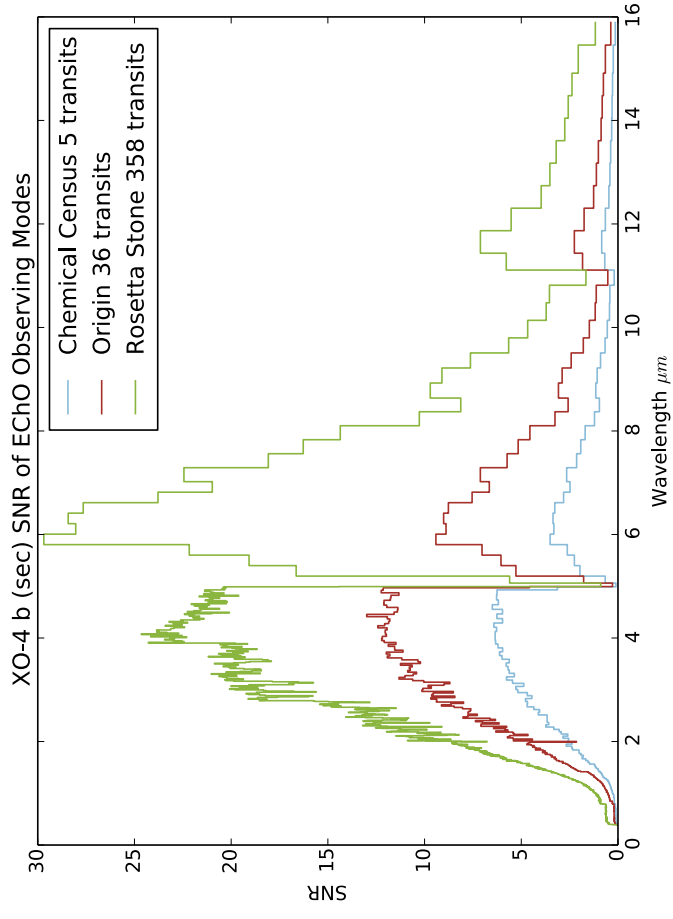
XO-3 b (sec) SNR of EChO Observing Modes



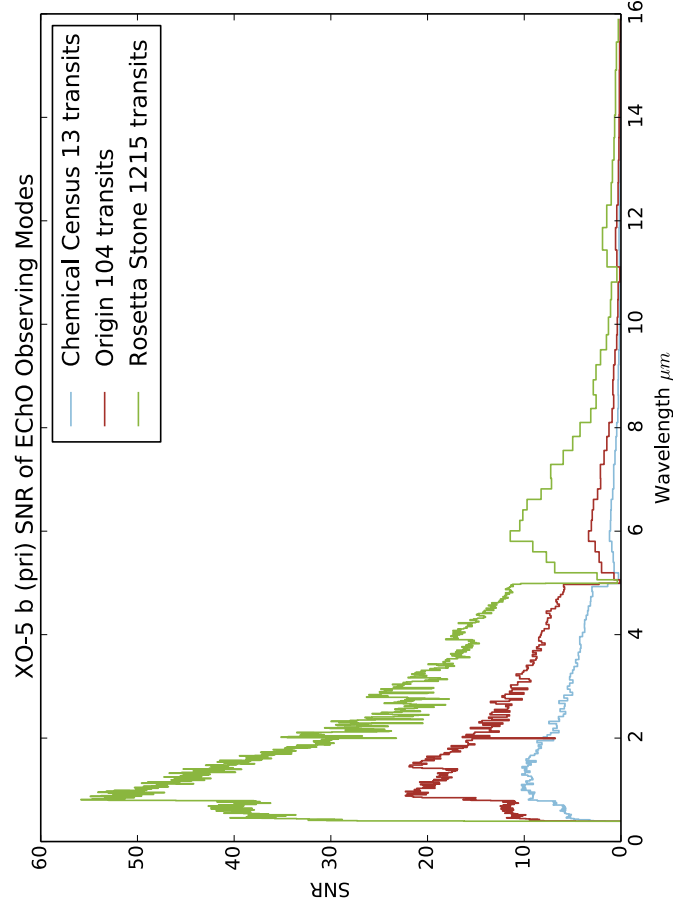
XO-4 b (pri) SNR of EChO Observing Modes



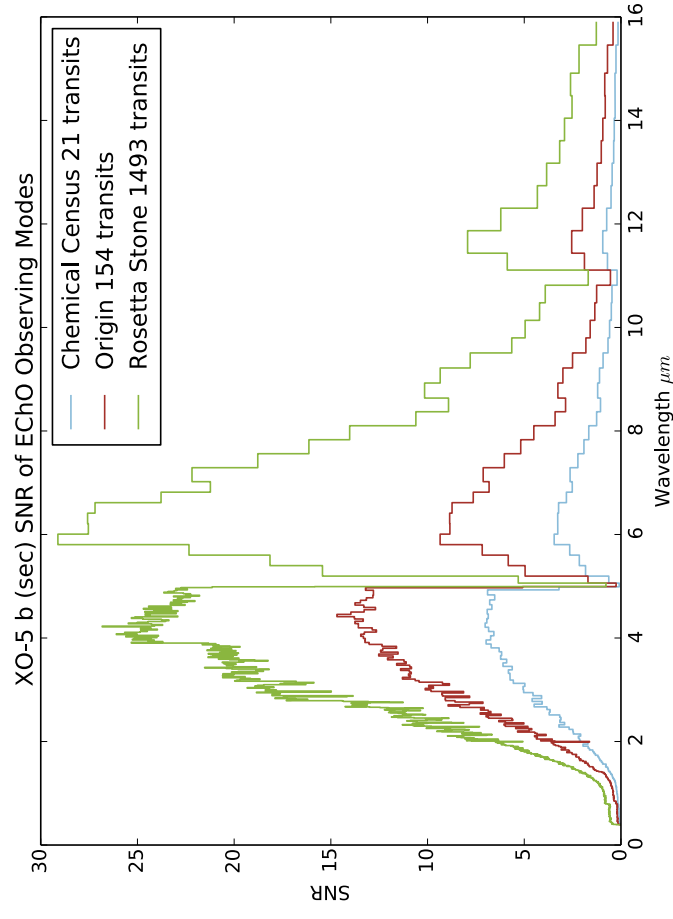
XO-4 b (sec) SNR of EChO Observing Modes




XO-5 b (pri) SNR of EChO Observing Modes



XO-5 b (sec) SNR of EChO Observing Modes

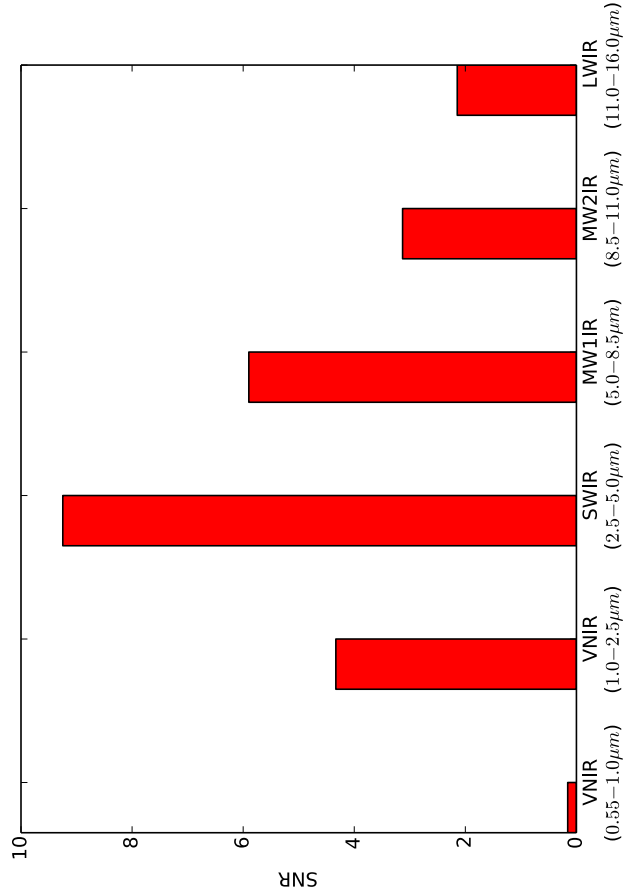


	<p><b>Exoplanet Characterisation Observatory</b></p>	<p>Doc Ref: ECHO-TN-0001-UCL Issue: 03 Date: 11-12-2013</p>
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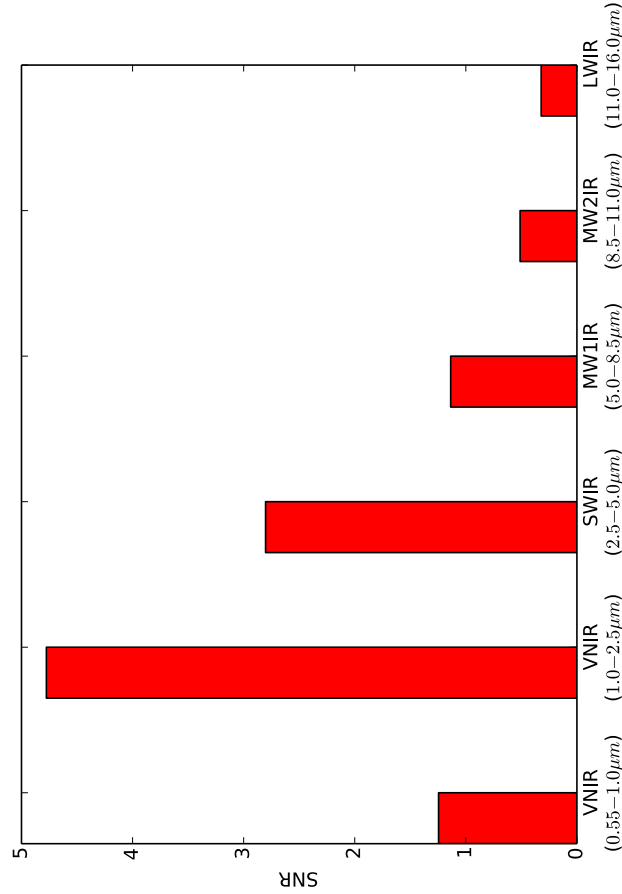
## Bulk SNR

Figure 11 SNR per channel (as a single bin)

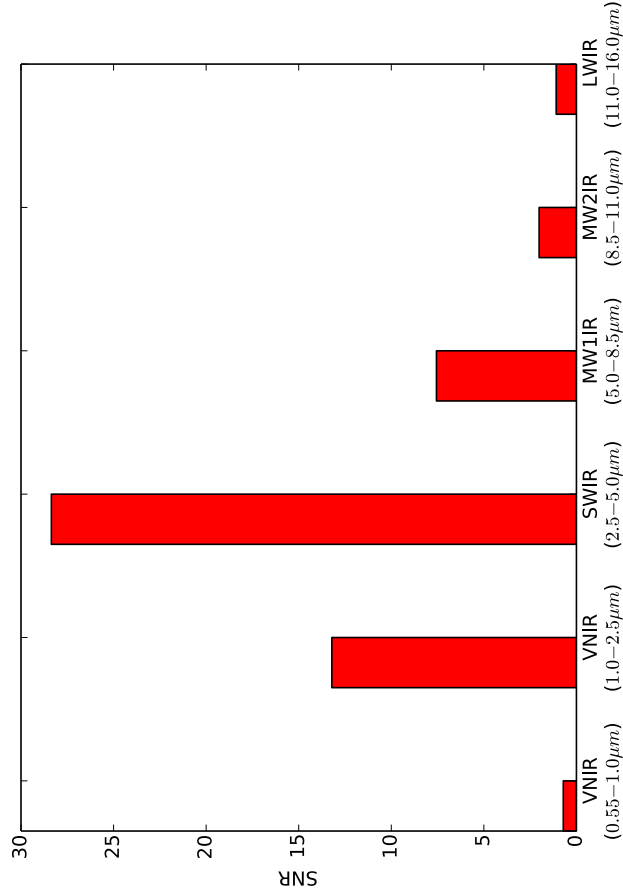
SNR of 55 Cnc e (Secondary) Per Channel (1 eclipse = 4.98h)



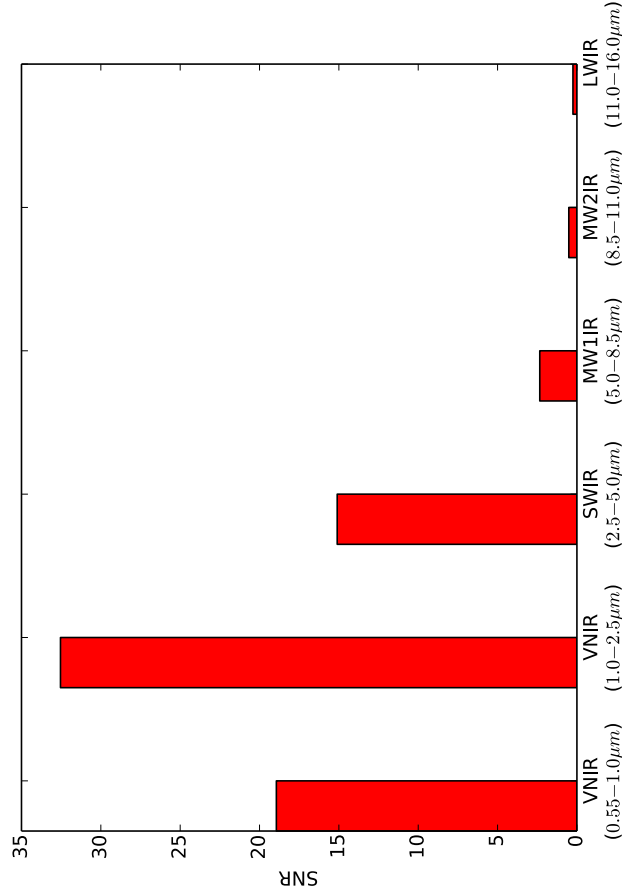
SNR of 55 Cnc e (Primary) Per Channel (1 transit = 4.98h)



SNR of BD+30 1138 b (Secondary) Per Channel (1 eclipse = 9.52h)

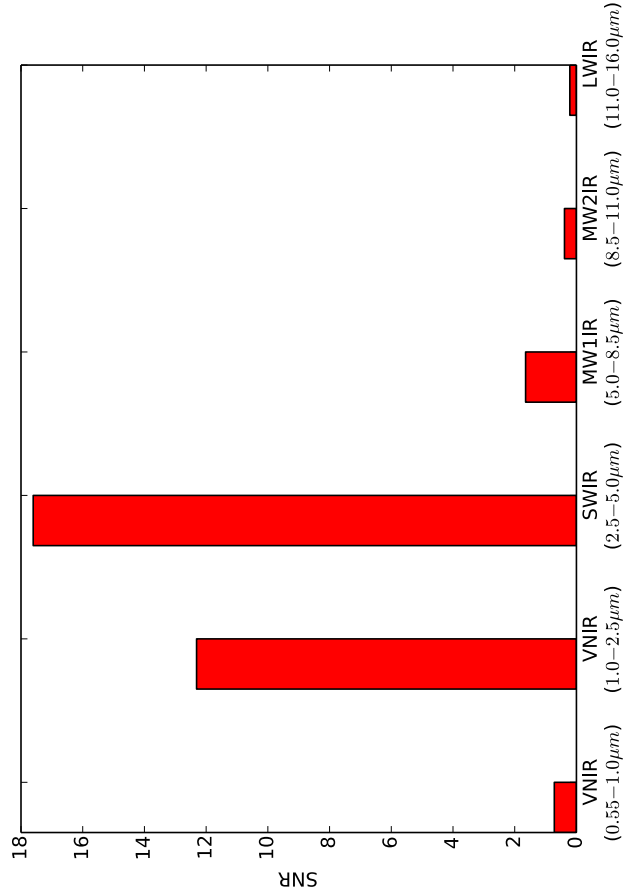


SNR of BD+30 1138 b (Primary) Per Channel (1 transit = 9.52h)

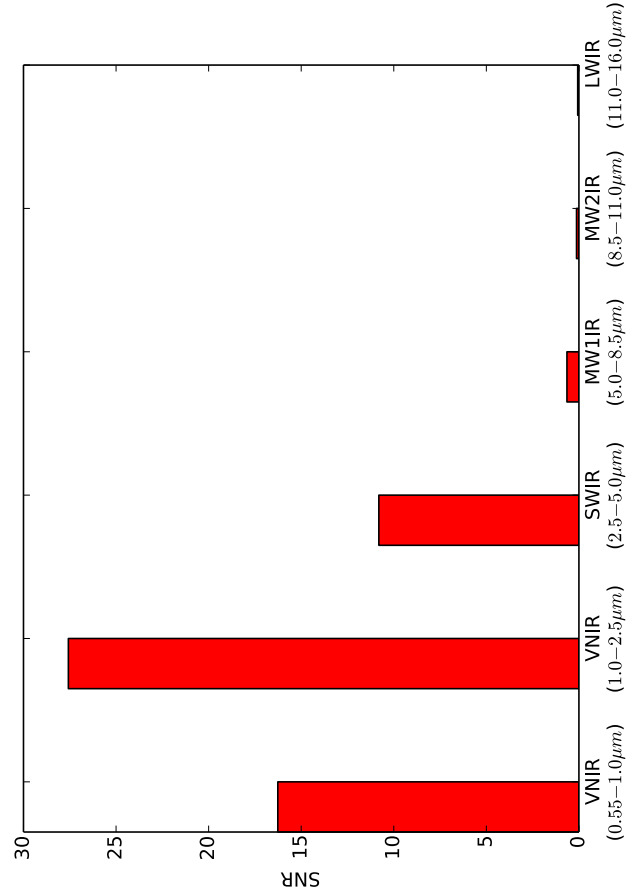




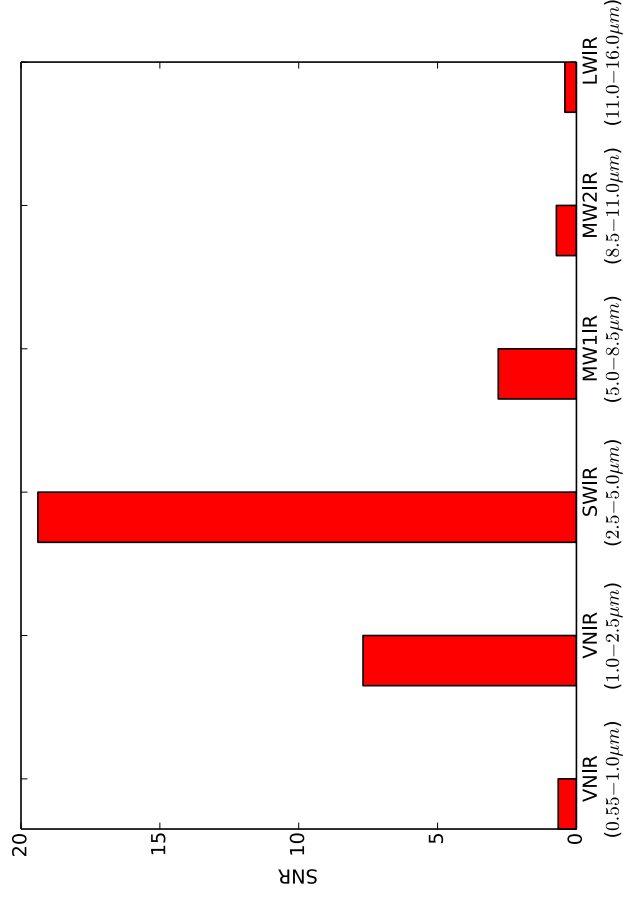
SNR of CoRoT-1 b (Secondary) Per Channel (1 eclipse = 7.54h)



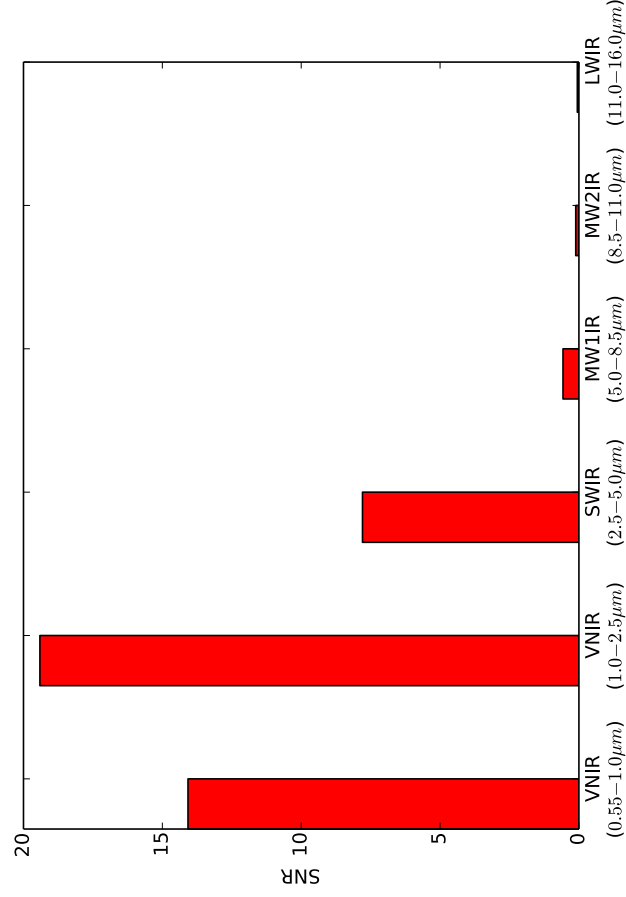
SNR of CoRoT-1 b (Primary) Per Channel (1 transit = 7.54h)



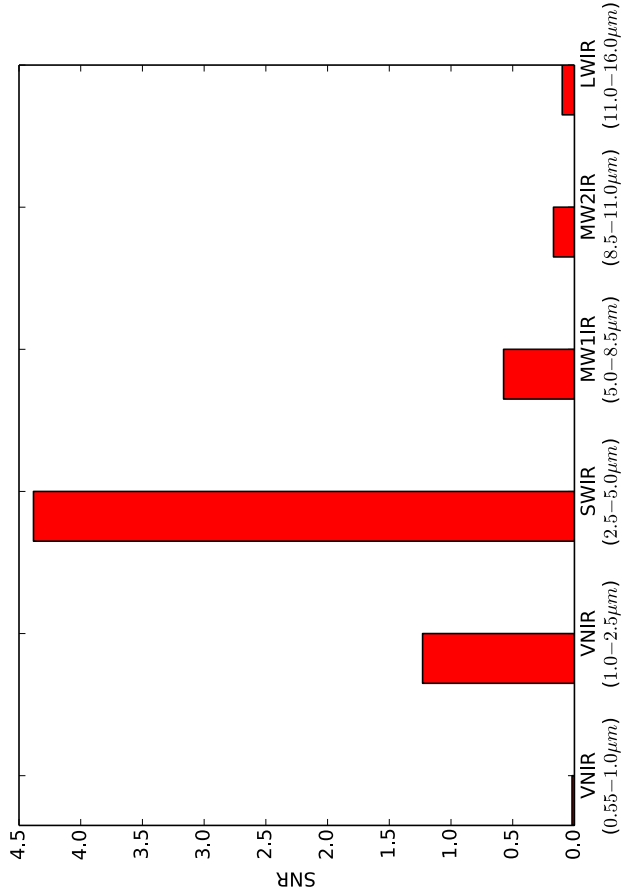
SNR of CoRoT-2 b (Secondary) Per Channel (1 eclipse = 6.84h)



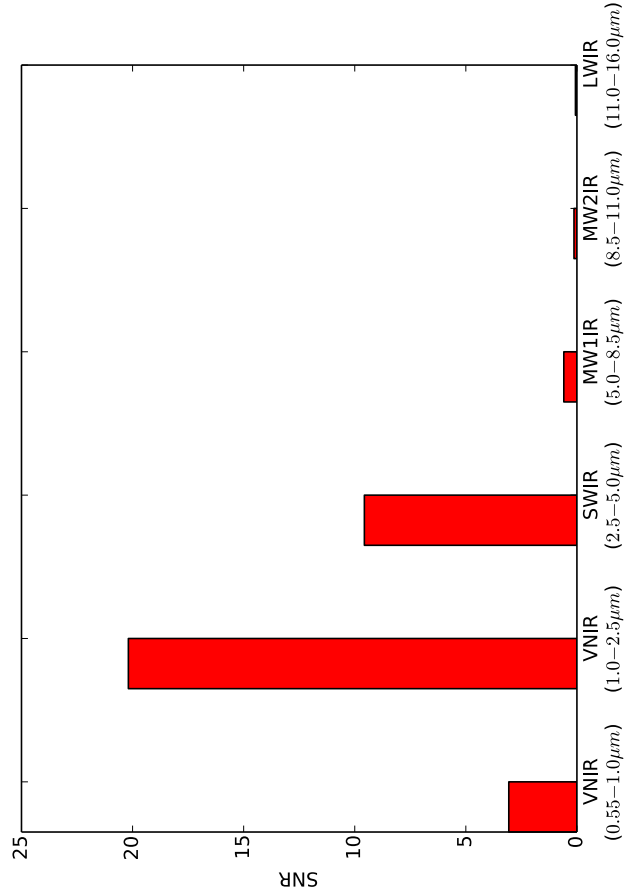
SNR of CoRoT-2 b (Primary) Per Channel (1 transit = 6.84h)



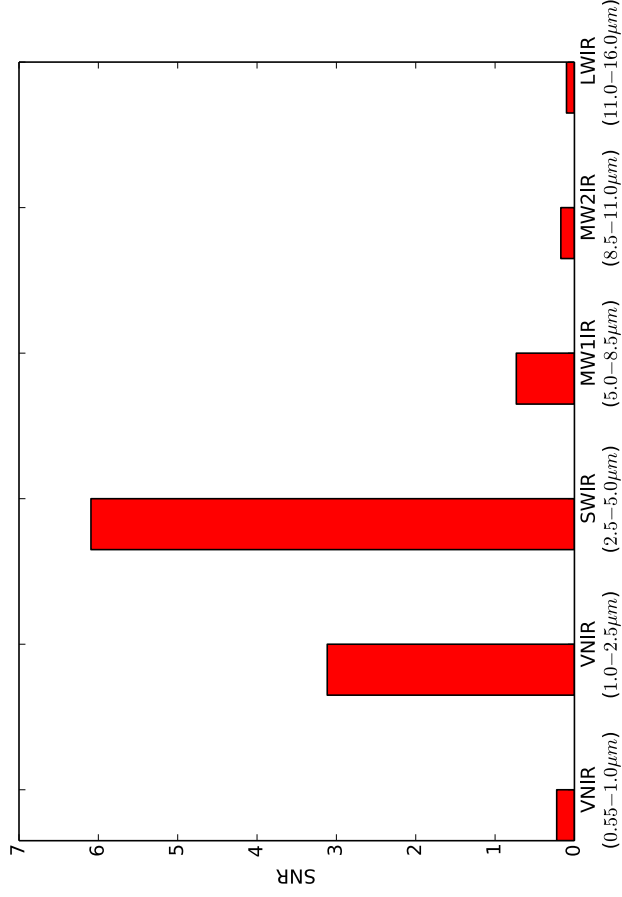
SNR of CoRoT-5 b (Secondary) Per Channel (1 eclipse = 9.47h)



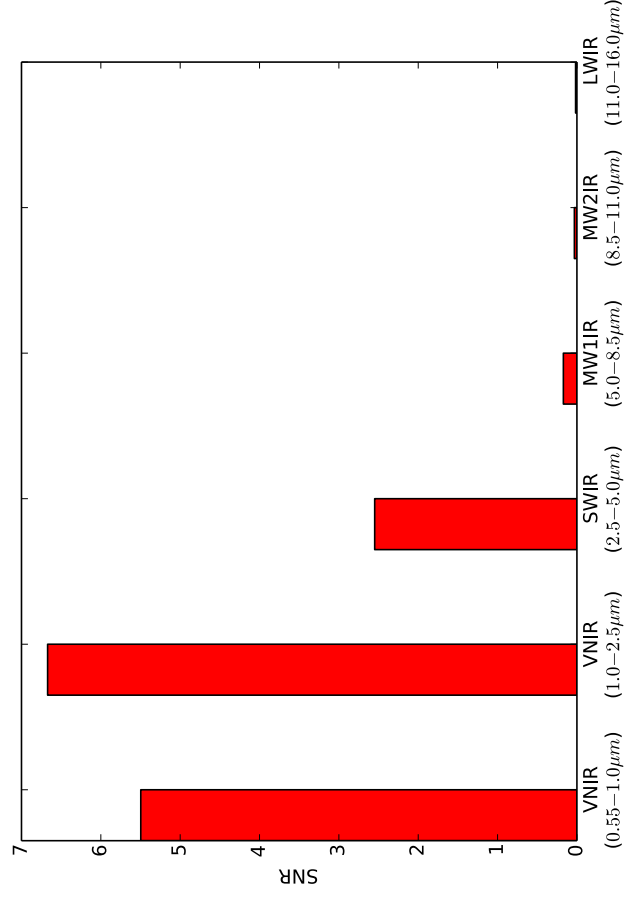
SNR of CoRoT-5 b (Primary) Per Channel (1 transit = 9.47h)



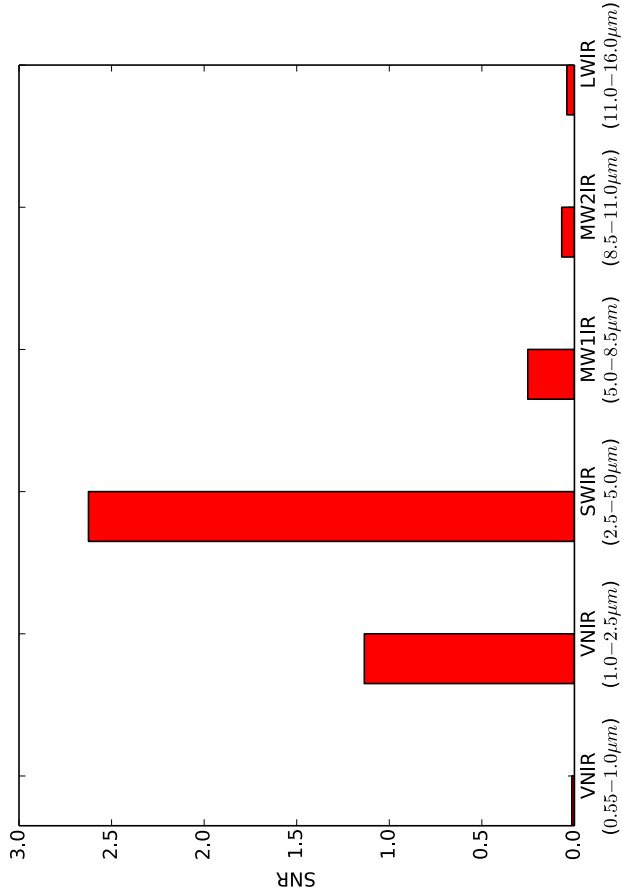
SNR of CoRoT-11 b (Secondary) Per Channel (1 eclipse = 4.38h)



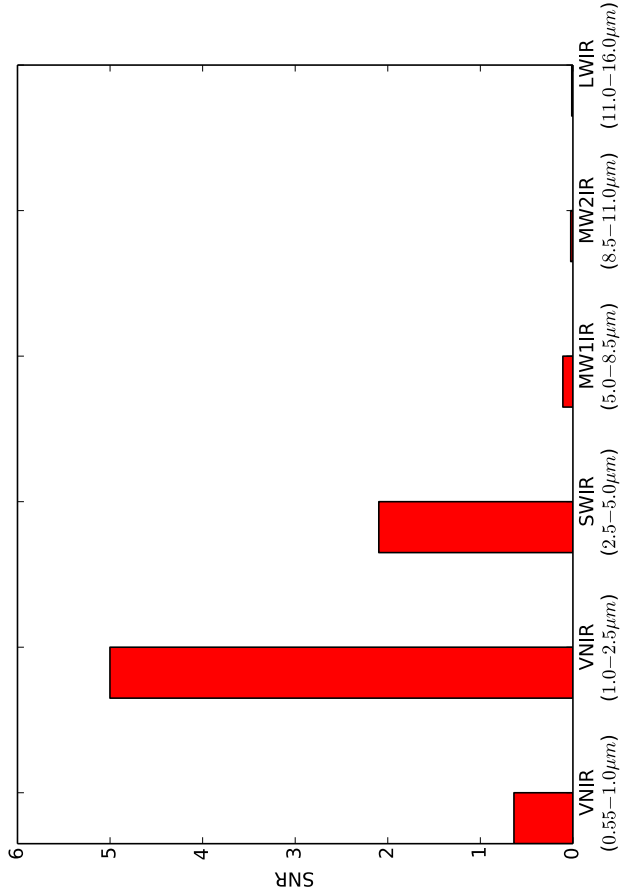
SNR of CoRoT-11 b (Primary) Per Channel (1 transit = 4.38h)



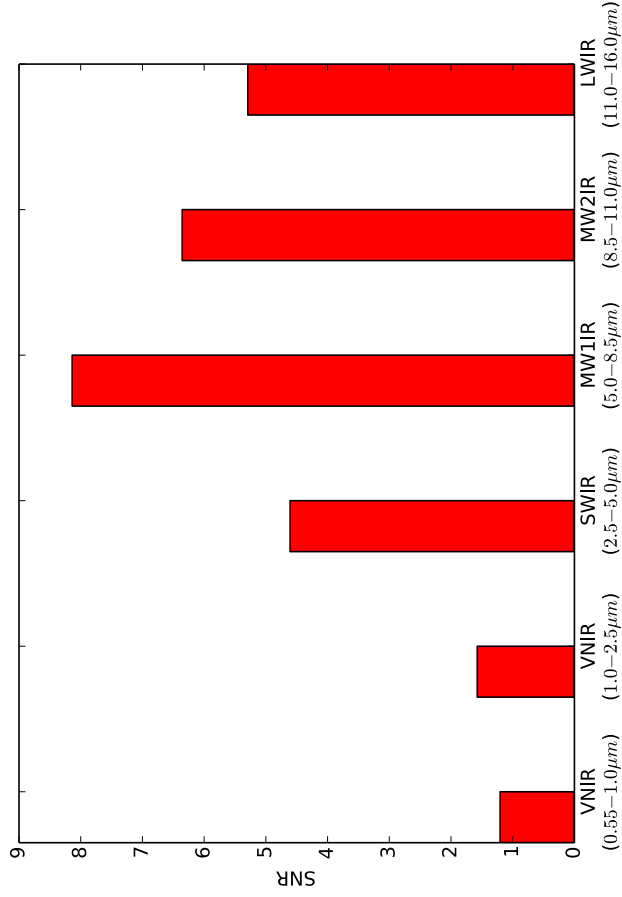
SNR of CoRoT-19 b (Secondary) Per Channel (1 eclipse = 14.05h)



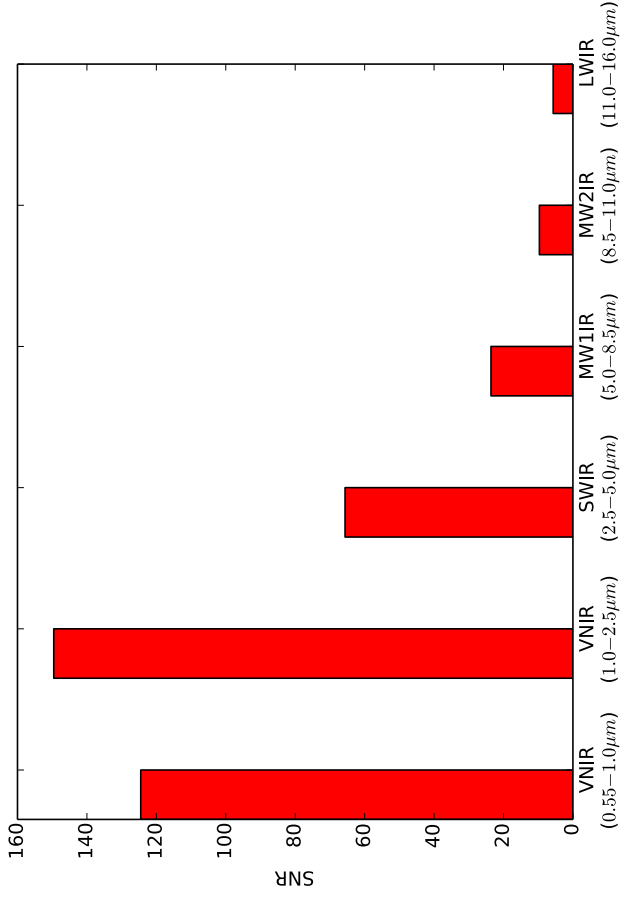
SNR of CoRoT-19 b (Primary) Per Channel (1 transit = 14.05h)



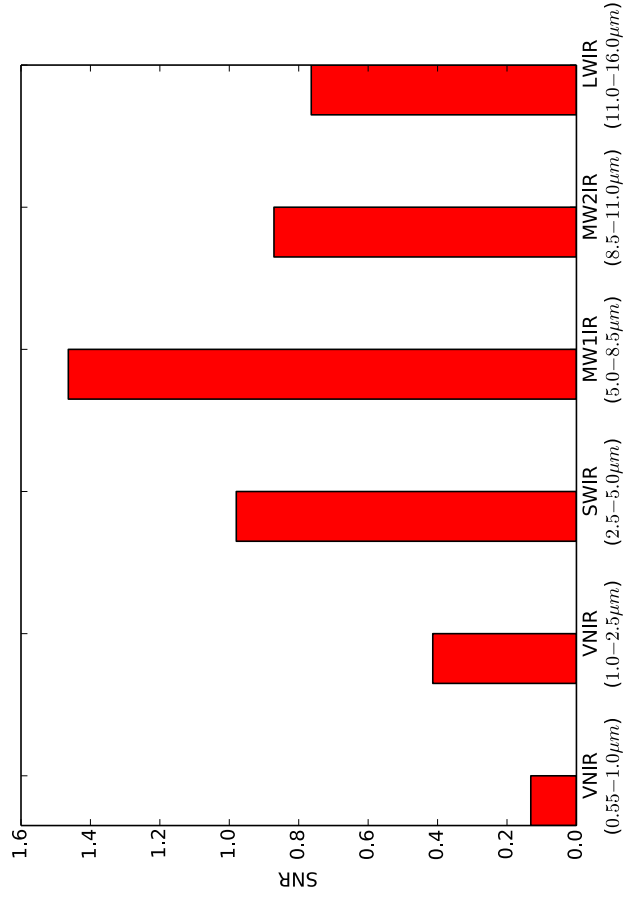
SNR of Gliese 436 b (Secondary) Per Channel (1 eclipse = 2.11h)



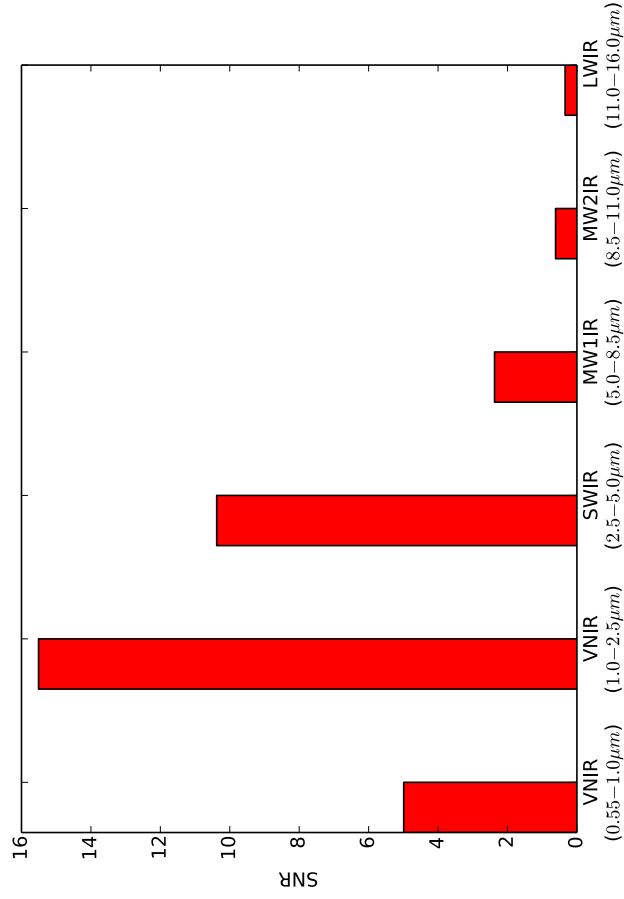
SNR of Gliese 436 b (Primary) Per Channel (1 transit = 2.11h)



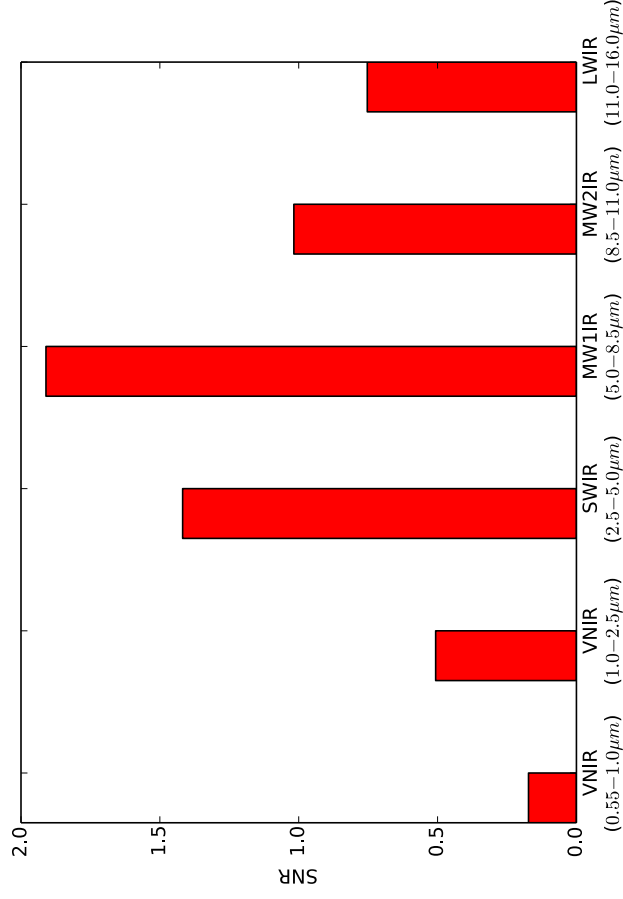
SNR of Gliese 1214 b (Secondary) Per Channel (1 eclipse = 2.74h)



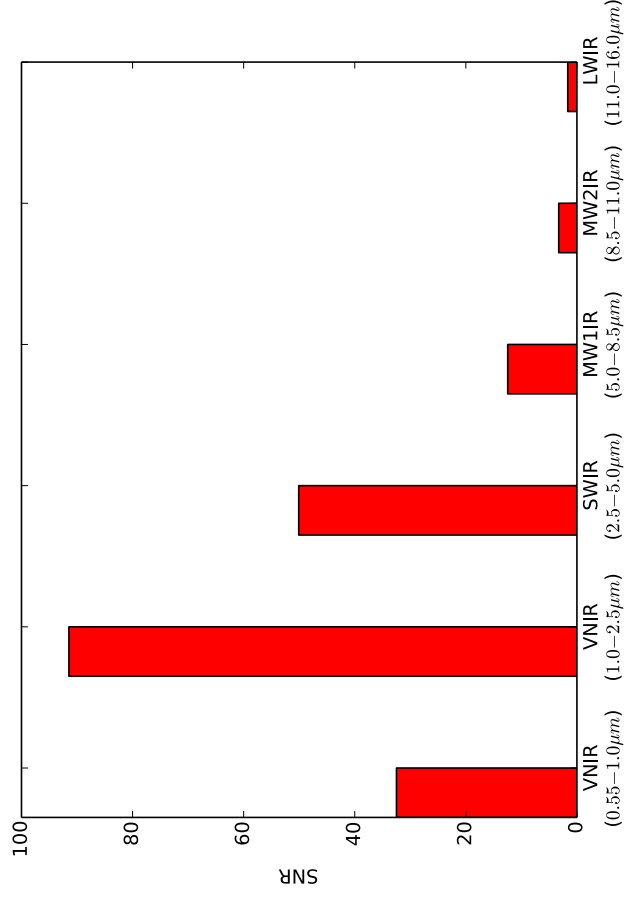
SNR of Gliese 1214 b (Primary) Per Channel (1 transit = 2.74h)



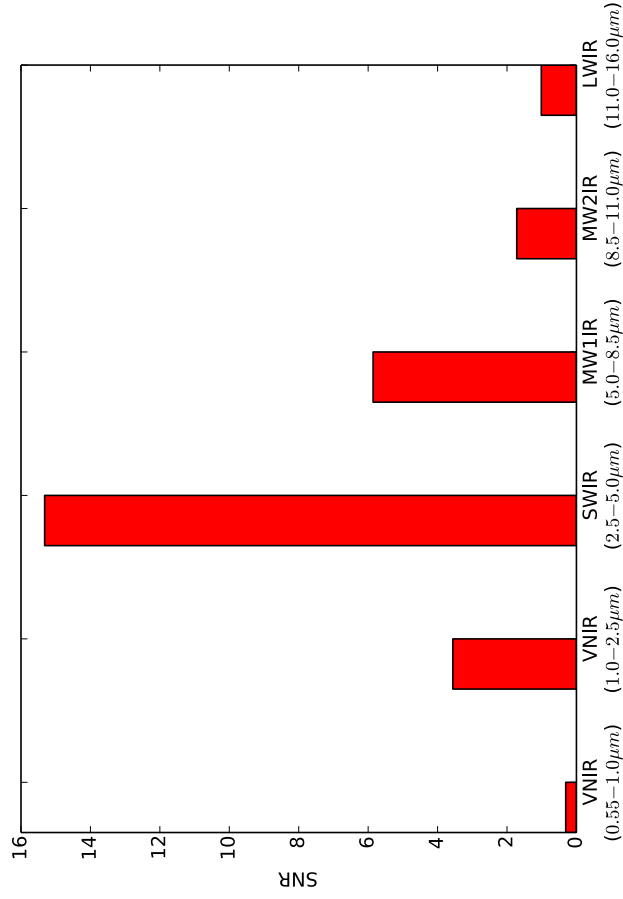
SNR of Gliese 3470 b (Secondary) Per Channel (1 eclipse = 5.73h)



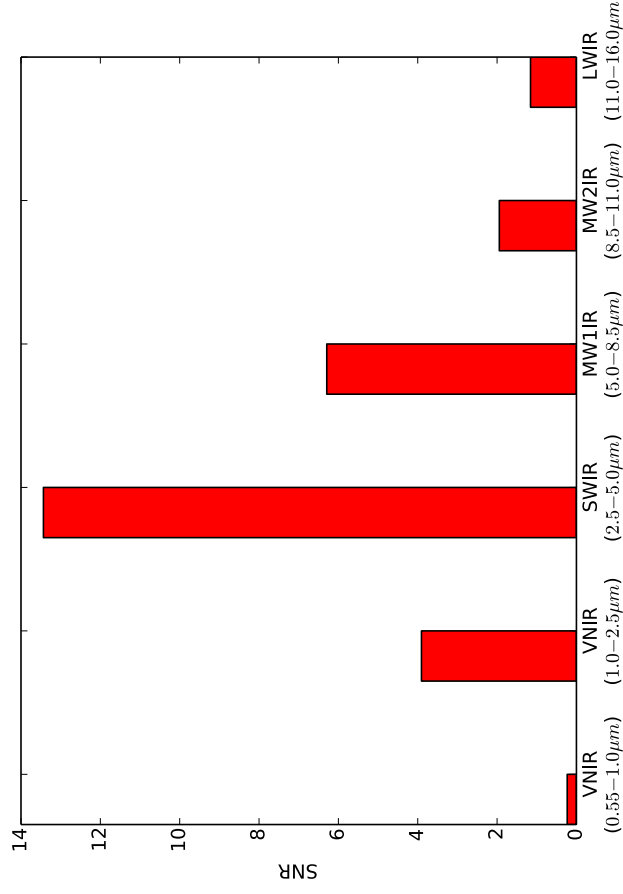
SNR of Gliese 3470 b (Primary) Per Channel (1 transit = 5.73h)



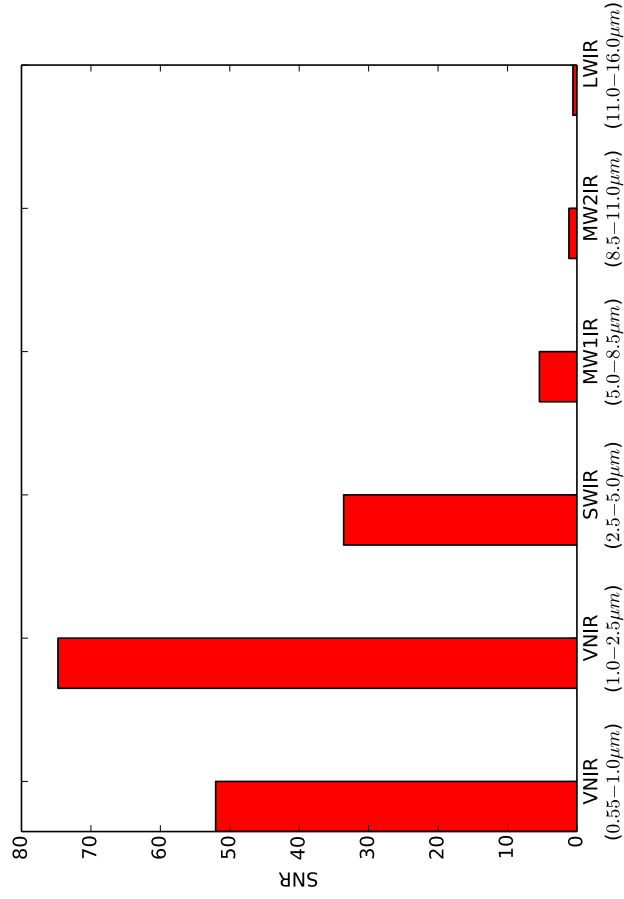
SNR of HAT-P-1 b (Secondary) Per Channel (1 eclipse = 8.41h)



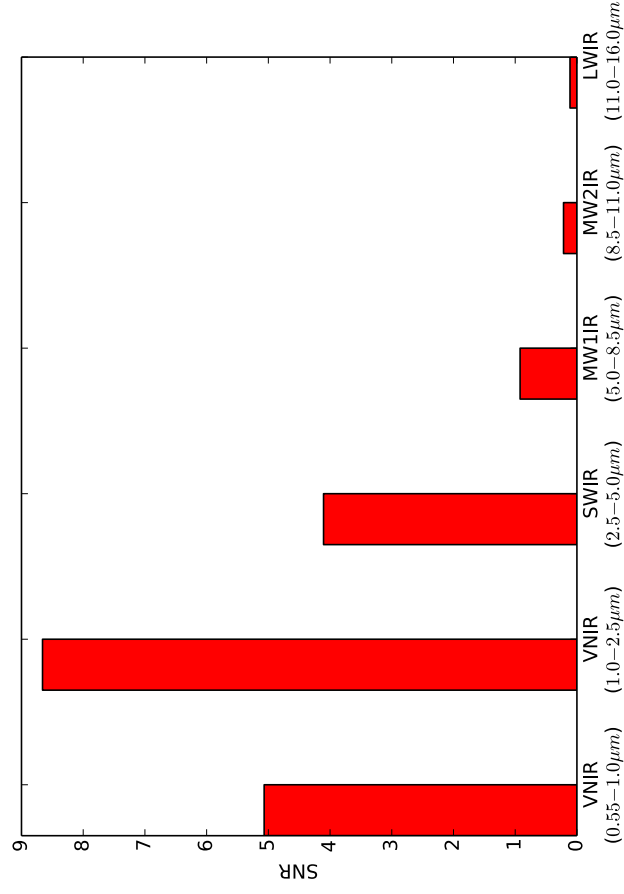
SNR of HAT-P-2 b (Secondary) Per Channel (1 eclipse = 15.58h)



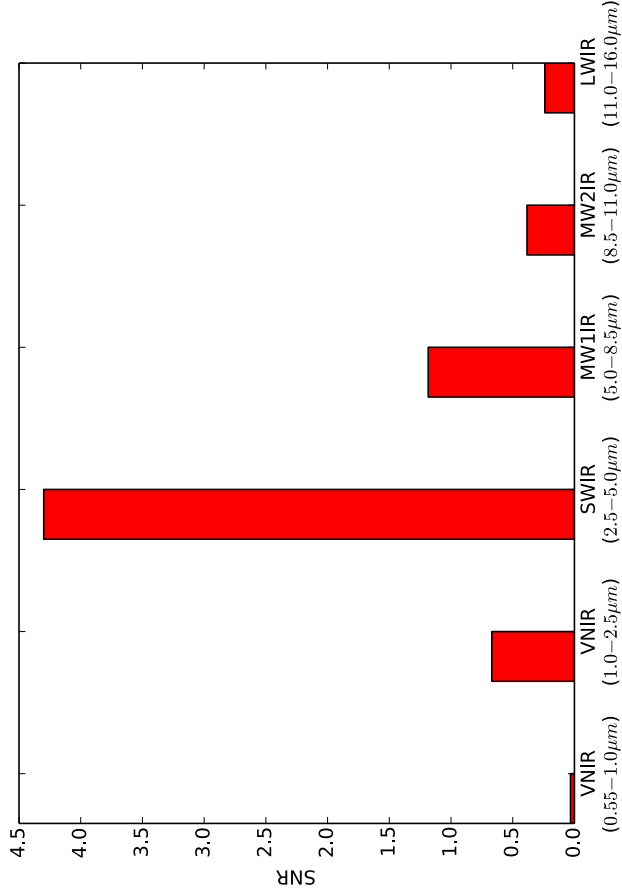
SNR of HAT-P-1 b (Primary) Per Channel (1 transit = 8.41h)



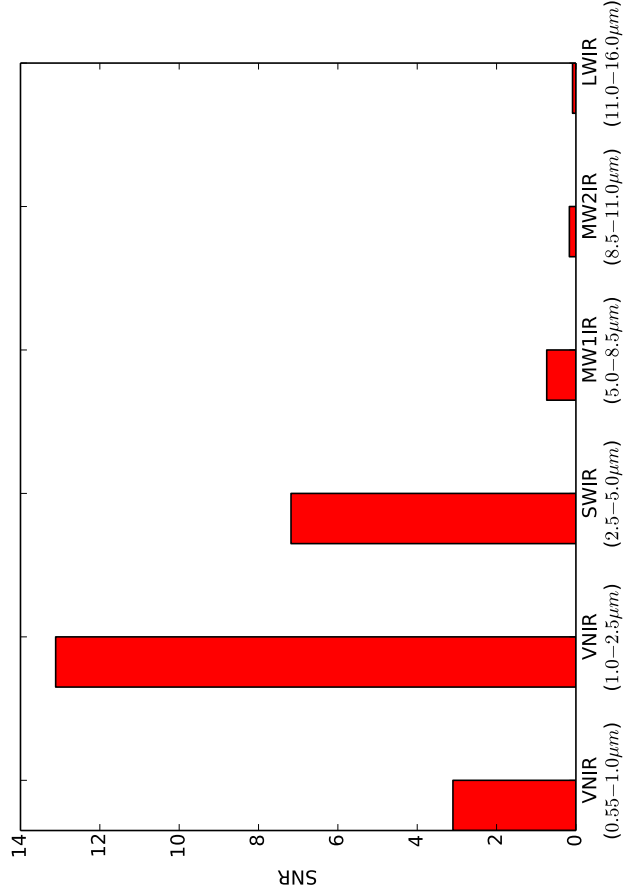
SNR of HAT-P-2 b (Primary) Per Channel (1 transit = 15.58h)



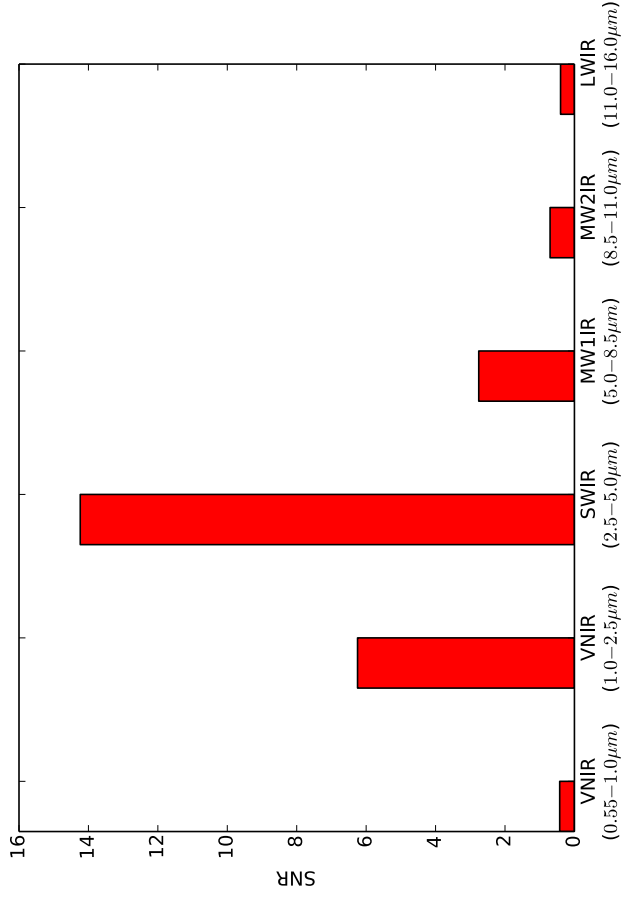
SNR of HAT-P-3 b (Secondary) Per Channel (1 eclipse = 6.24h)



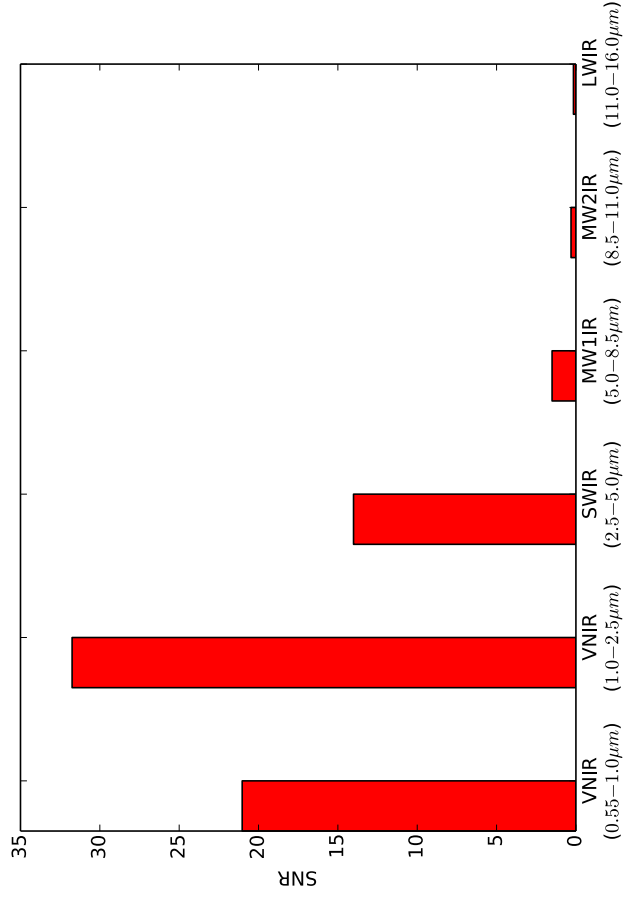
SNR of HAT-P-3 b (Primary) Per Channel (1 transit = 6.24h)



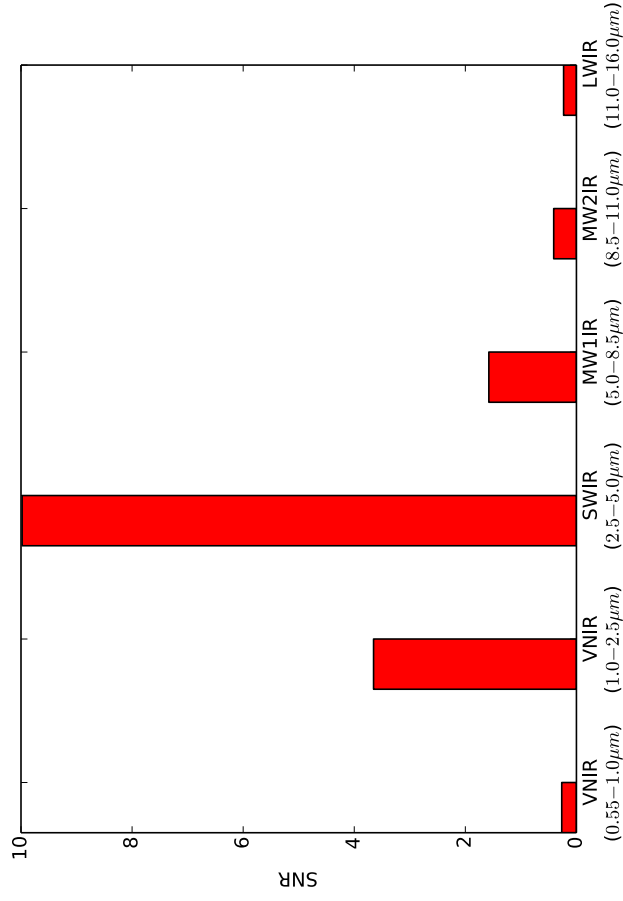
SNR of HAT-P-4 b (Secondary) Per Channel (1 eclipse = 12.67h)



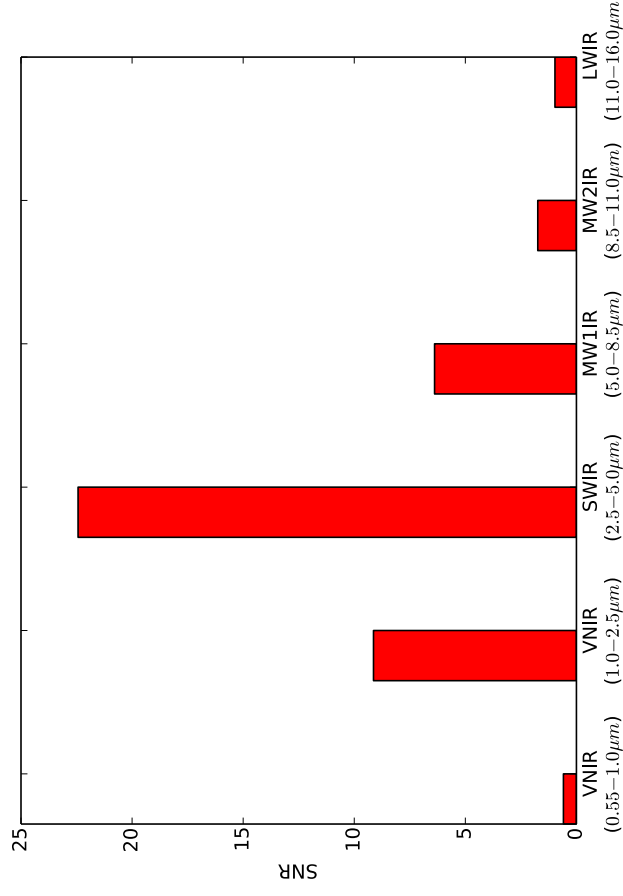
SNR of HAT-P-4 b (Primary) Per Channel (1 transit = 12.67h)



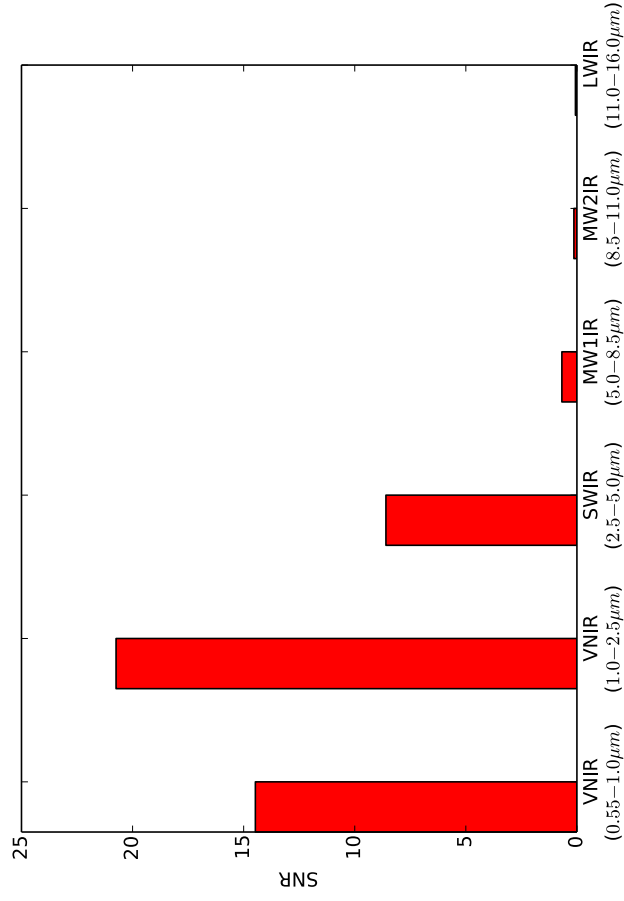
SNR of HAT-P-5 b (Secondary) Per Channel (1 eclipse = 8.55h)



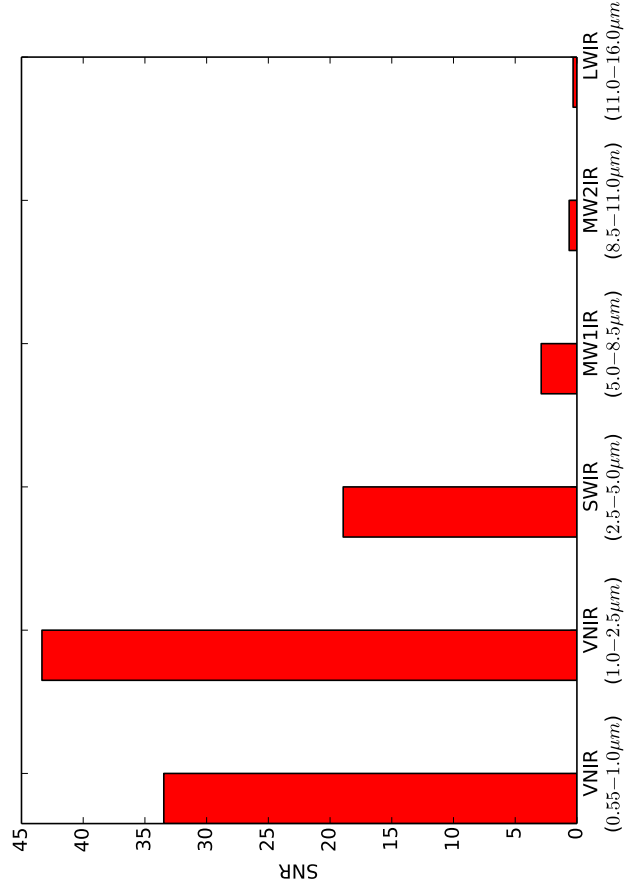
SNR of HAT-P-6 b (Secondary) Per Channel (1 eclipse = 10.55h)



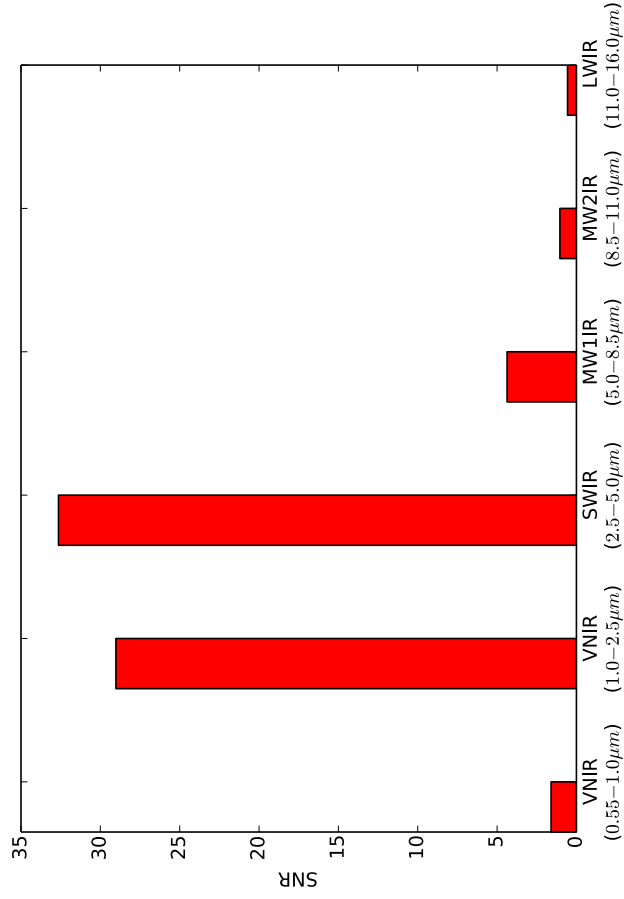
SNR of HAT-P-5 b (Primary) Per Channel (1 transit = 8.55h)



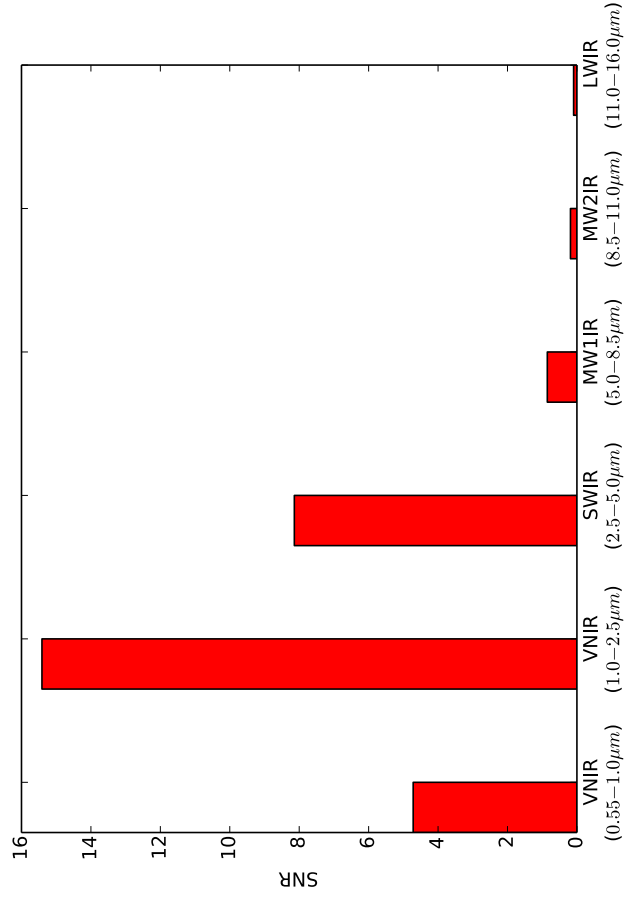
SNR of HAT-P-6 b (Primary) Per Channel (1 transit = 10.55h)



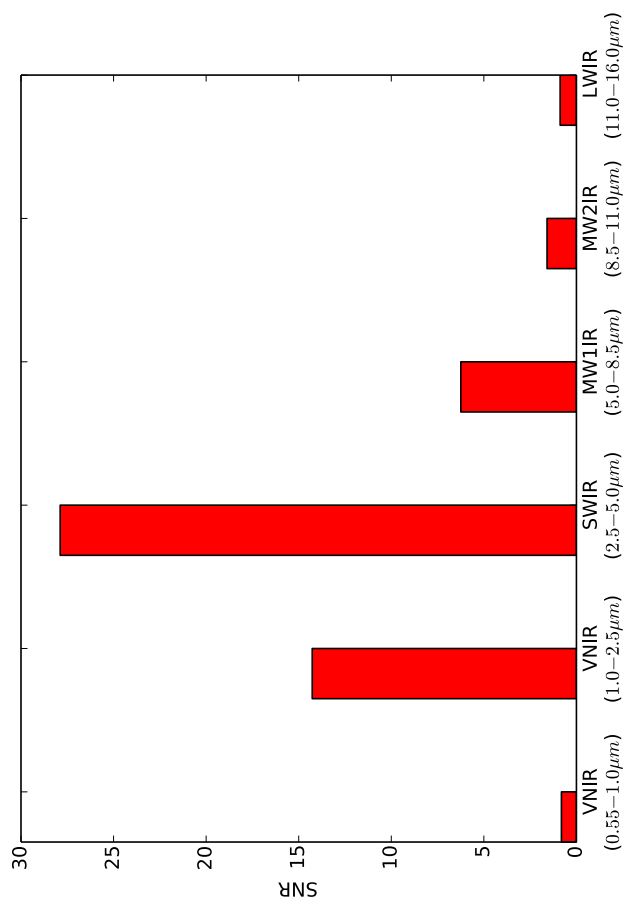
SNR of HAT-P-7 b (Secondary) Per Channel (1 eclipse = 11.60h)



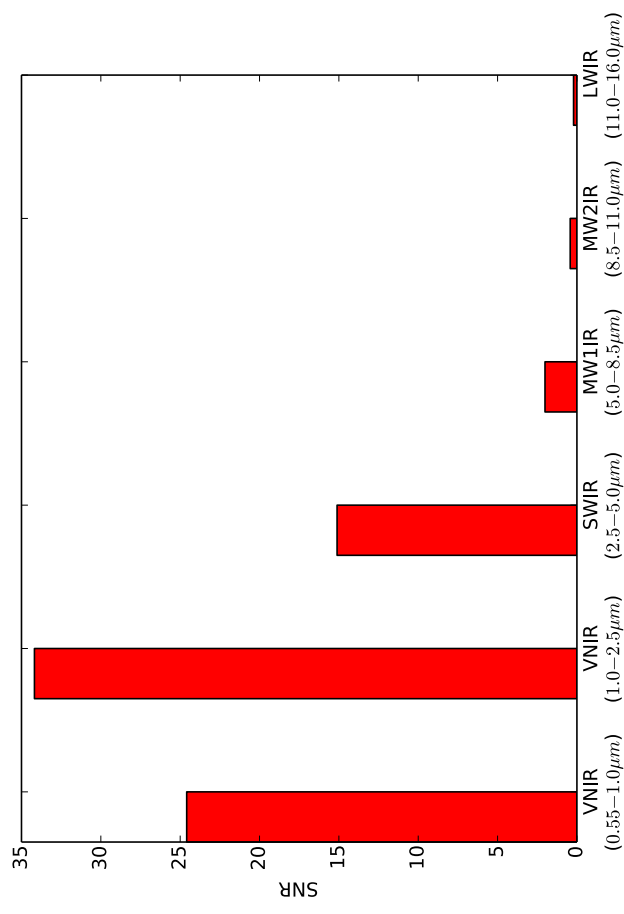
SNR of HAT-P-7 b (Primary) Per Channel (1 transit = 11.60h)



SNR of HAT-P-8 b (Secondary) Per Channel (1 eclipse = 11.82h)

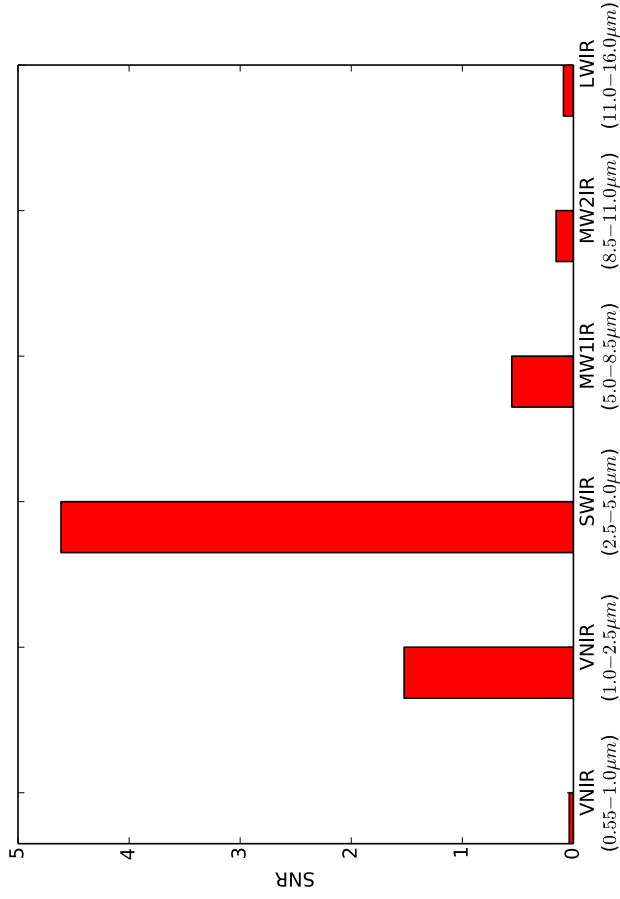


SNR of HAT-P-8 b (Primary) Per Channel (1 transit = 11.82h)

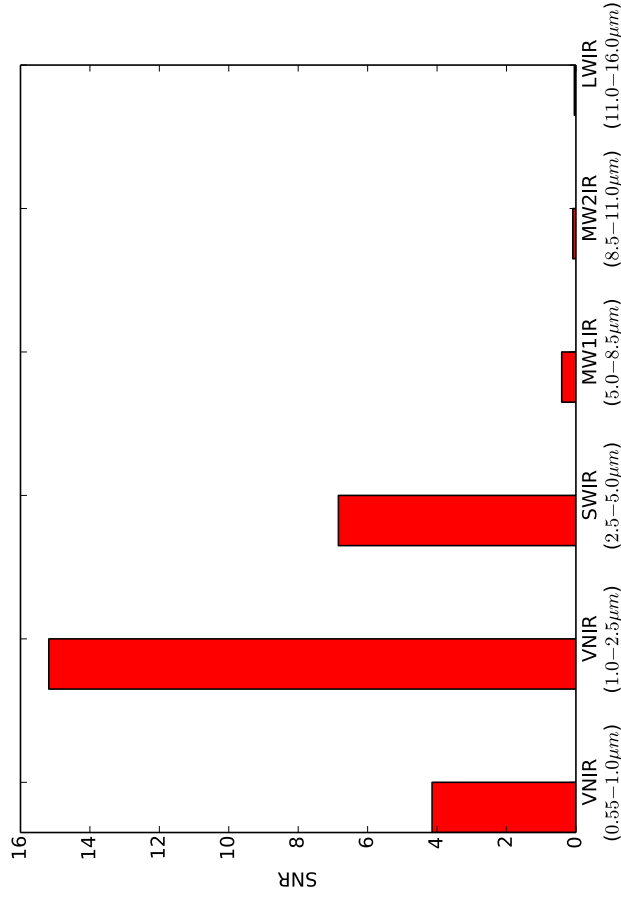




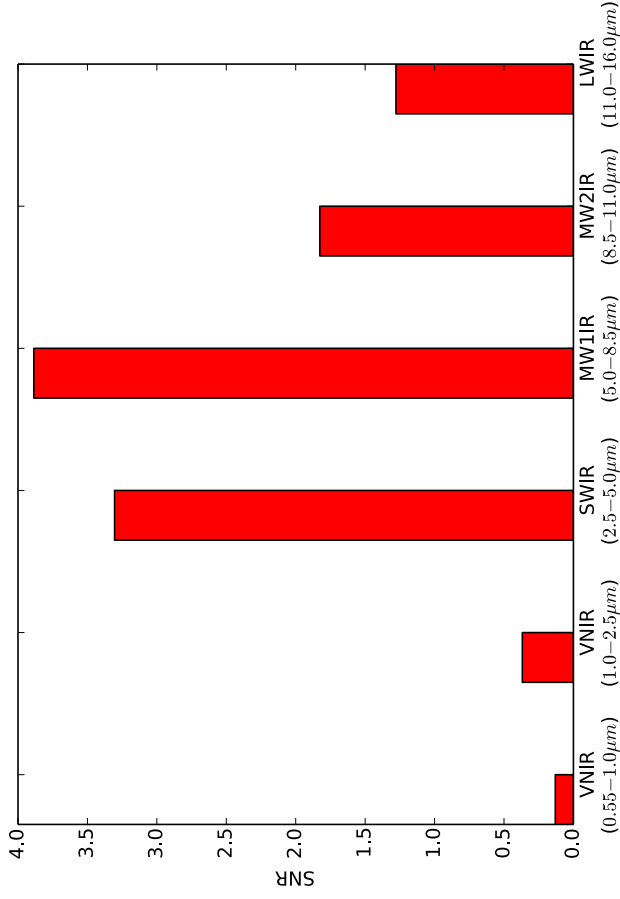
SNR of HAT-P-9 b (Secondary) Per Channel (1 eclipse = 10.24h)



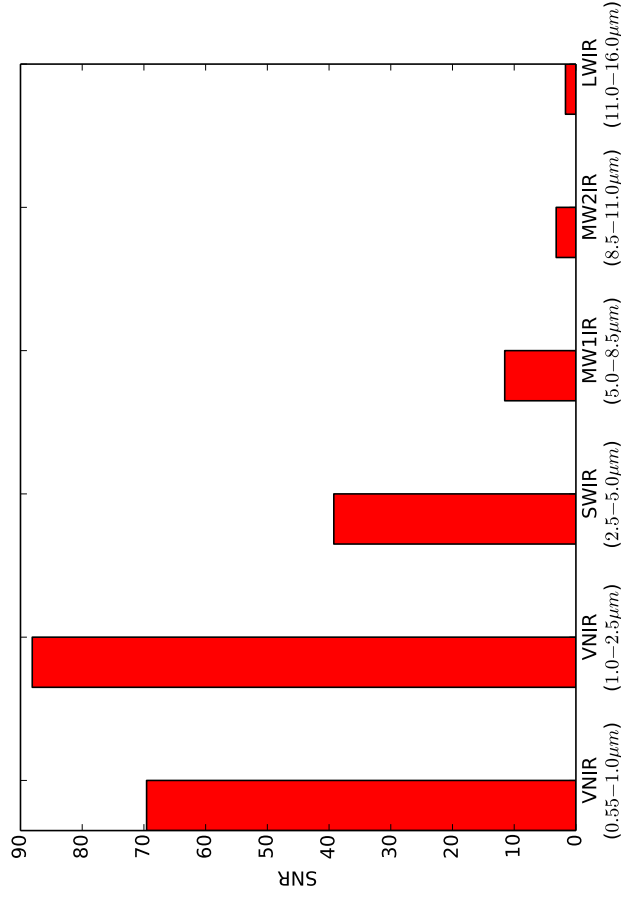
SNR of HAT-P-9 b (Primary) Per Channel (1 transit = 10.24h)



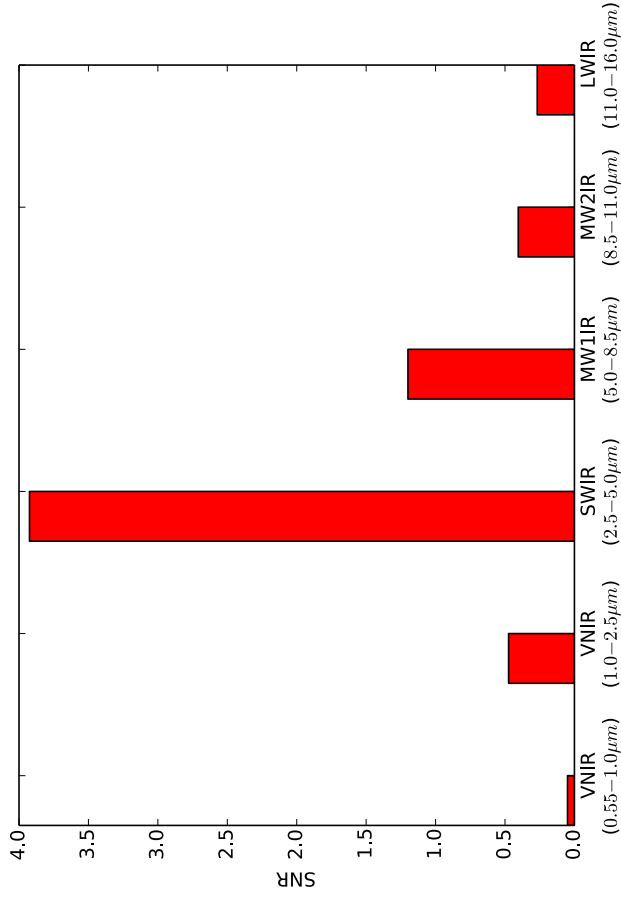
SNR of HAT-P-11 b (Secondary) Per Channel (1 eclipse = 7.30h)



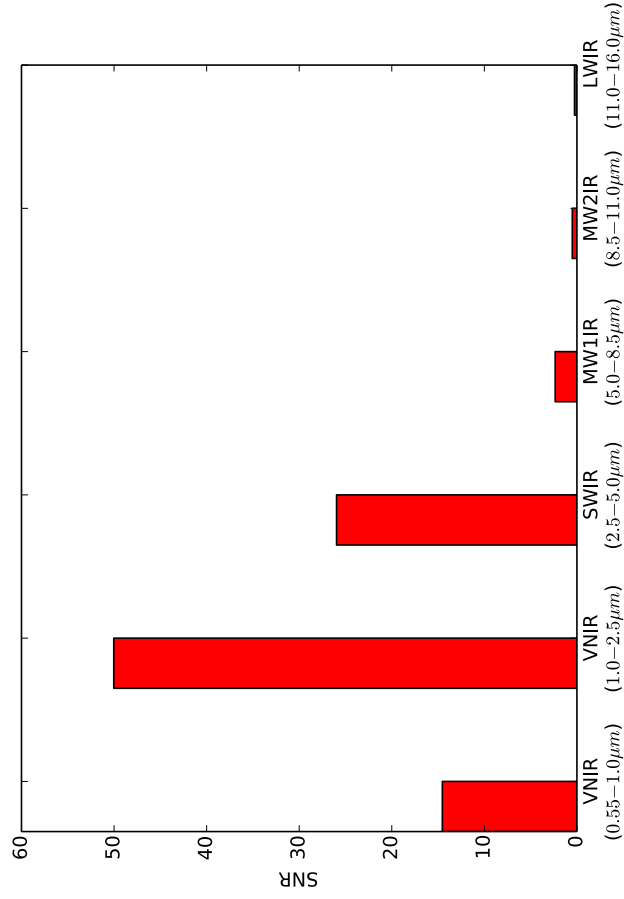
SNR of HAT-P-11 b (Primary) Per Channel (1 transit = 7.30h)



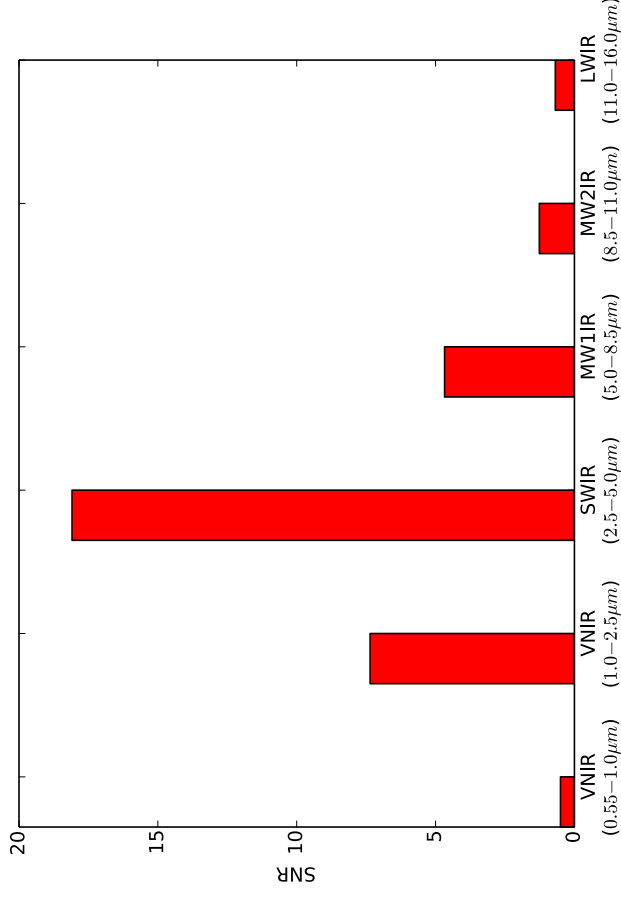
SNR of HAT-P-12 b (Secondary) Per Channel (1 eclipse = 7.15h)



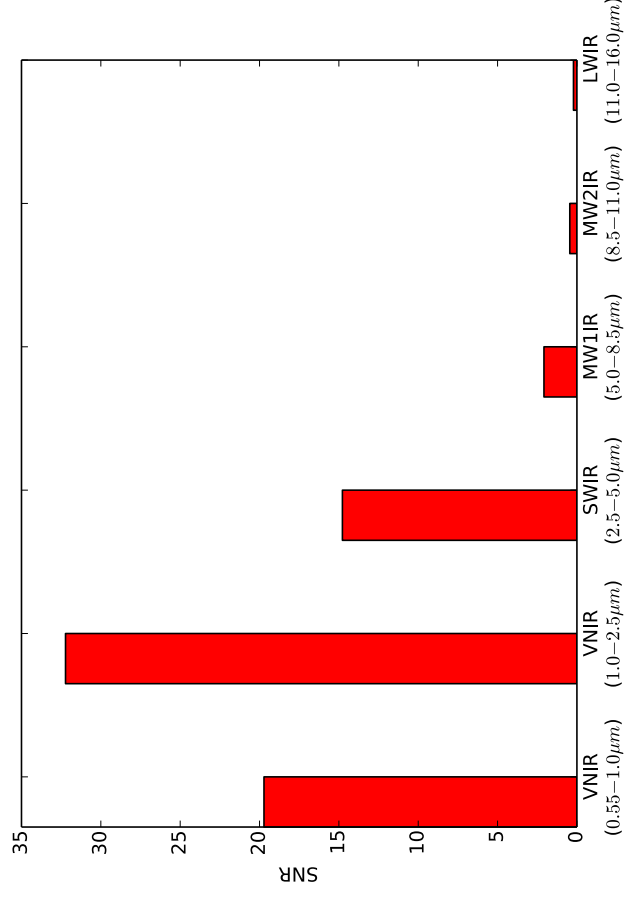
SNR of HAT-P-12 b (Primary) Per Channel (1 transit = 7.15h)



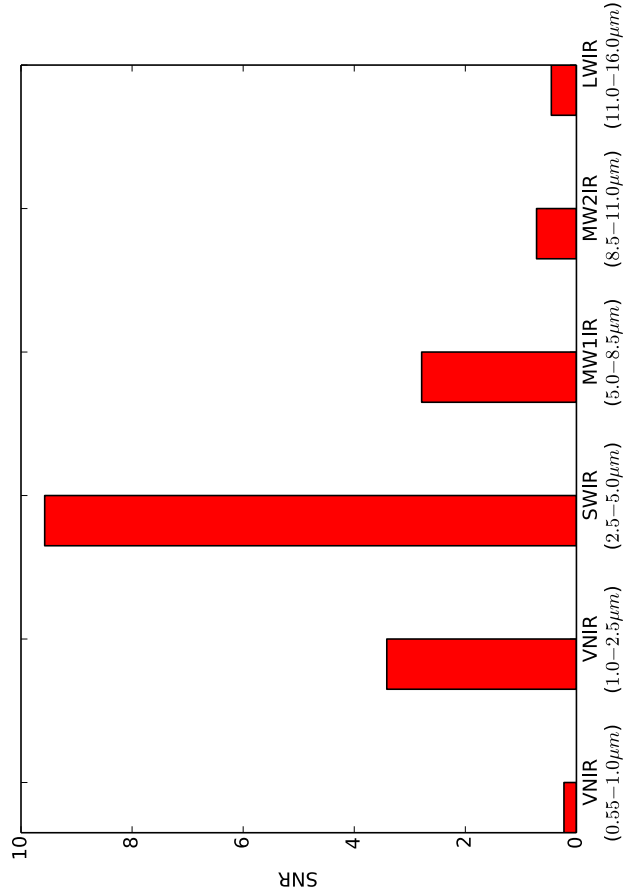
SNR of HAT-P-13 b (Secondary) Per Channel (1 eclipse = 9.72h)



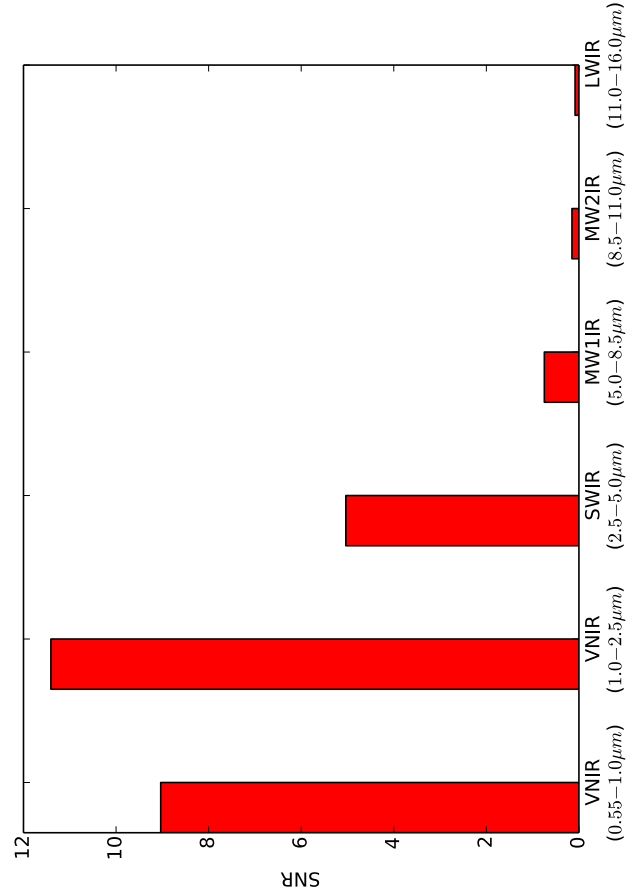
SNR of HAT-P-13 b (Primary) Per Channel (1 transit = 9.72h)



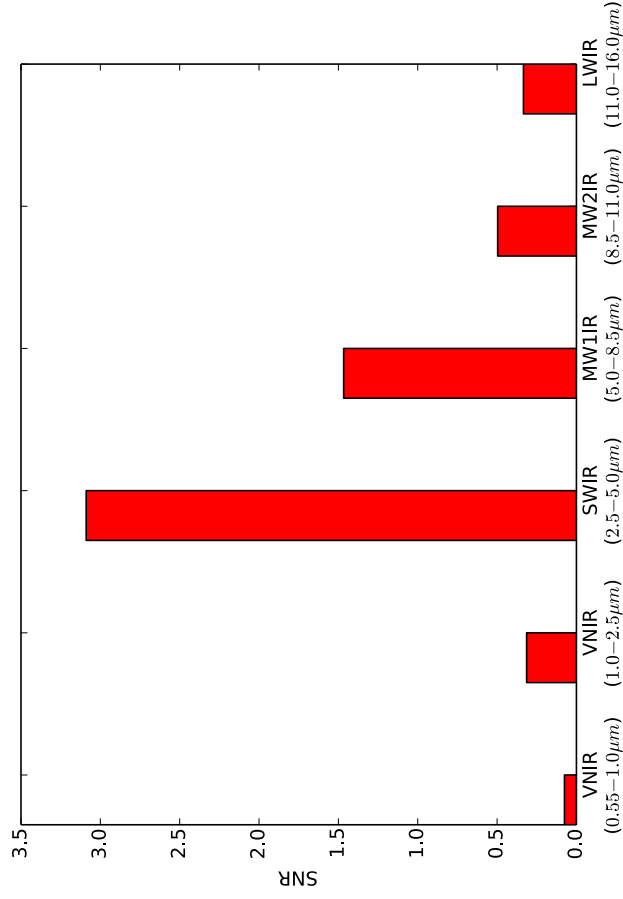
SNR of HAT-P-14 b (Secondary) Per Channel (1 eclipse = 4.28h)



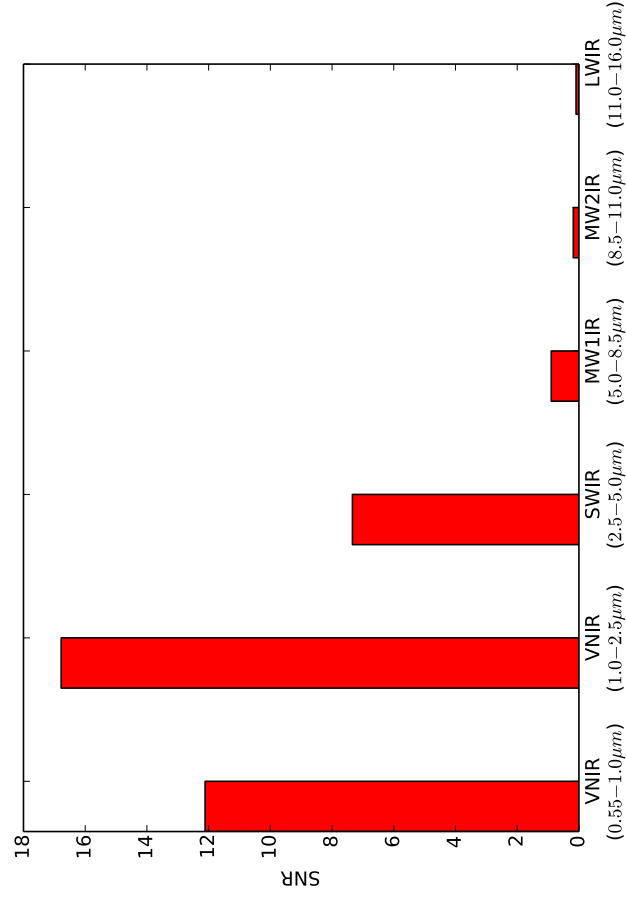
SNR of HAT-P-14 b (Primary) Per Channel (1 transit = 4.28h)



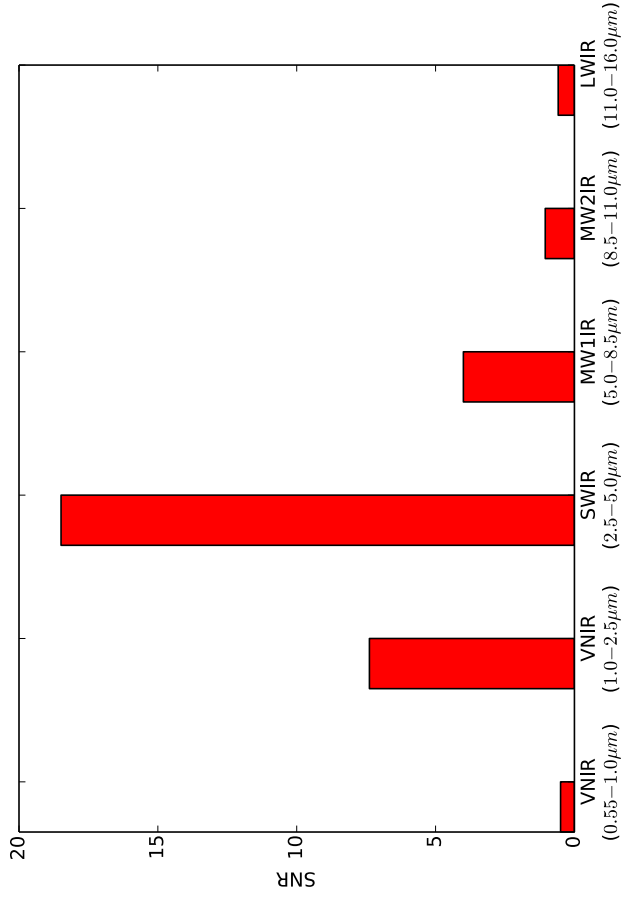
SNR of HAT-P-15 b (Secondary) Per Channel (1 eclipse = 13.80h)



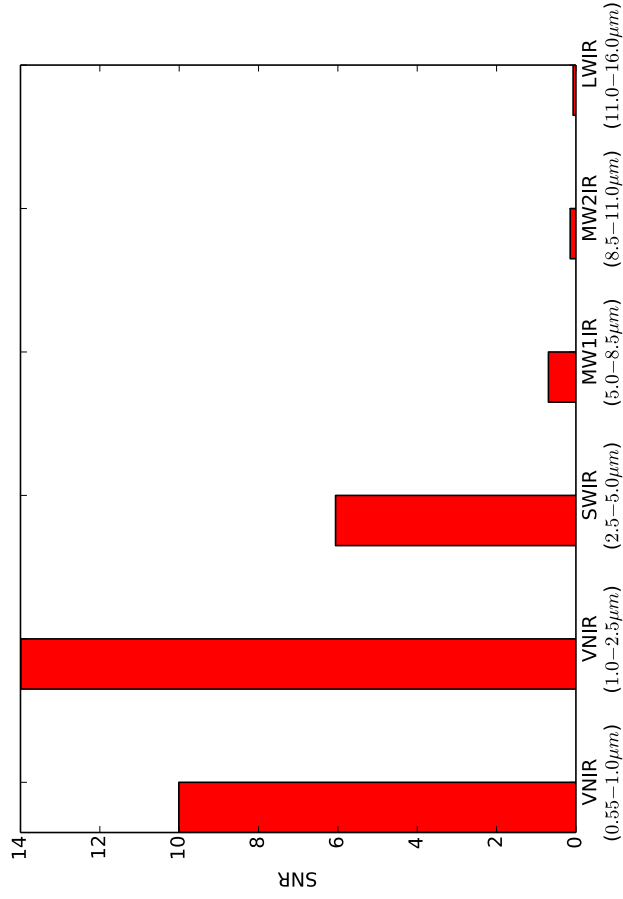
SNR of HAT-P-15 b (Primary) Per Channel (1 transit = 13.80h)



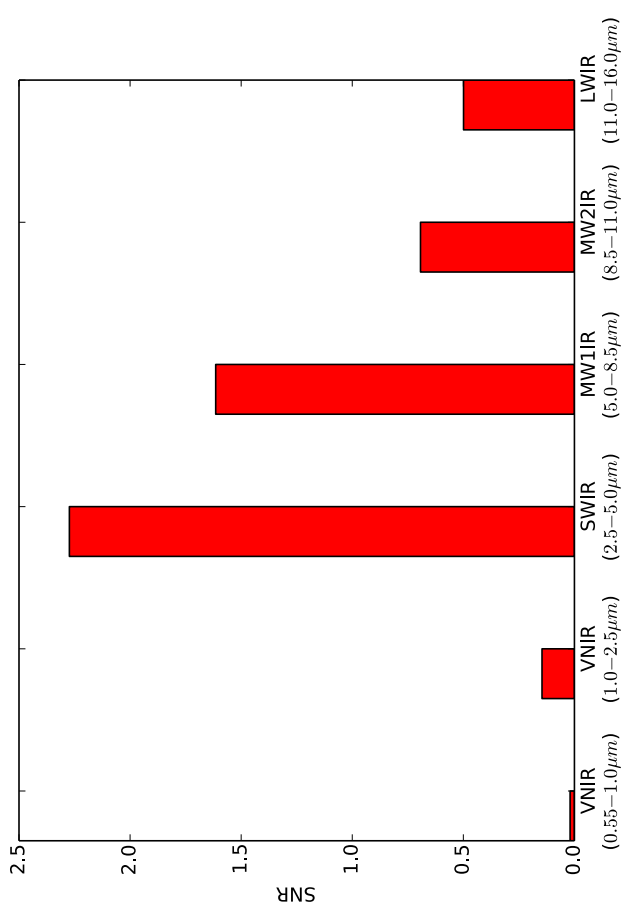
SNR of HAT-P-16 b (Secondary) Per Channel (1 eclipse = 9.13h)



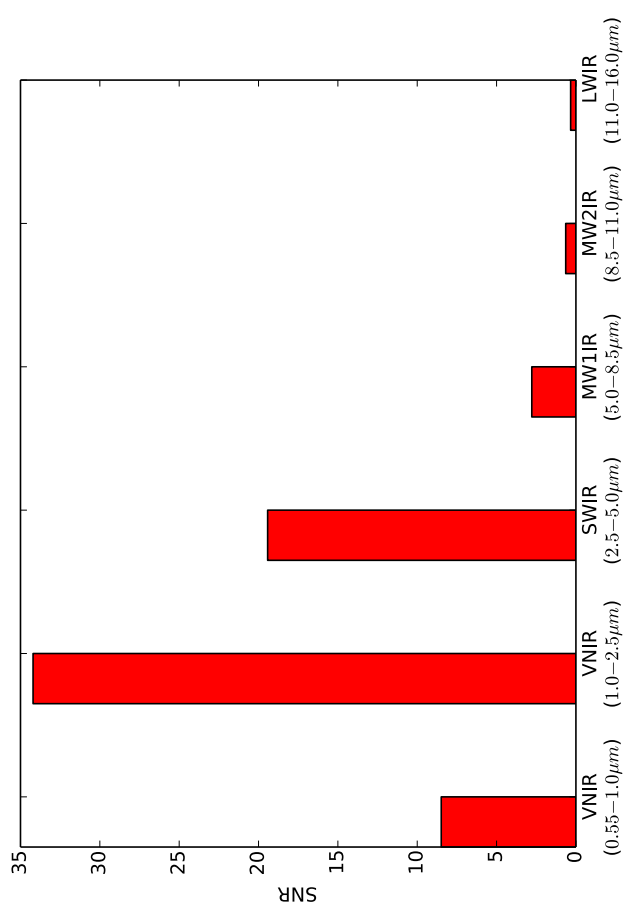
SNR of HAT-P-16 b (Primary) Per Channel (1 transit = 9.13h)



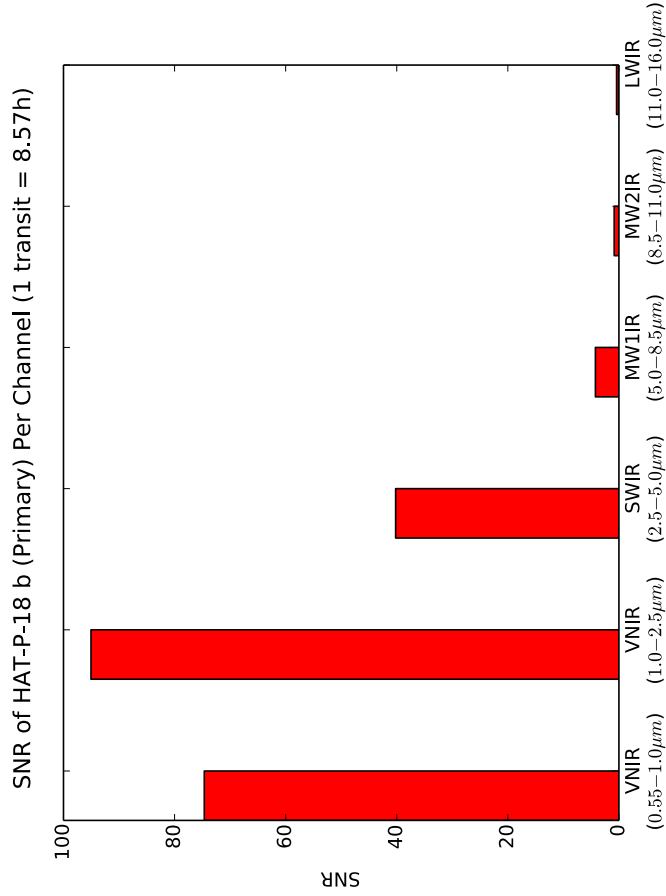
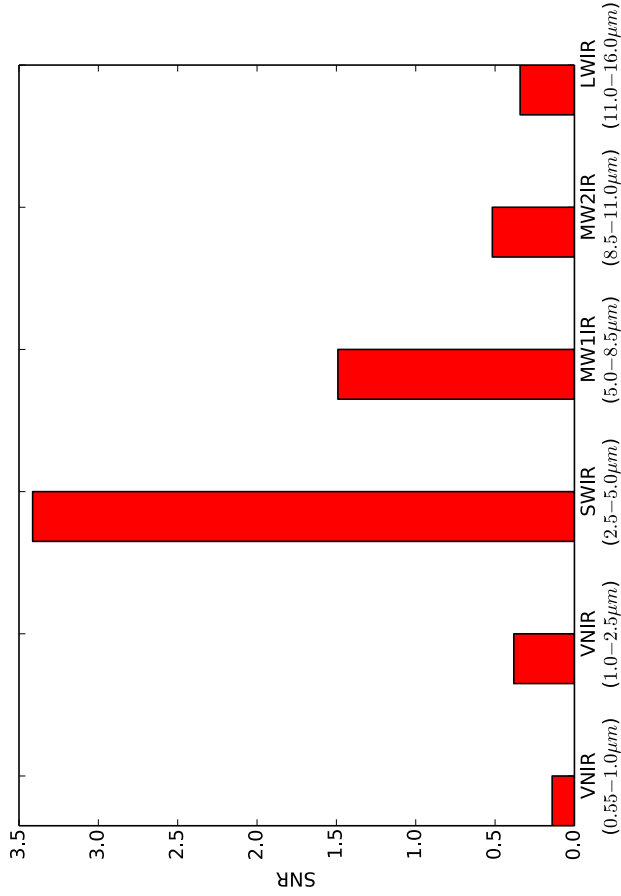
SNR of HAT-P-17 b (Secondary) Per Channel (1 eclipse = 11.31h)



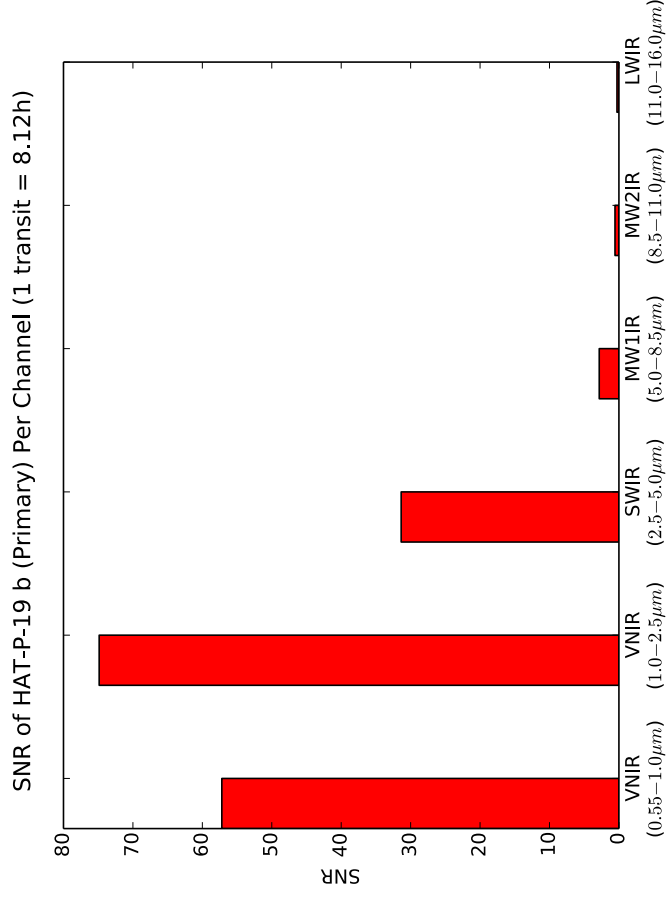
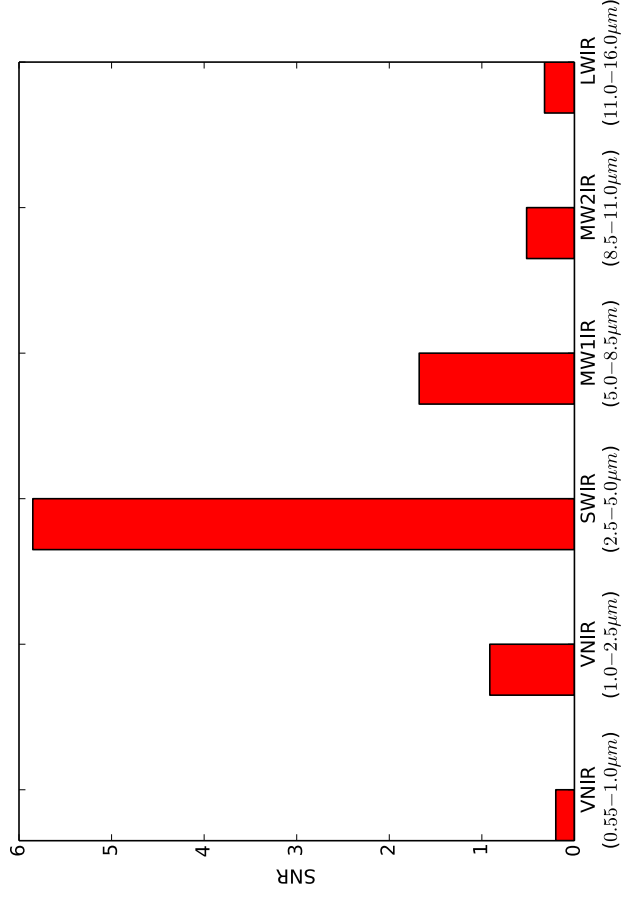
SNR of HAT-P-17 b (Primary) Per Channel (1 transit = 11.31h)



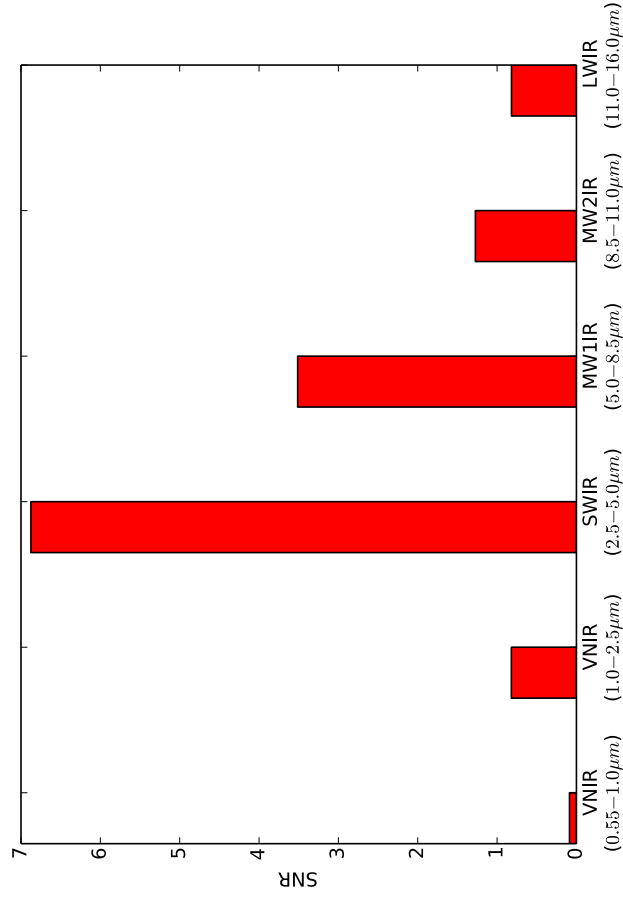
SNR of HAT-P-18 b (Secondary) Per Channel (1 eclipse = 8.57h)



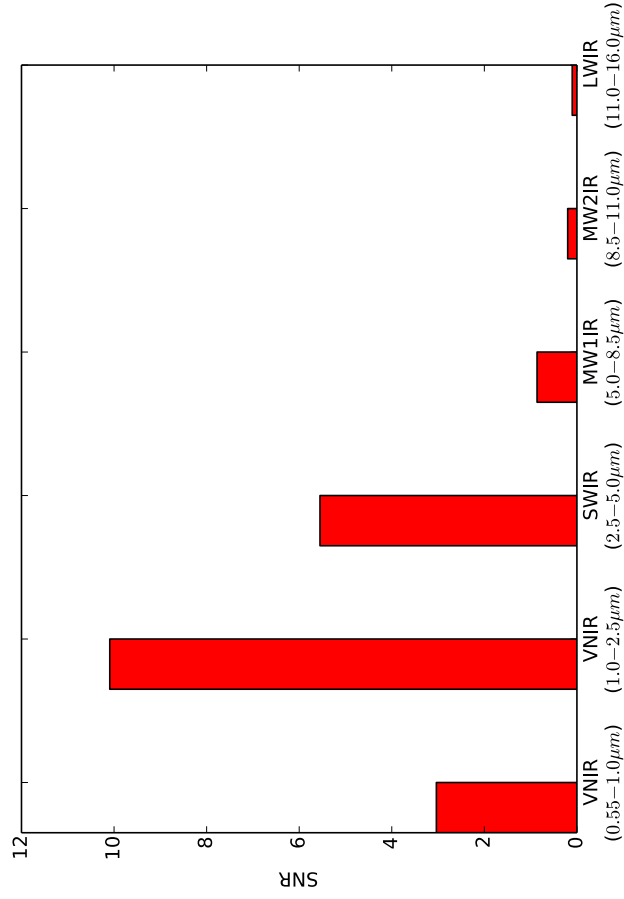
SNR of HAT-P-19 b (Secondary) Per Channel (1 eclipse = 8.12h)



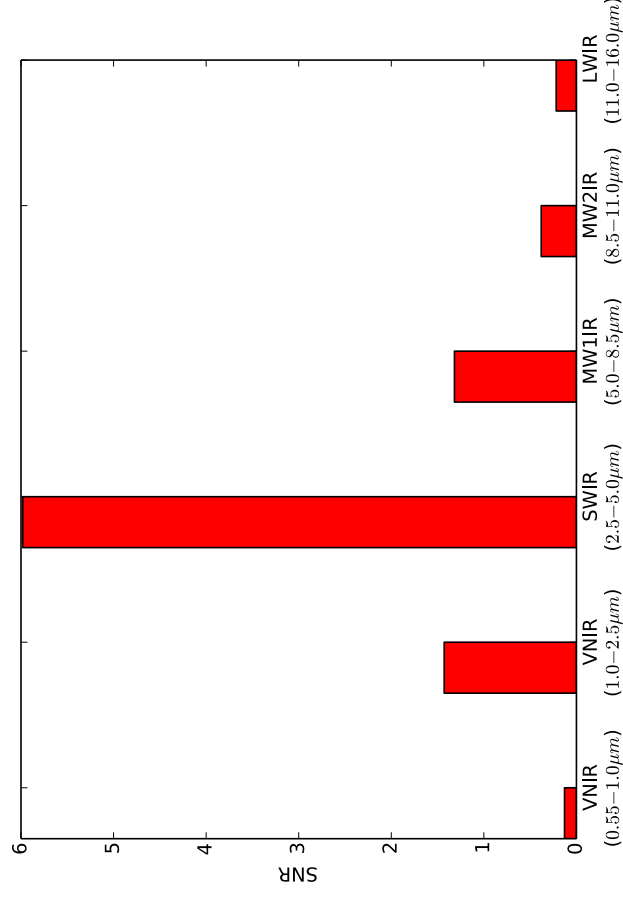
SNR of HAT-P-20 b (Secondary) Per Channel (1 eclipse = 5.57h)



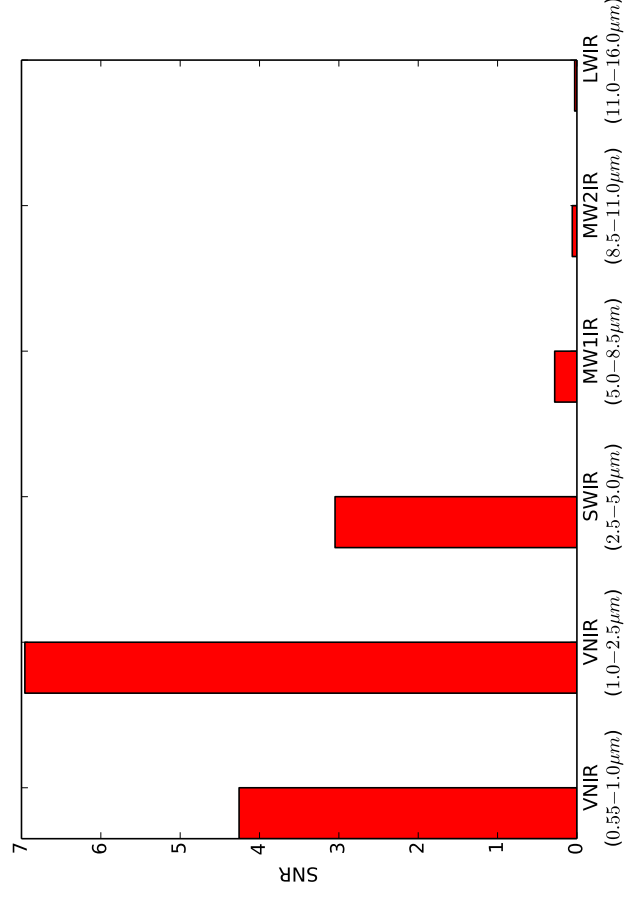
SNR of HAT-P-20 b (Primary) Per Channel (1 transit = 5.57h)



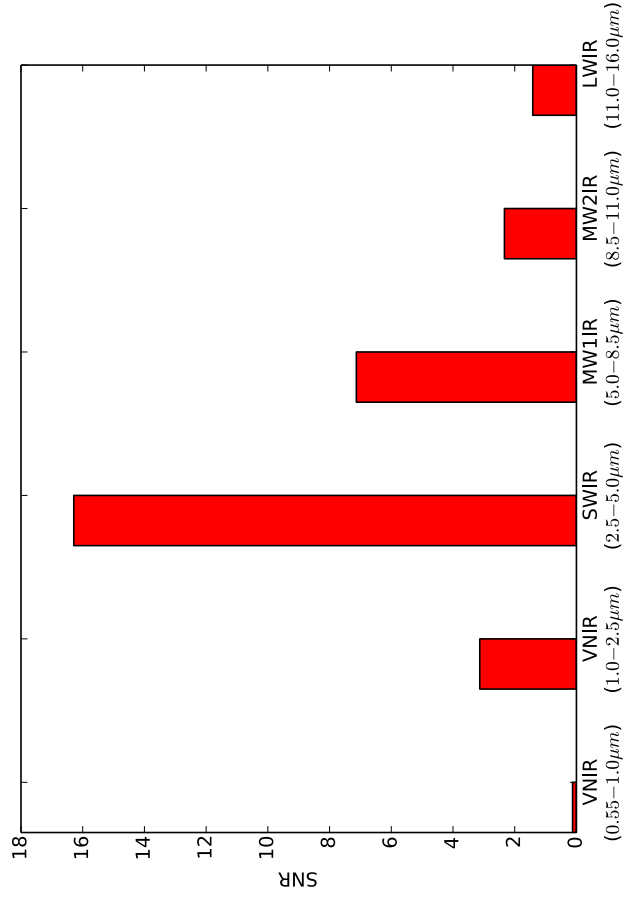
SNR of HAT-P-21 b (Secondary) Per Channel (1 eclipse = 9.79h)



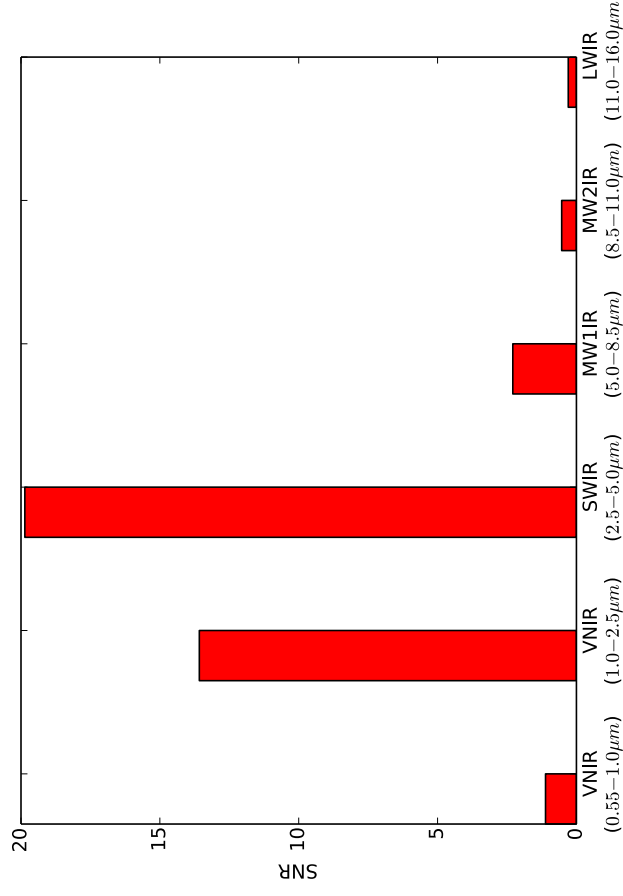
SNR of HAT-P-21 b (Primary) Per Channel (1 transit = 9.79h)



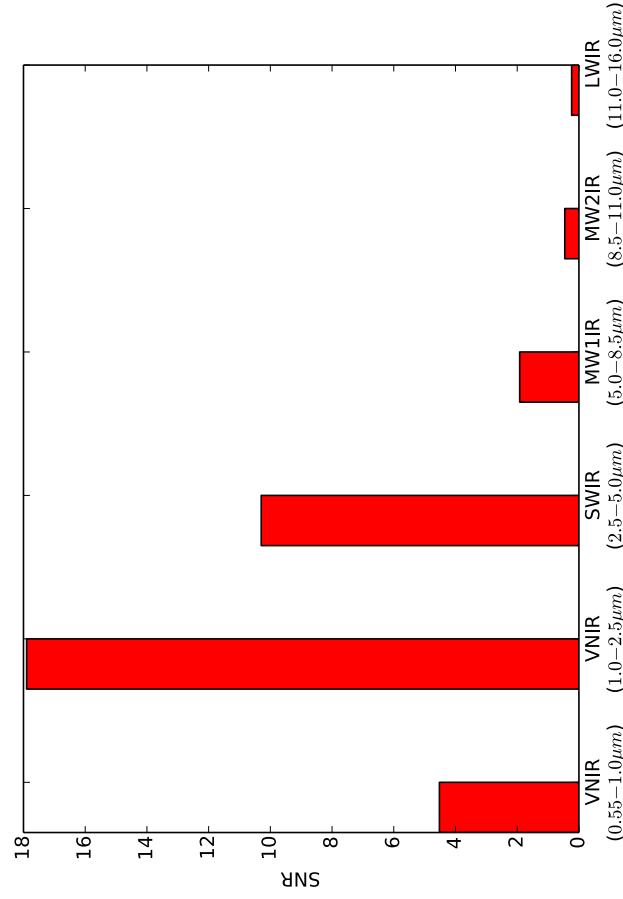
SNR of HAT-P-22 b (Secondary) Per Channel (1 eclipse = 8.71h)



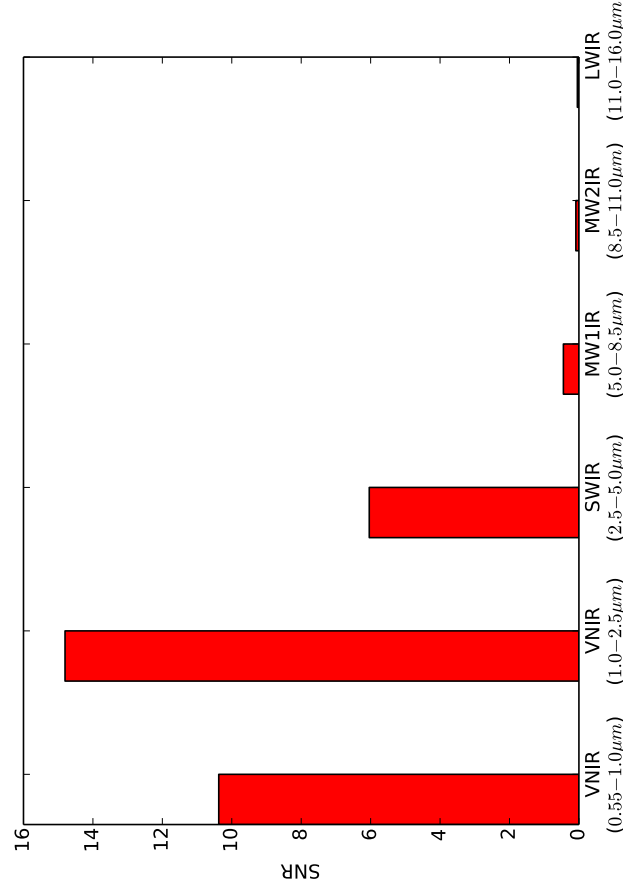
SNR of HAT-P-23 b (Secondary) Per Channel (1 eclipse = 7.23h)



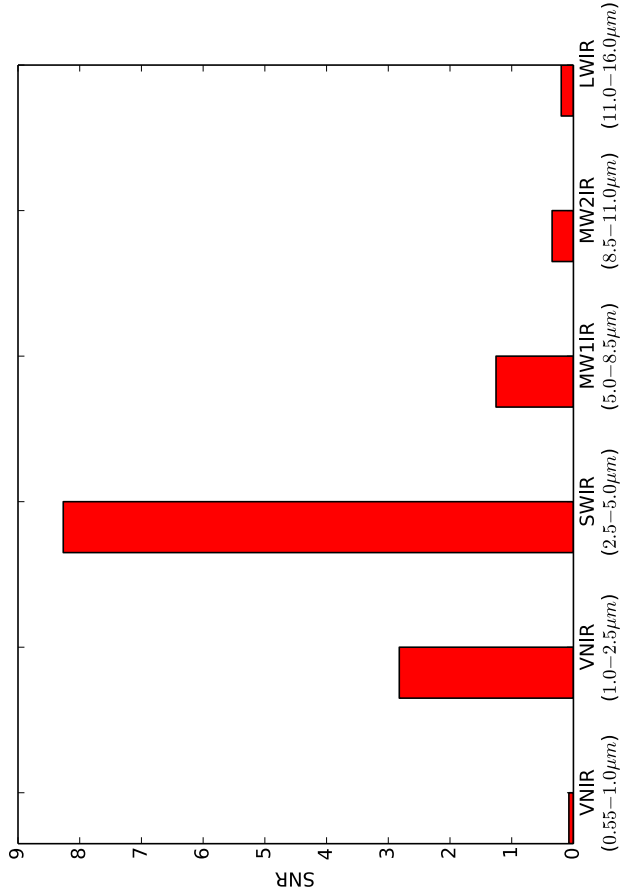
SNR of HAT-P-22 b (Primary) Per Channel (1 transit = 8.71h)



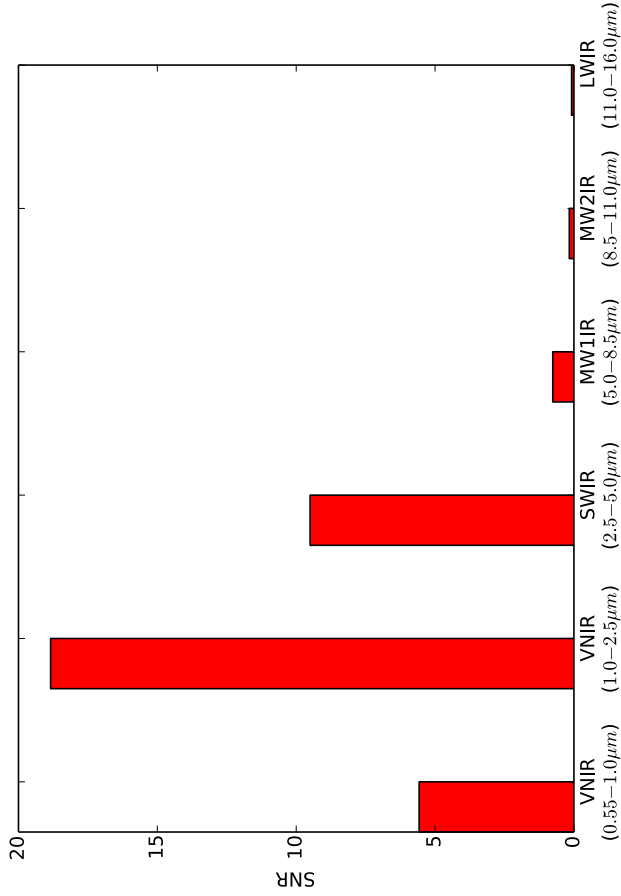
SNR of HAT-P-23 b (Primary) Per Channel (1 transit = 7.23h)



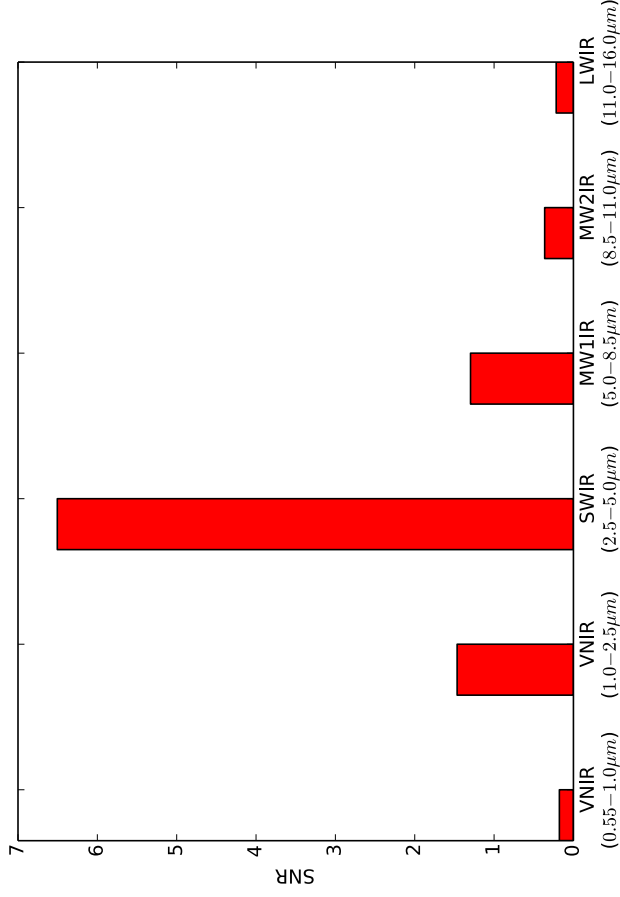
SNR of HAT-P-24 b (Secondary) Per Channel (1 eclipse = 11.02h)



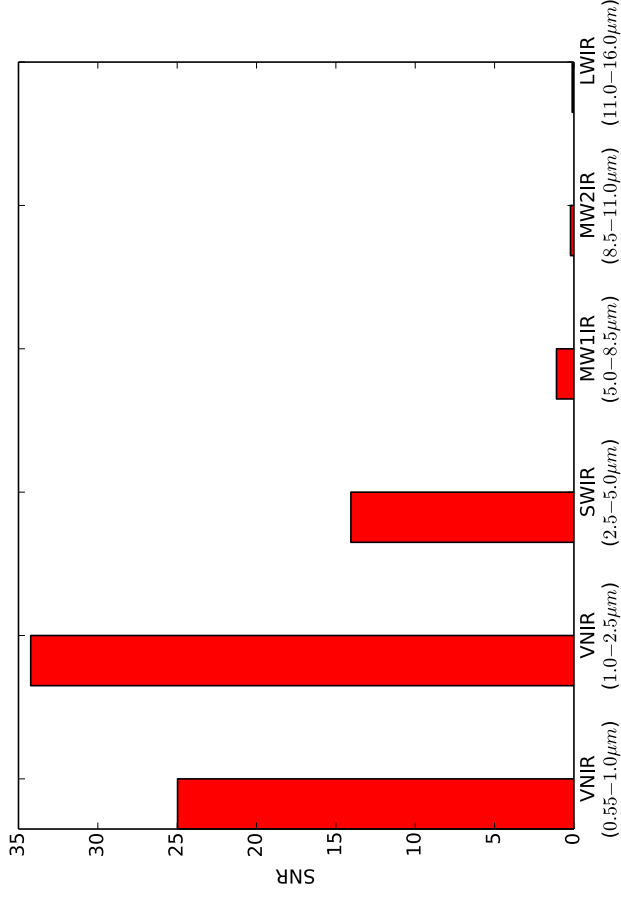
SNR of HAT-P-24 b (Primary) Per Channel (1 transit = 11.02h)



SNR of HAT-P-25 b (Secondary) Per Channel (1 eclipse = 8.37h)

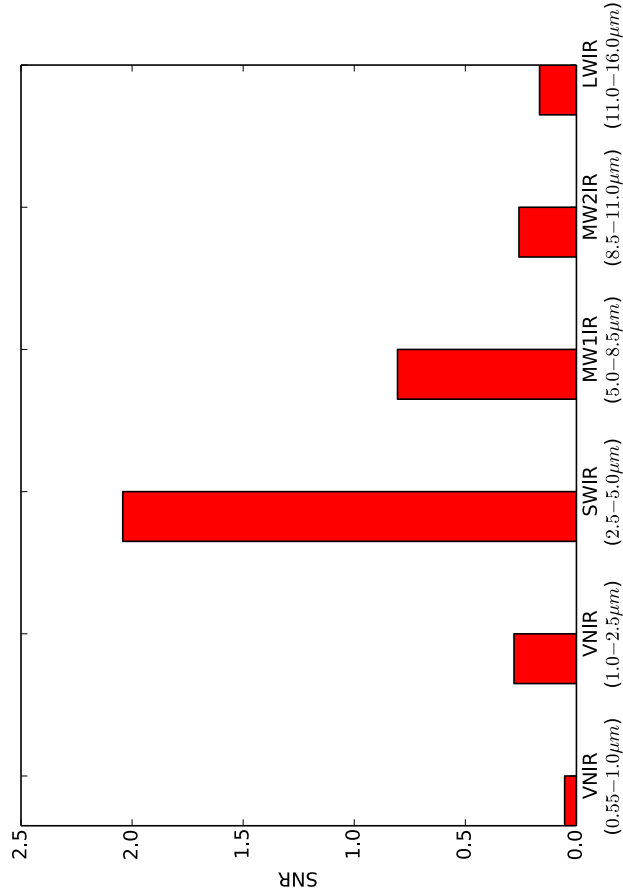


SNR of HAT-P-25 b (Primary) Per Channel (1 transit = 8.37h)

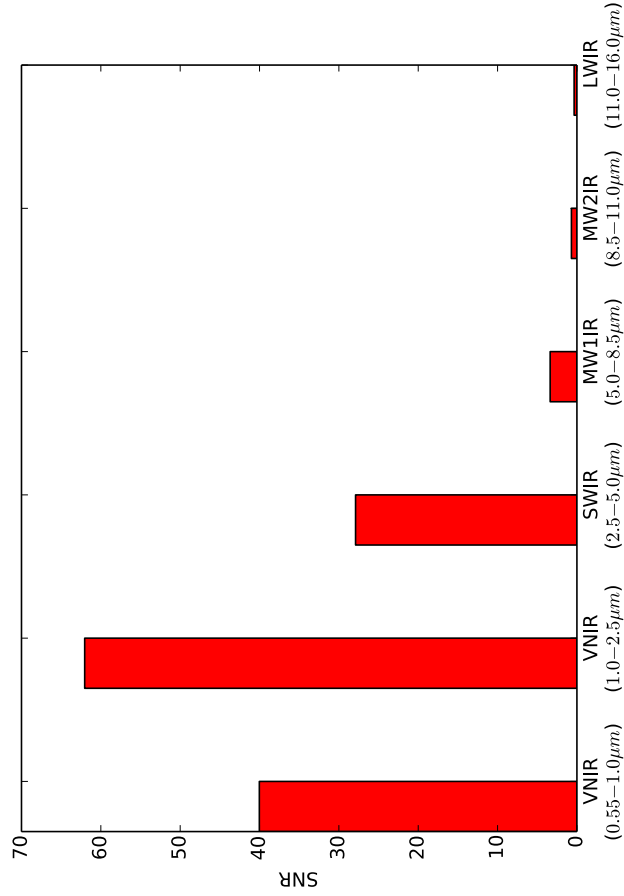




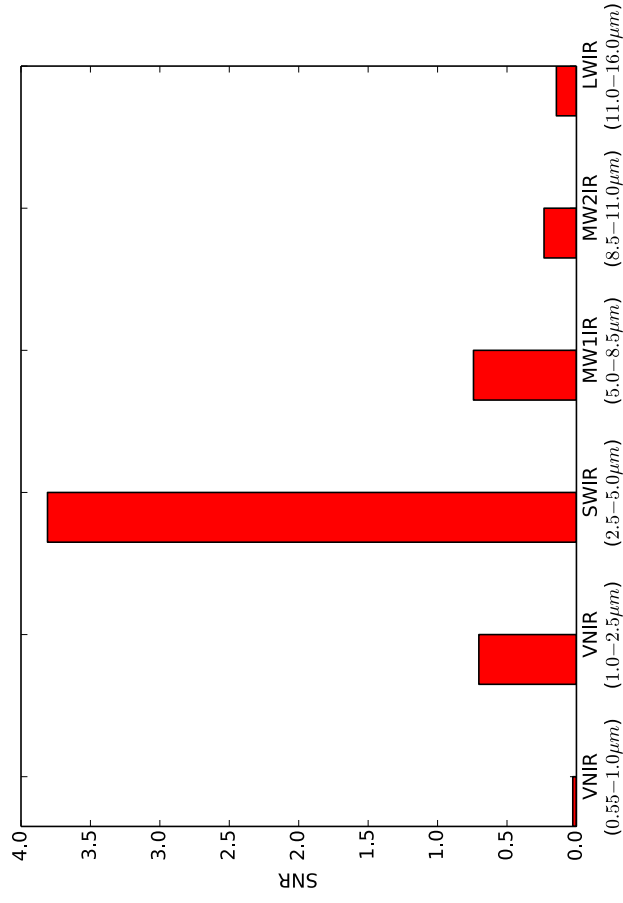
SNR of HAT-P-26 b (Secondary) Per Channel (1 eclipse = 7.65h)



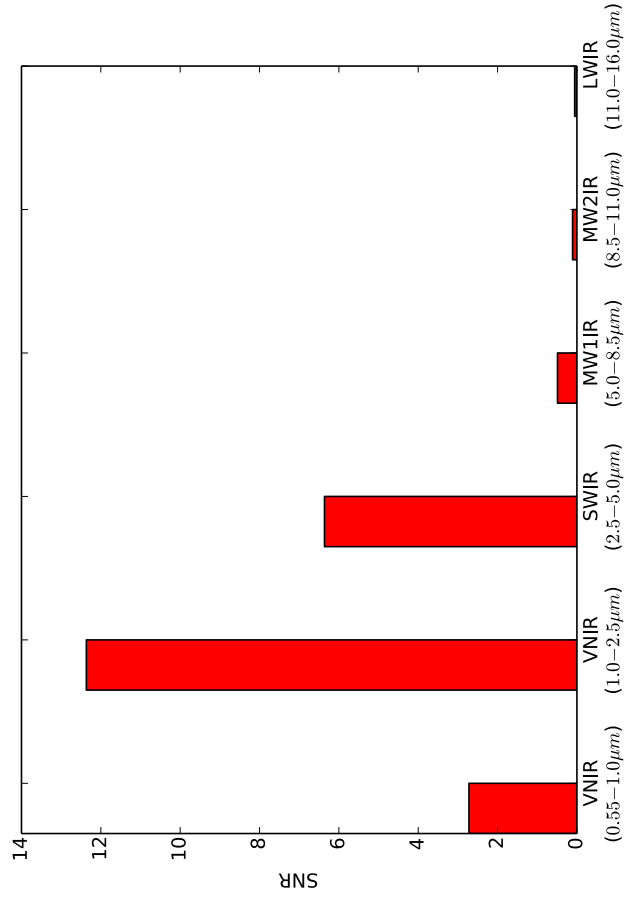
SNR of HAT-P-26 b (Primary) Per Channel (1 transit = 7.65h)



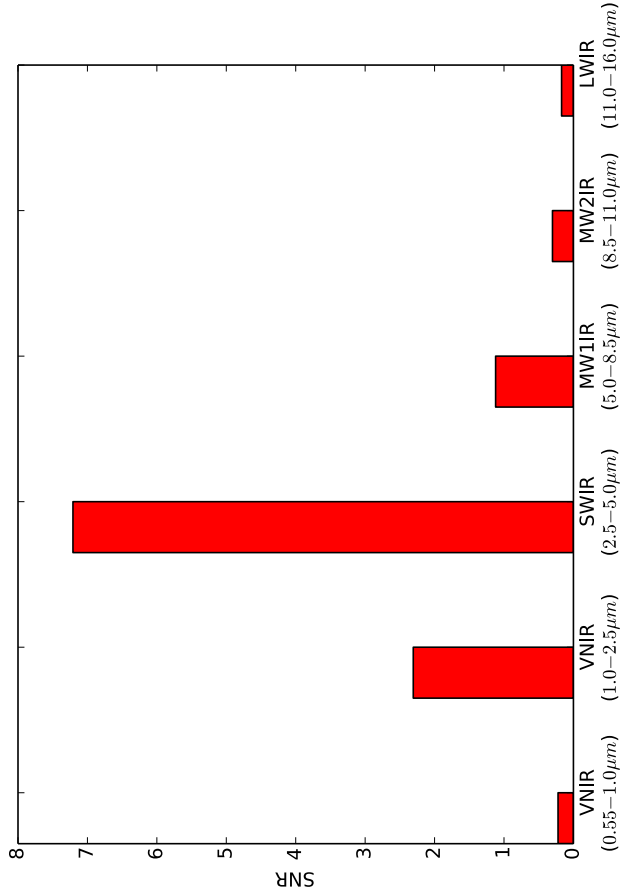
SNR of HAT-P-27 b (Secondary) Per Channel (1 eclipse = 5.10h)



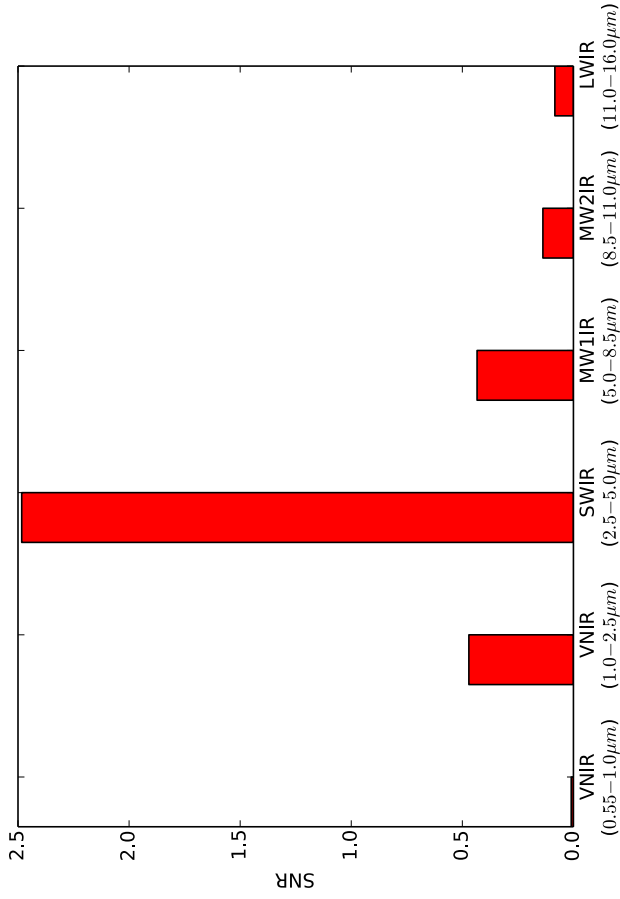
SNR of HAT-P-27 b (Primary) Per Channel (1 transit = 5.10h)



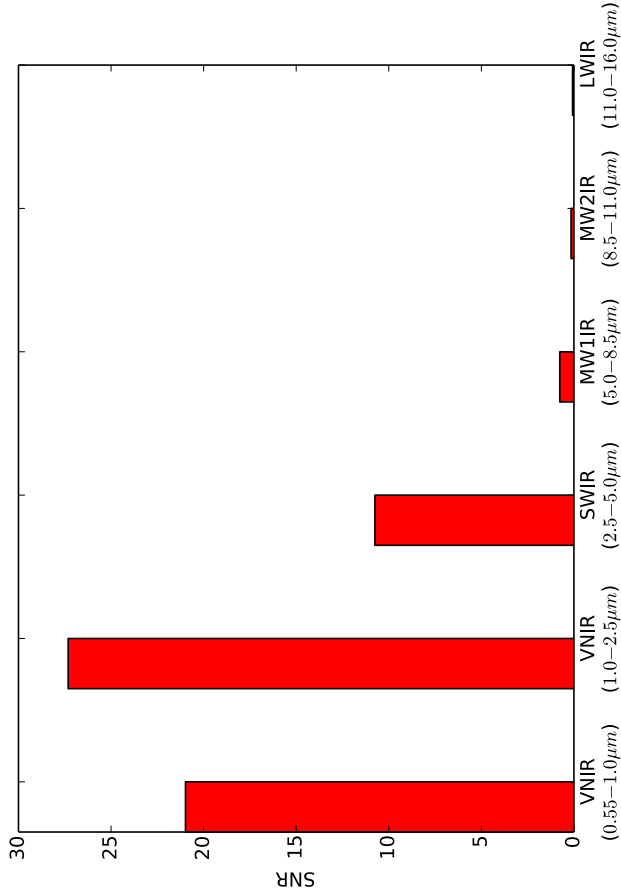
SNR of HAT-P-28 b (Secondary) Per Channel (1 eclipse = 9.53h)



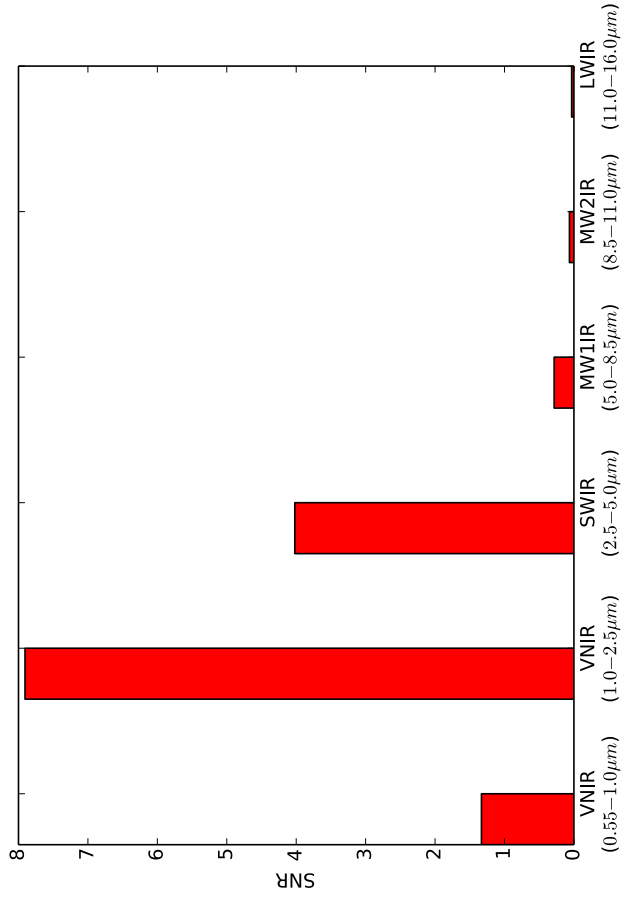
SNR of HAT-P-29 b (Secondary) Per Channel (1 eclipse = 10.35h)



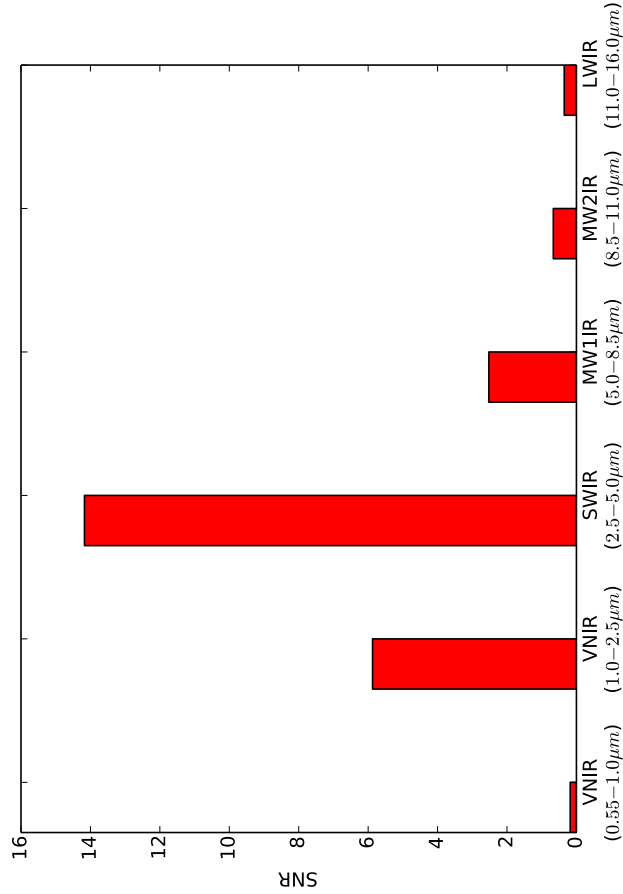
SNR of HAT-P-28 b (Primary) Per Channel (1 transit = 9.53h)



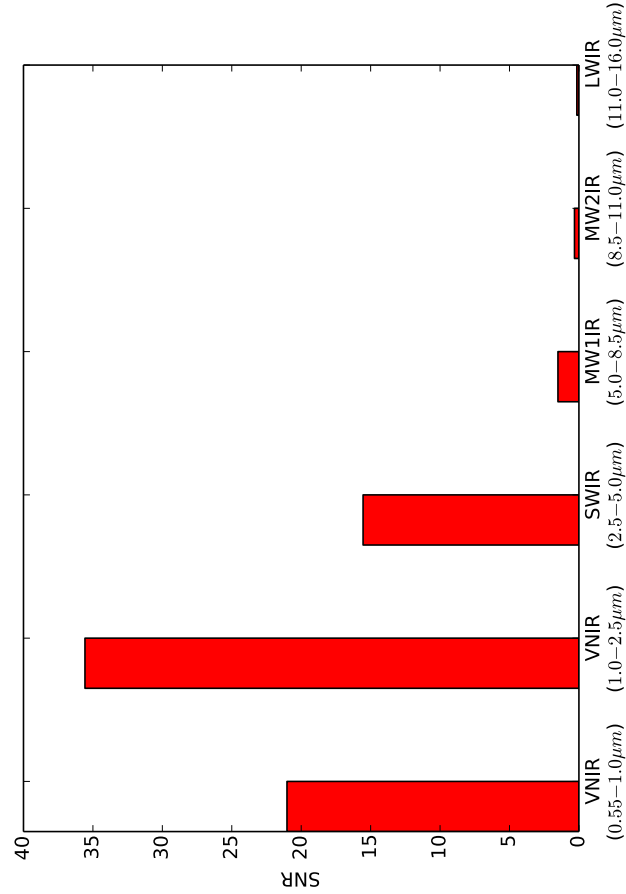
SNR of HAT-P-29 b (Primary) Per Channel (1 transit = 10.35h)



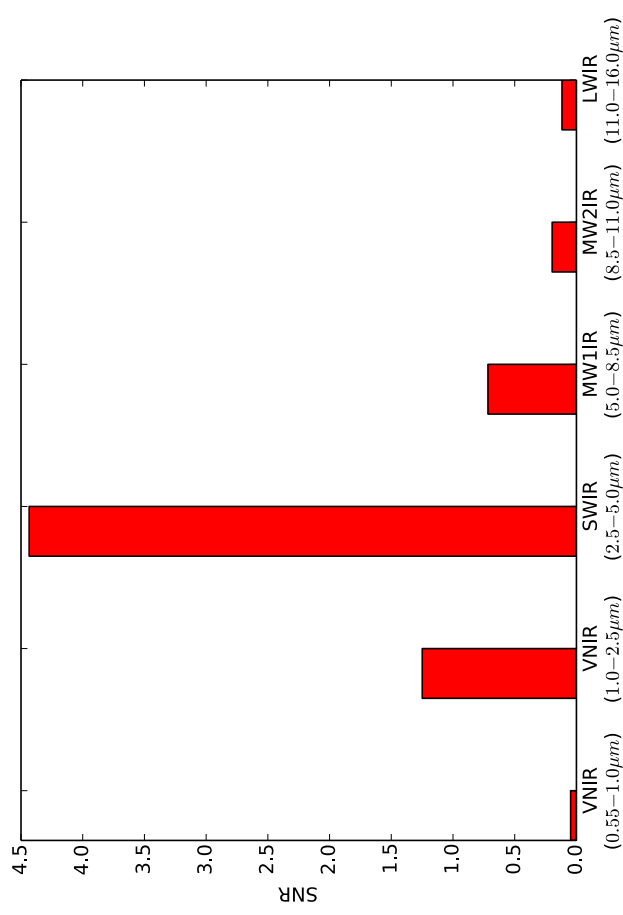
SNR of HAT-P-30 b (Secondary) Per Channel (1 eclipse = 1.87h)



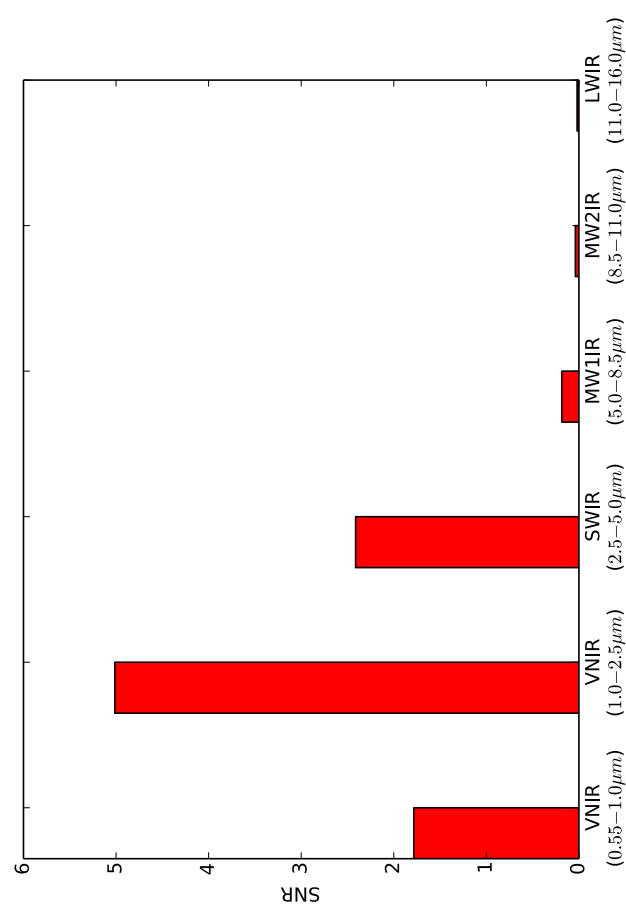
SNR of HAT-P-30 b (Primary) Per Channel (1 transit = 1.87h)



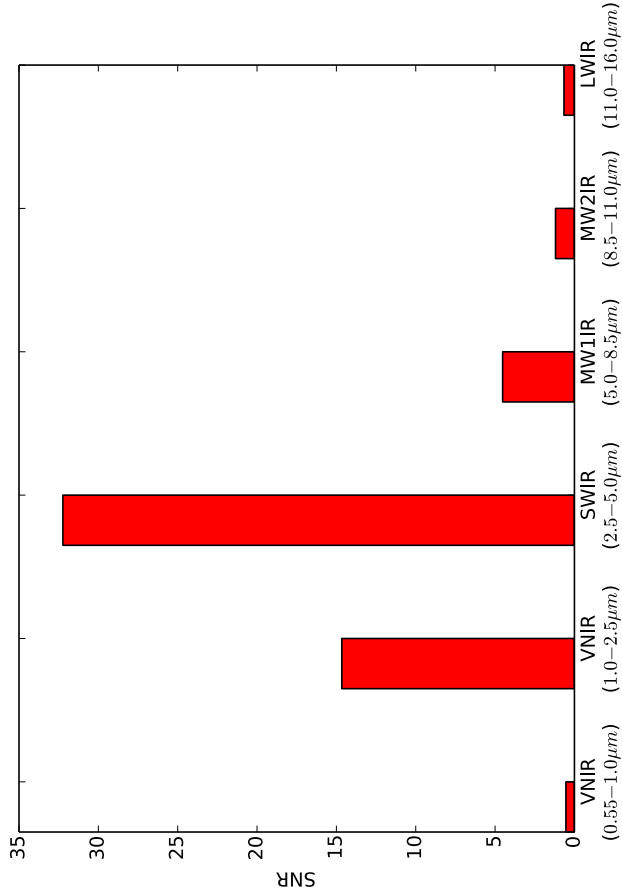
SNR of HAT-P-31 b (Secondary) Per Channel (1 eclipse = 13.12h)



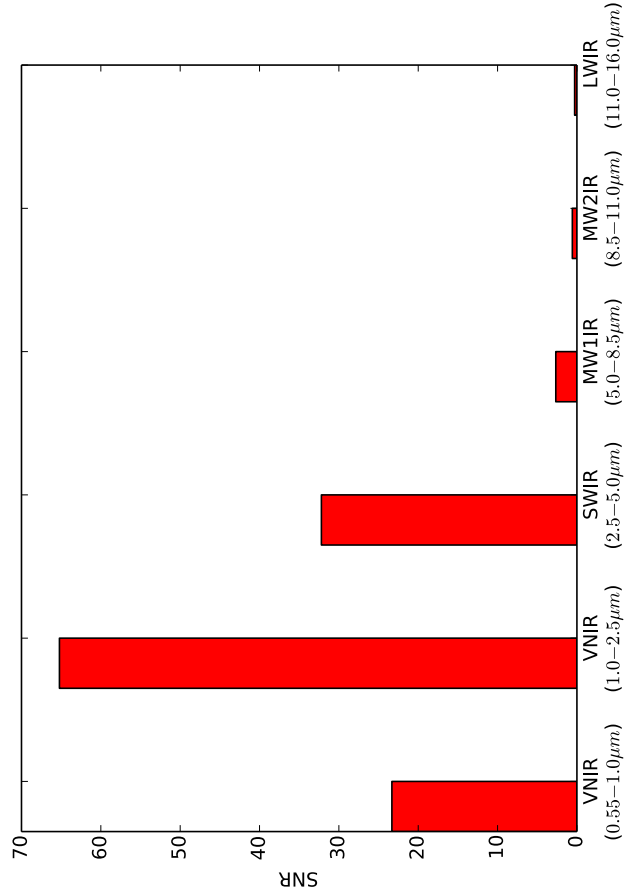
SNR of HAT-P-31 b (Primary) Per Channel (1 transit = 13.12h)



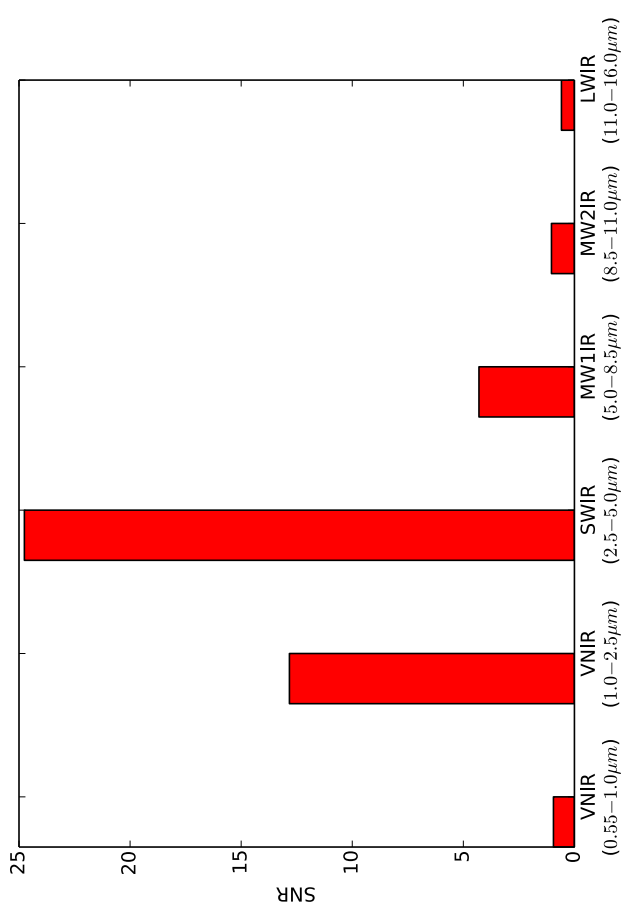
SNR of HAT-P-32 b (Secondary) Per Channel (1 eclipse = 10.68h)



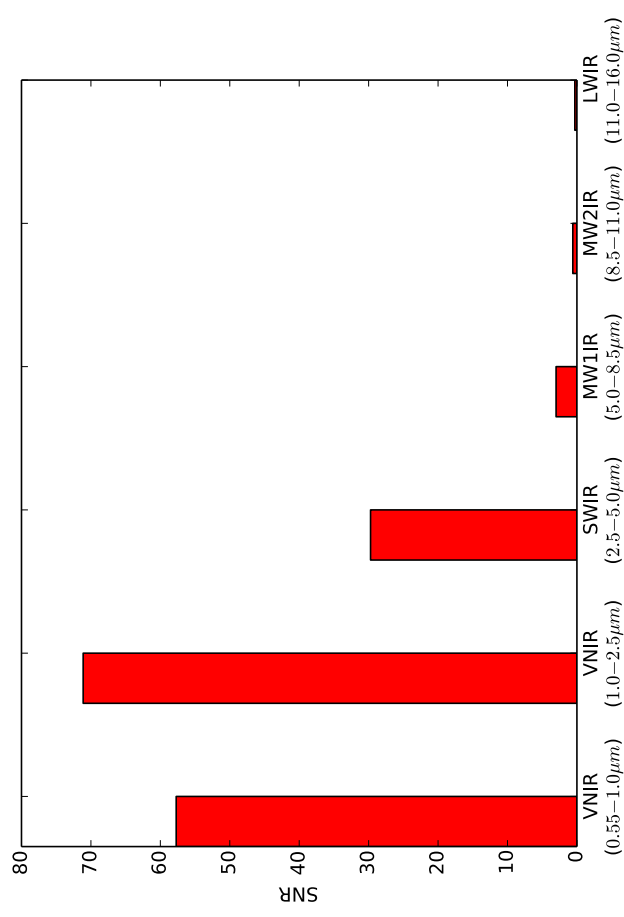
SNR of HAT-P-32 b (Primary) Per Channel (1 transit = 10.68h)



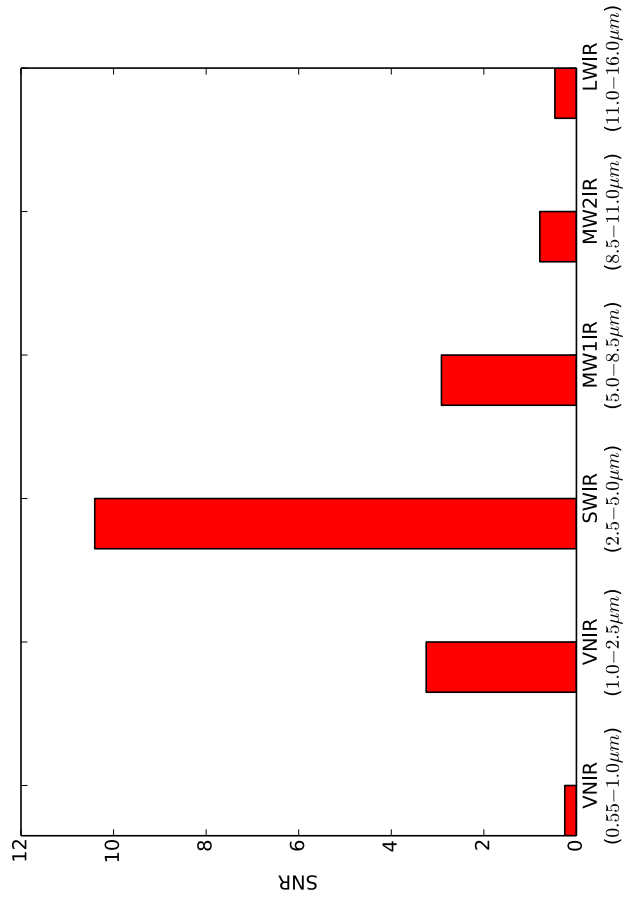
SNR of HAT-P-33 b (Secondary) Per Channel (1 eclipse = 13.85h)



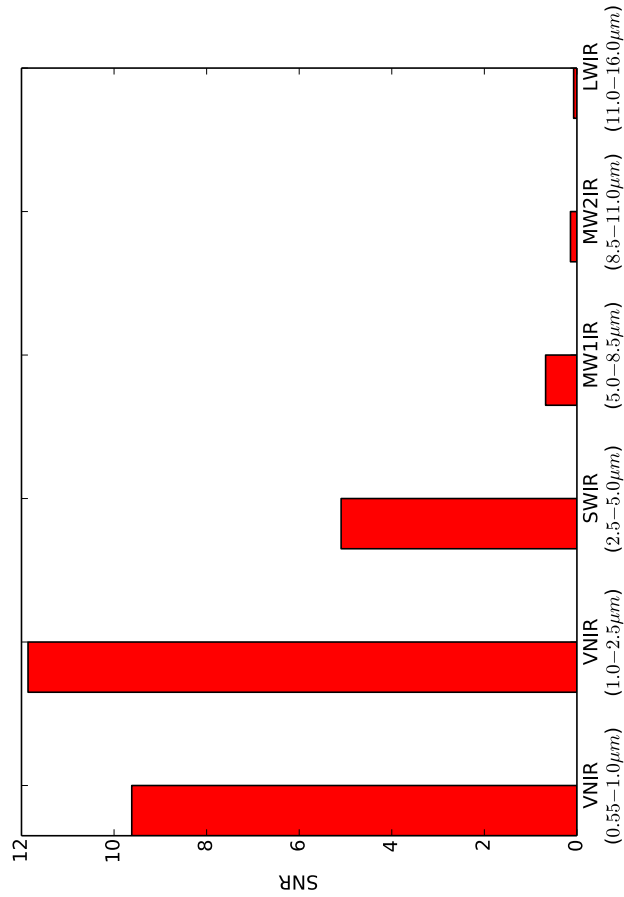
SNR of HAT-P-33 b (Primary) Per Channel (1 transit = 13.85h)



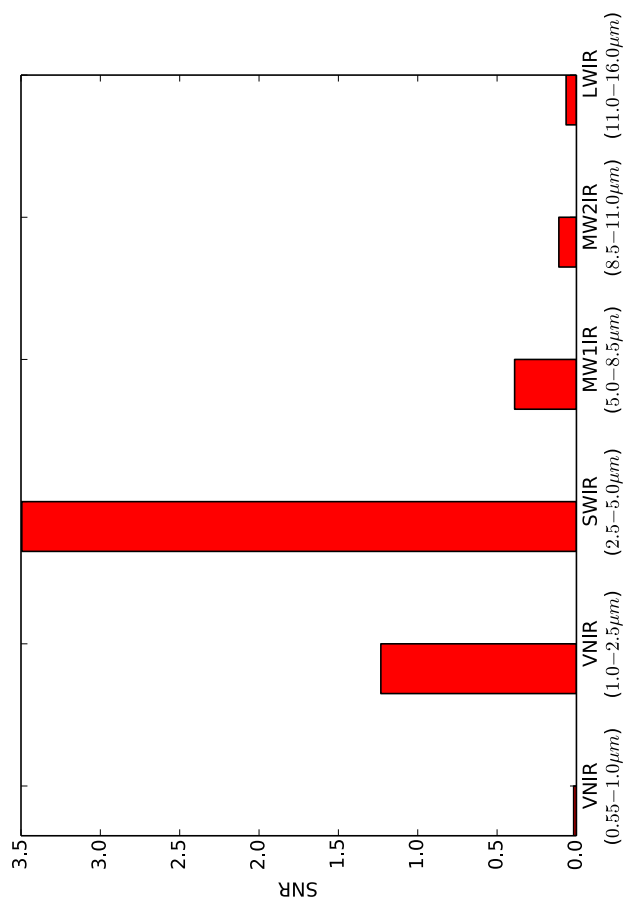
SNR of HAT-P-34 b (Secondary) Per Channel (1 eclipse = 12.84h)



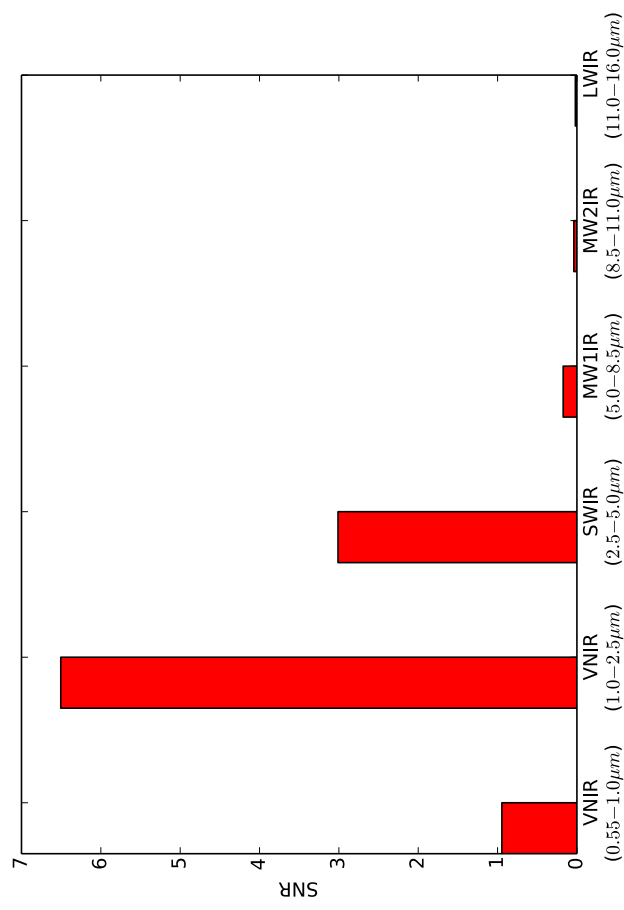
SNR of HAT-P-34 b (Primary) Per Channel (1 transit = 12.84h)



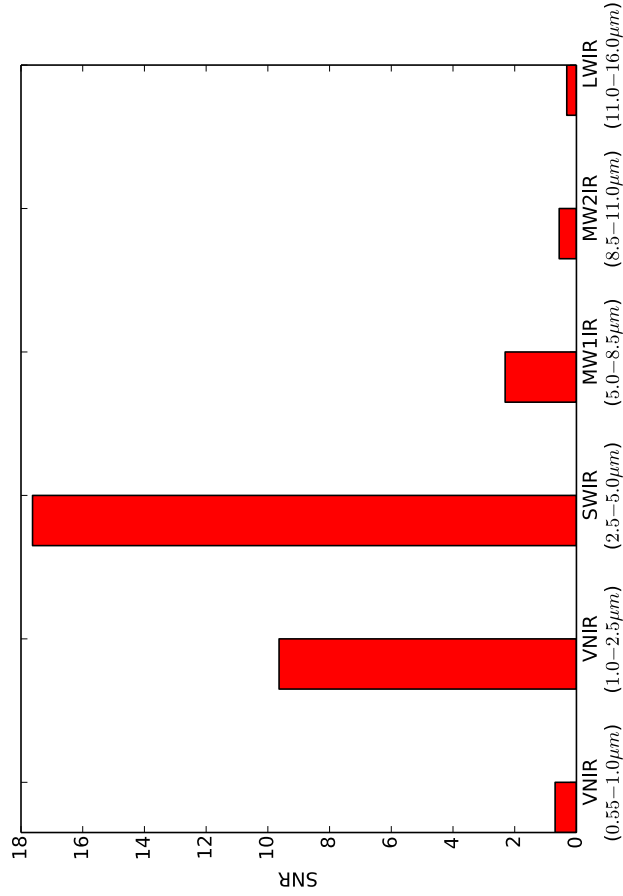
SNR of HAT-P-35 b (Secondary) Per Channel (1 eclipse = 11.71h)



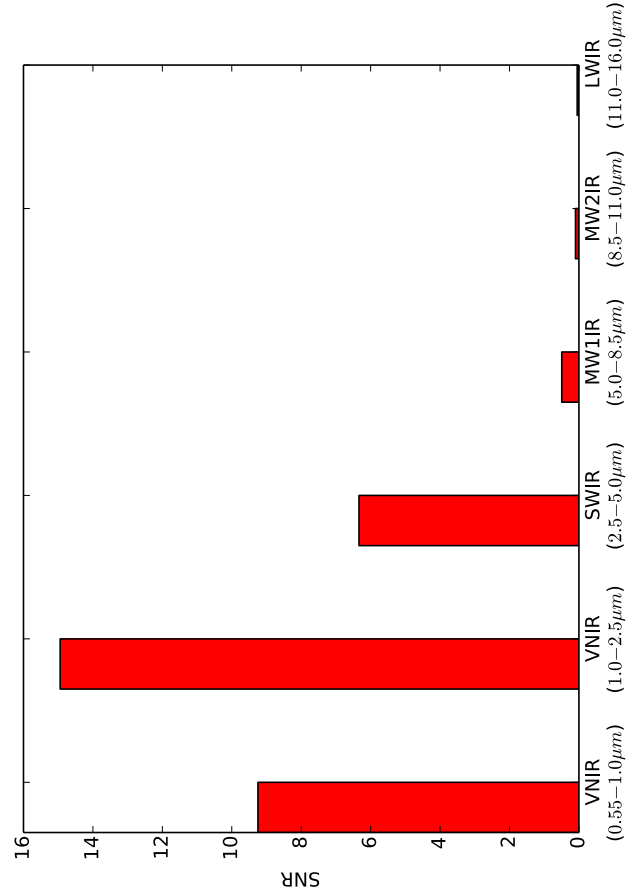
SNR of HAT-P-35 b (Primary) Per Channel (1 transit = 11.71h)



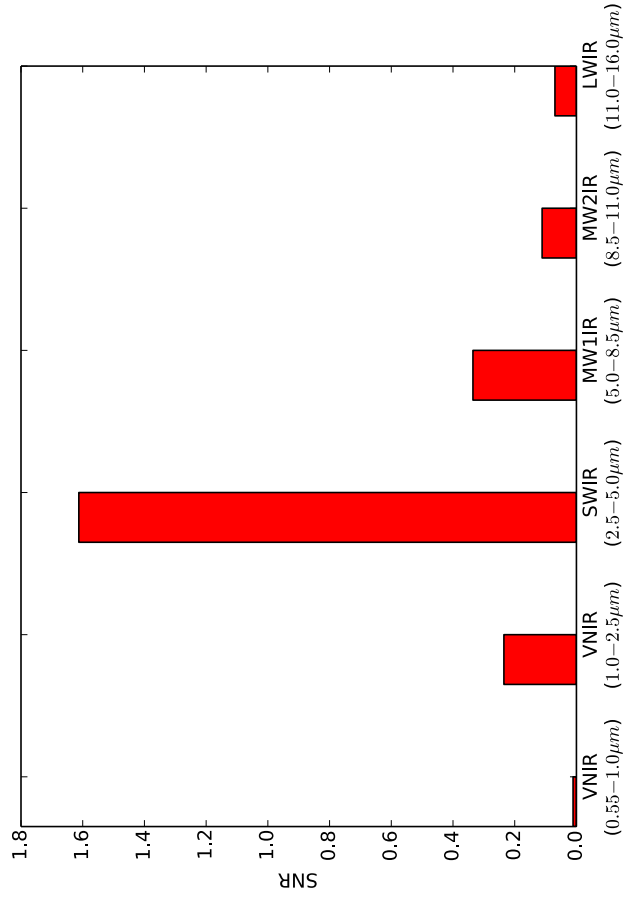
SNR of HAT-P-36 b (Secondary) Per Channel (1 eclipse = 7.07h)



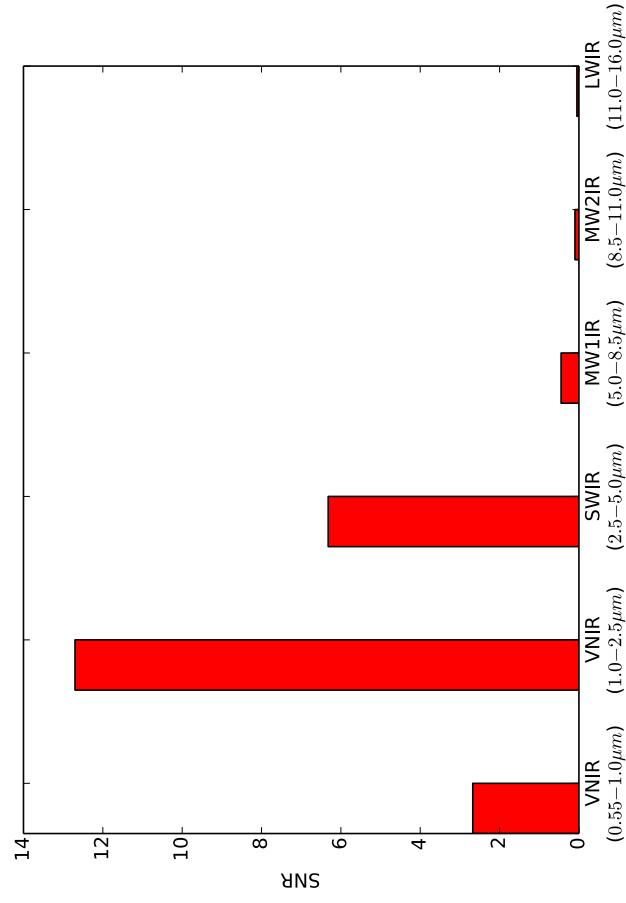
SNR of HAT-P-36 b (Primary) Per Channel (1 transit = 7.07h)



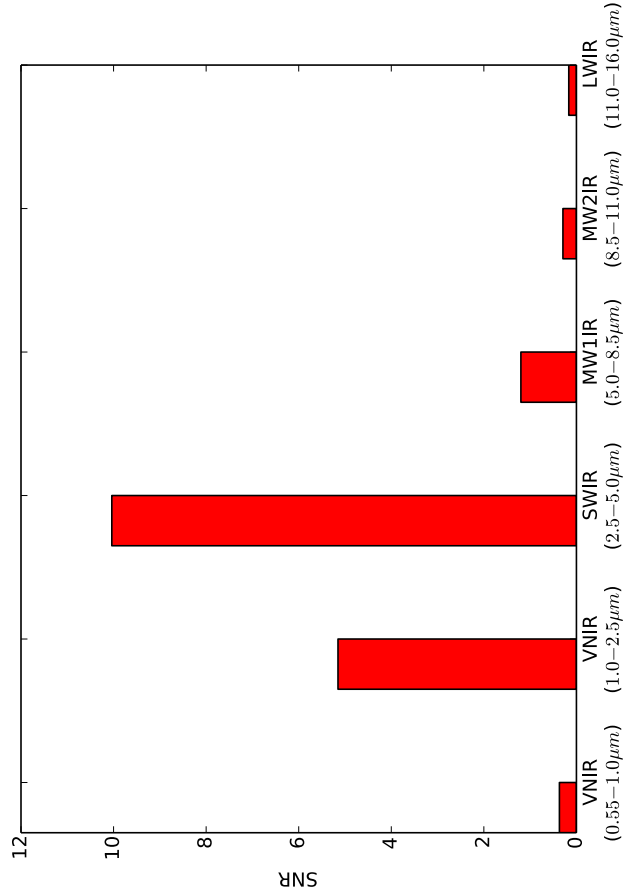
SNR of HAT-P-38 b (Secondary) Per Channel (1 eclipse = 9.04h)



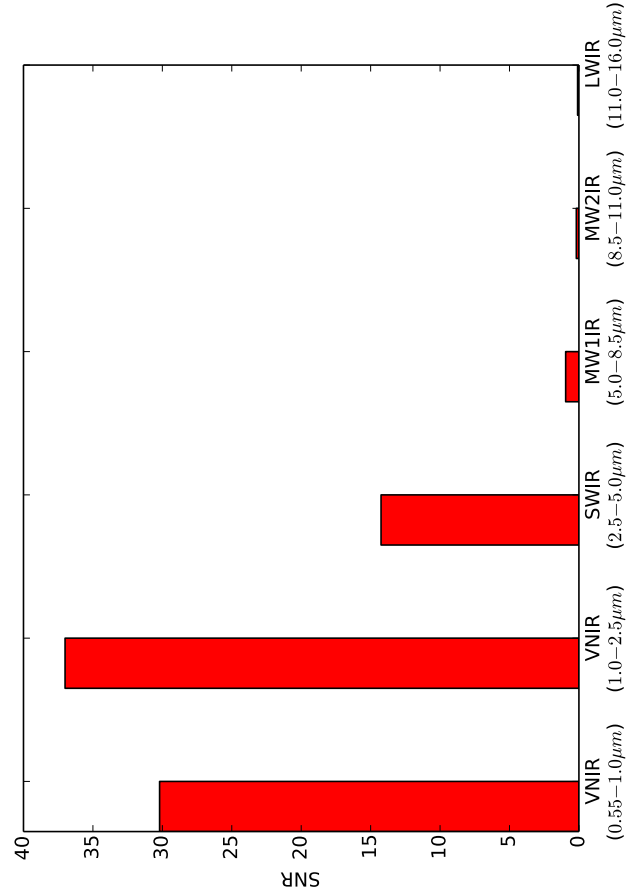
SNR of HAT-P-38 b (Primary) Per Channel (1 transit = 9.04h)



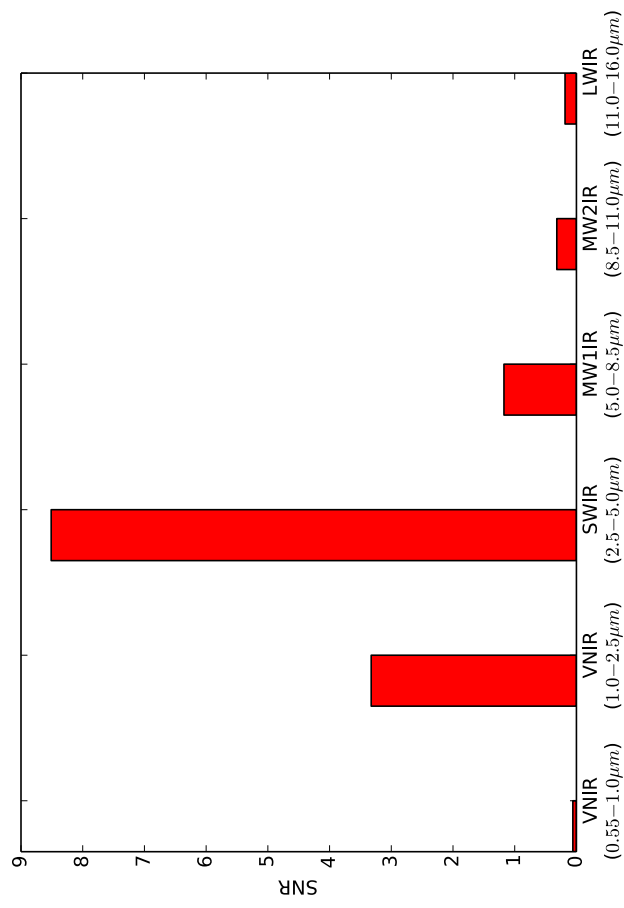
SNR of HAT-P-39 b (Secondary) Per Channel (1 eclipse = 12.67h)



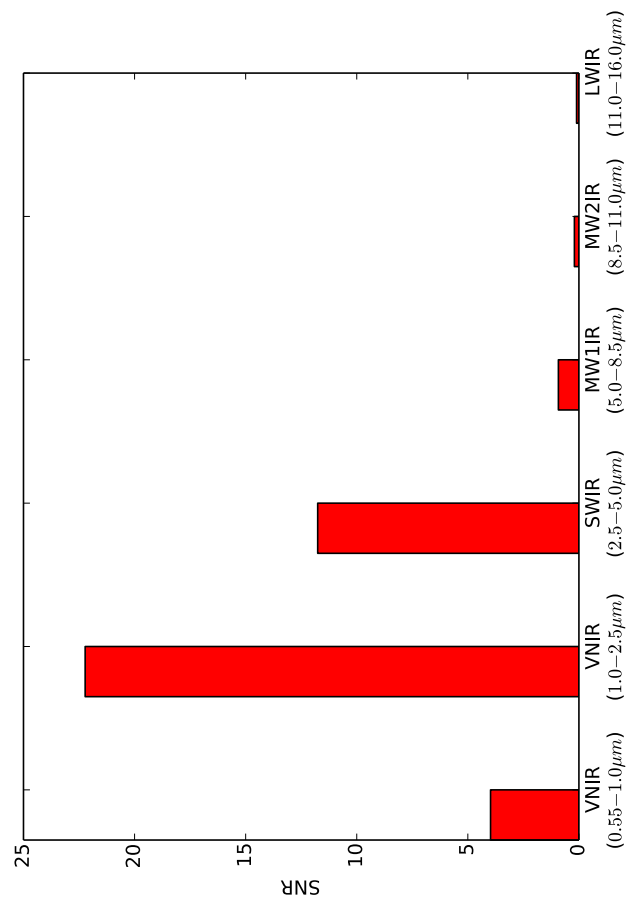
SNR of HAT-P-39 b (Primary) Per Channel (1 transit = 12.67h)



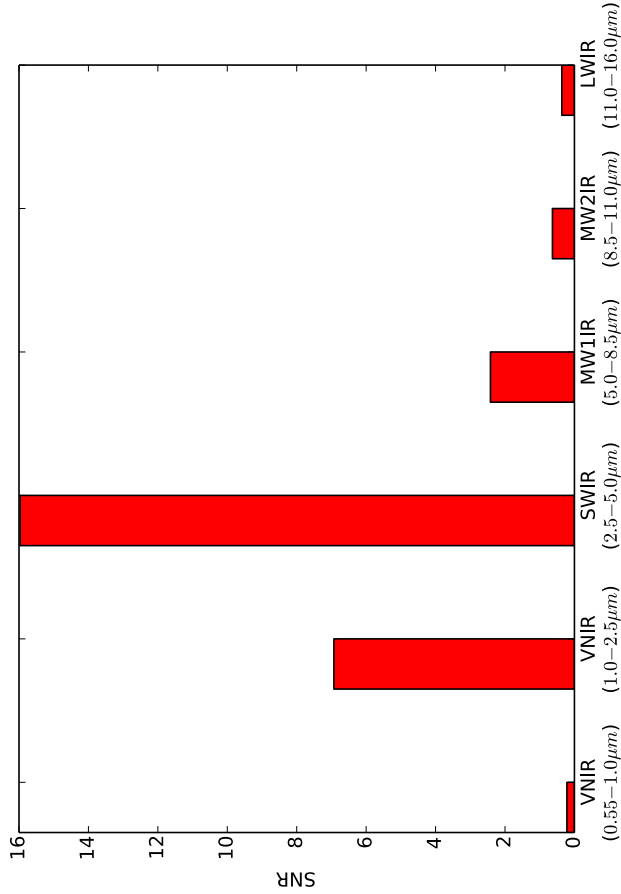
SNR of HAT-P-40 b (Secondary) Per Channel (1 eclipse = 18.55h)



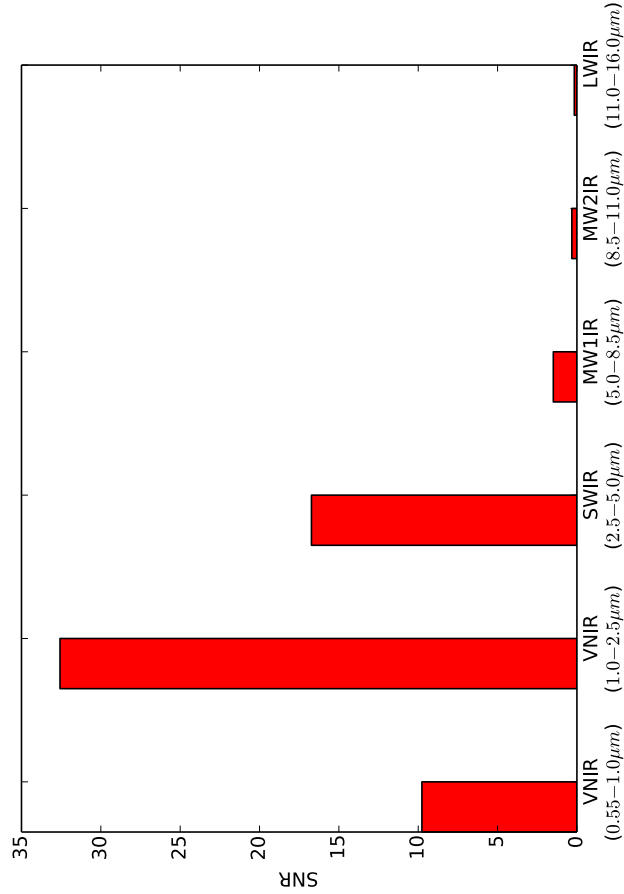
SNR of HAT-P-40 b (Primary) Per Channel (1 transit = 18.55h)



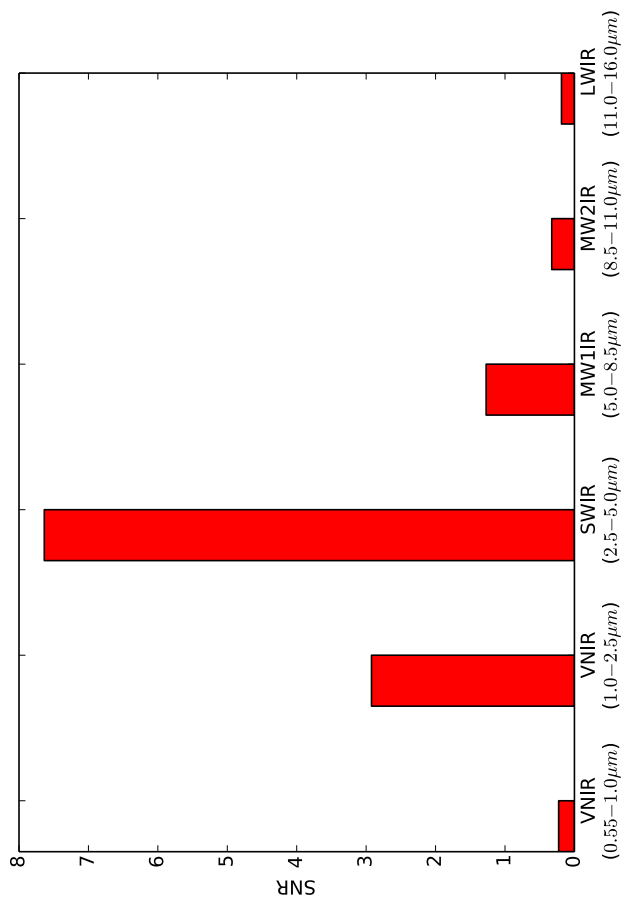
SNR of HAT-P-41 b (Secondary) Per Channel (1 eclipse = 12.39h)



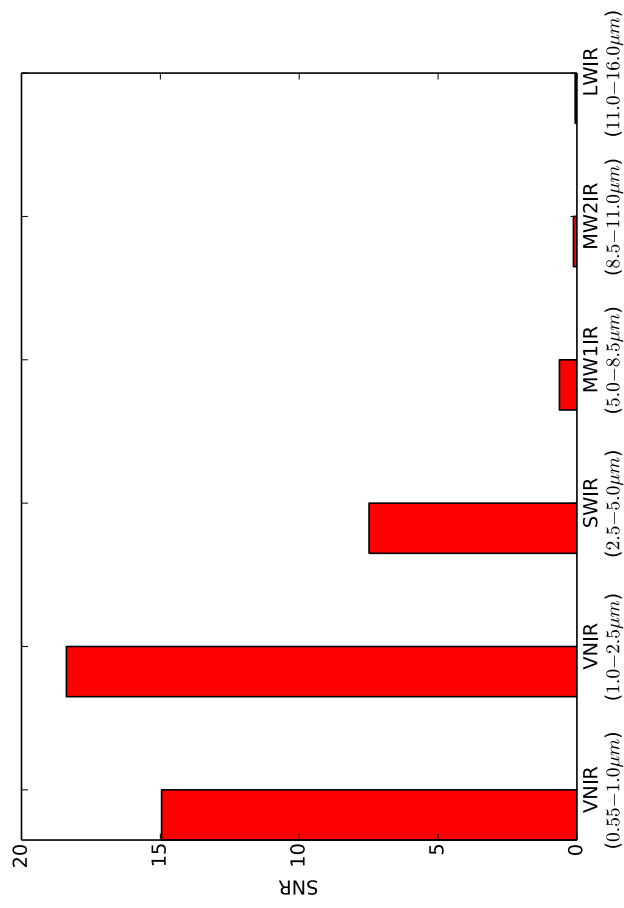
SNR of HAT-P-41 b (Primary) Per Channel (1 transit = 12.39h)



SNR of HAT-P-42 b (Secondary) Per Channel (1 eclipse = 12.19h)

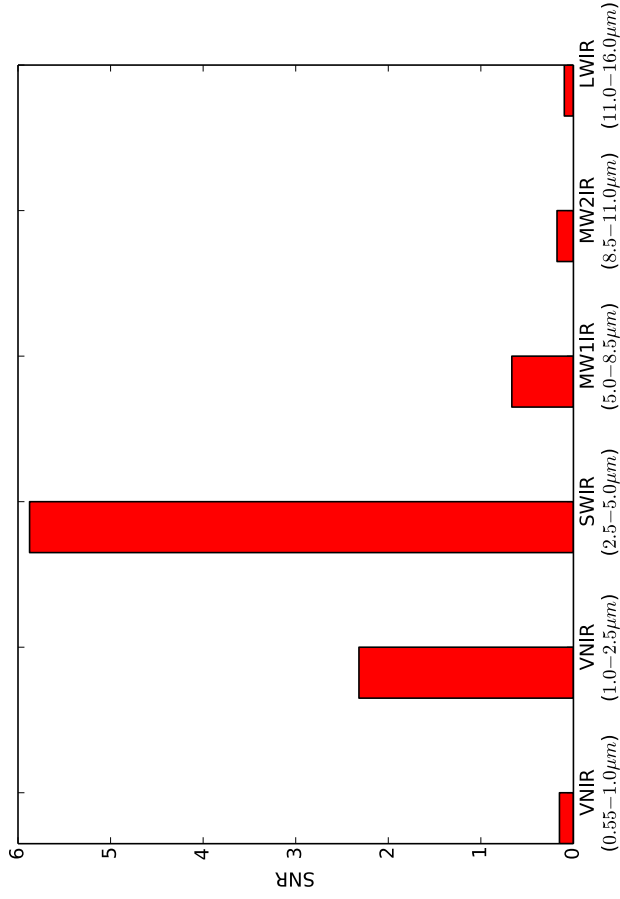


SNR of HAT-P-42 b (Primary) Per Channel (1 transit = 12.19h)

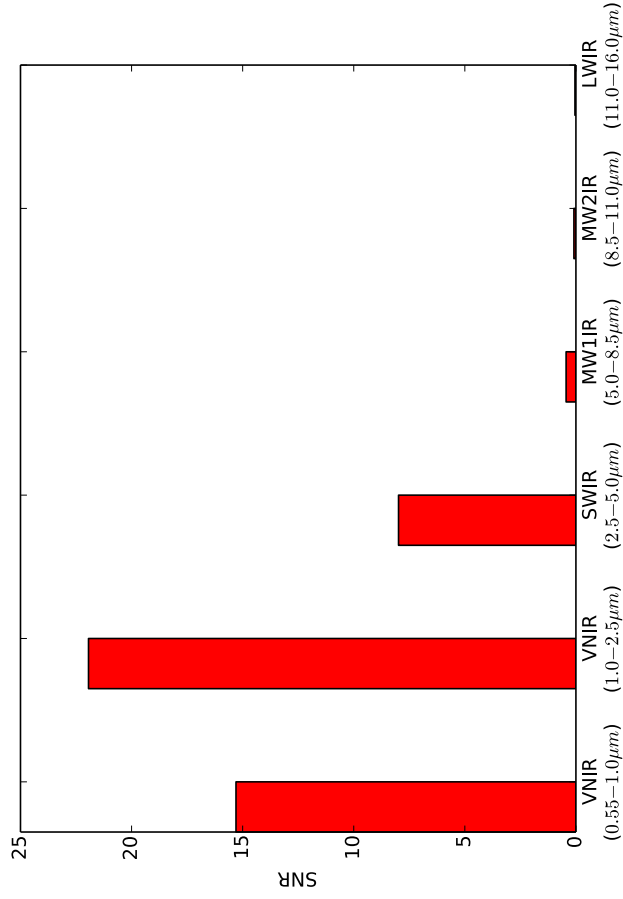




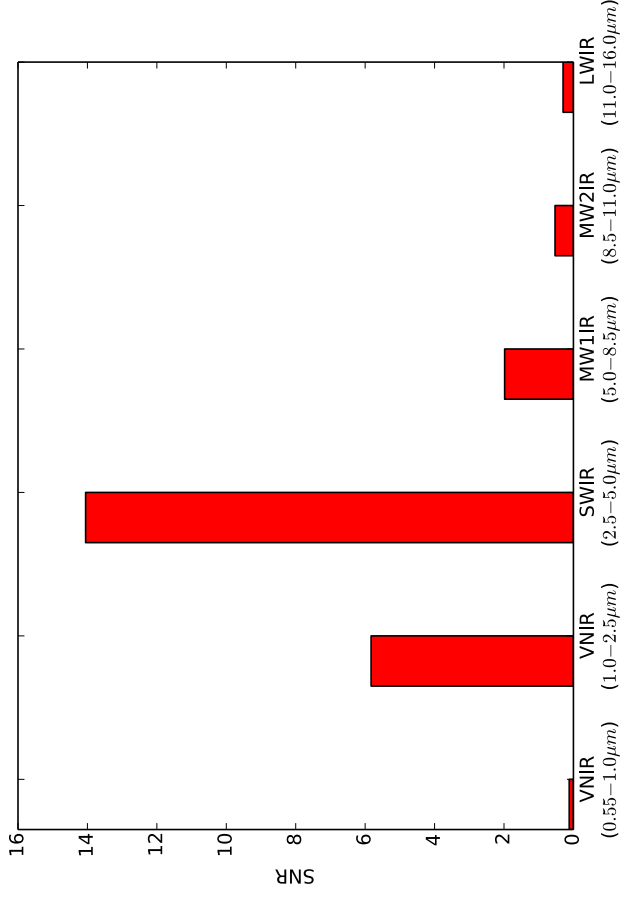
SNR of HAT-P-43 b (Secondary) Per Channel (1 eclipse = 9.81h)



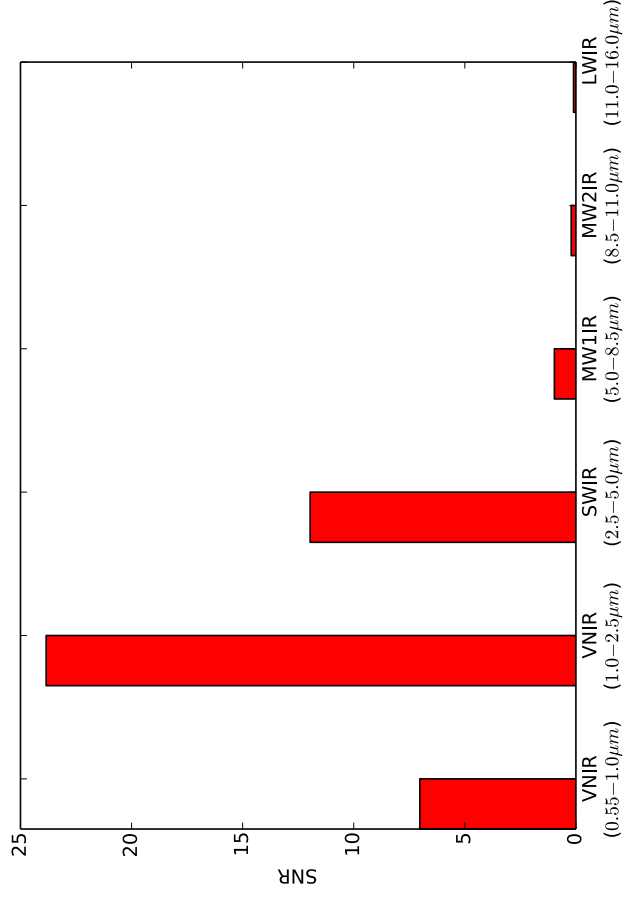
SNR of HAT-P-43 b (Primary) Per Channel (1 transit = 9.81h)



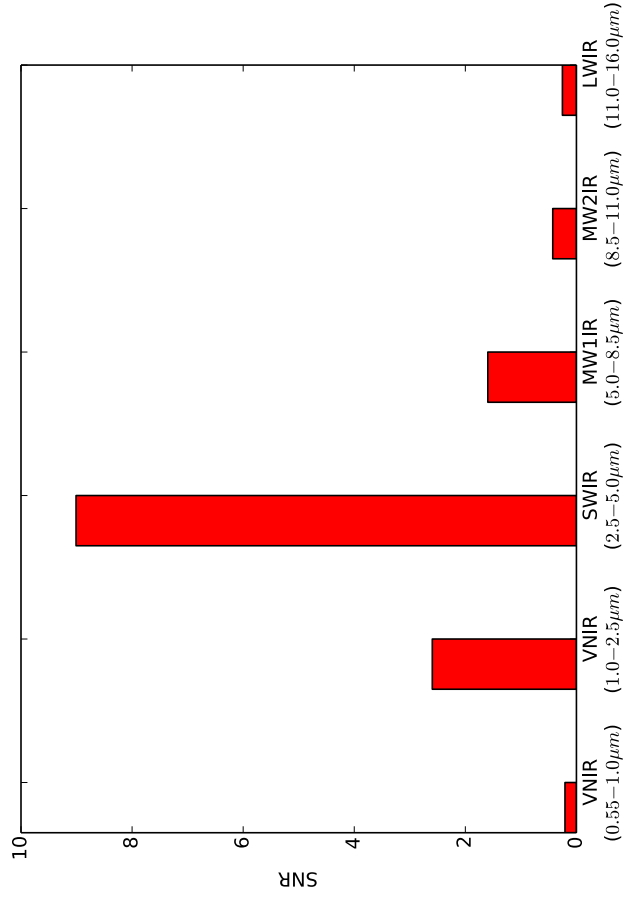
SNR of HAT-P-45 b (Secondary) Per Channel (1 eclipse = 10.53h)



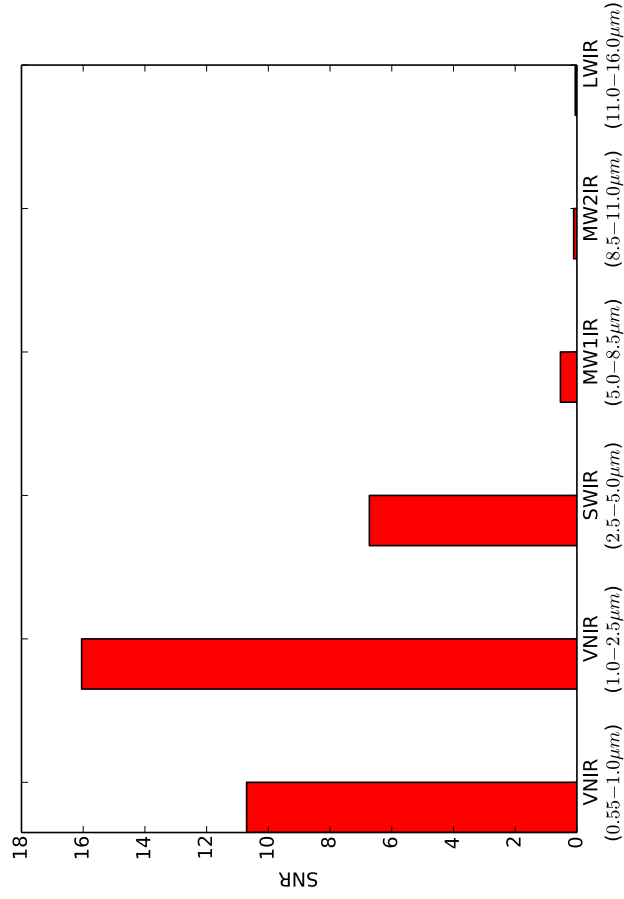
SNR of HAT-P-45 b (Primary) Per Channel (1 transit = 10.53h)



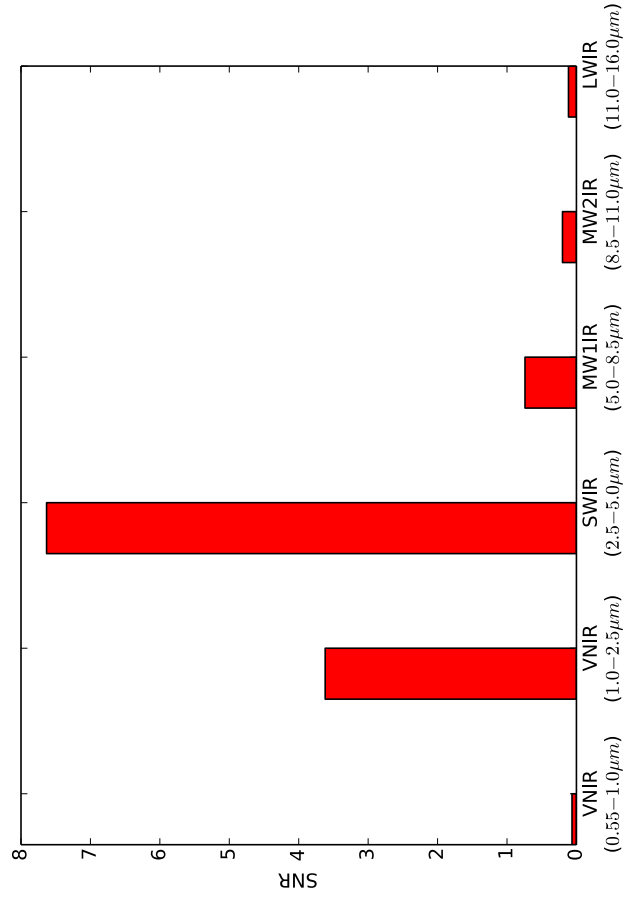
SNR of HATS-1 b (Secondary) Per Channel (1 eclipse = 7.63h)



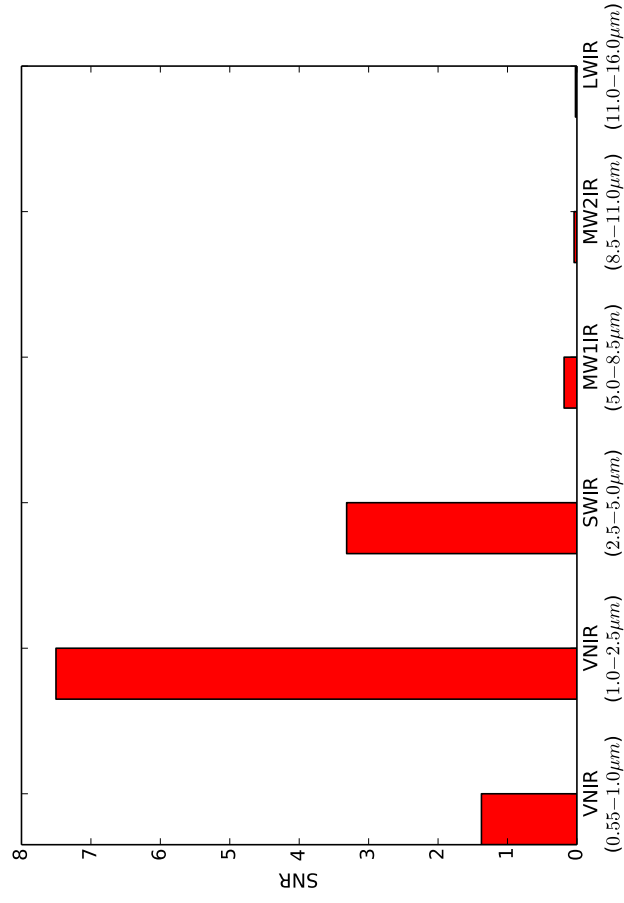
SNR of HATS-1 b (Primary) Per Channel (1 transit = 7.63h)



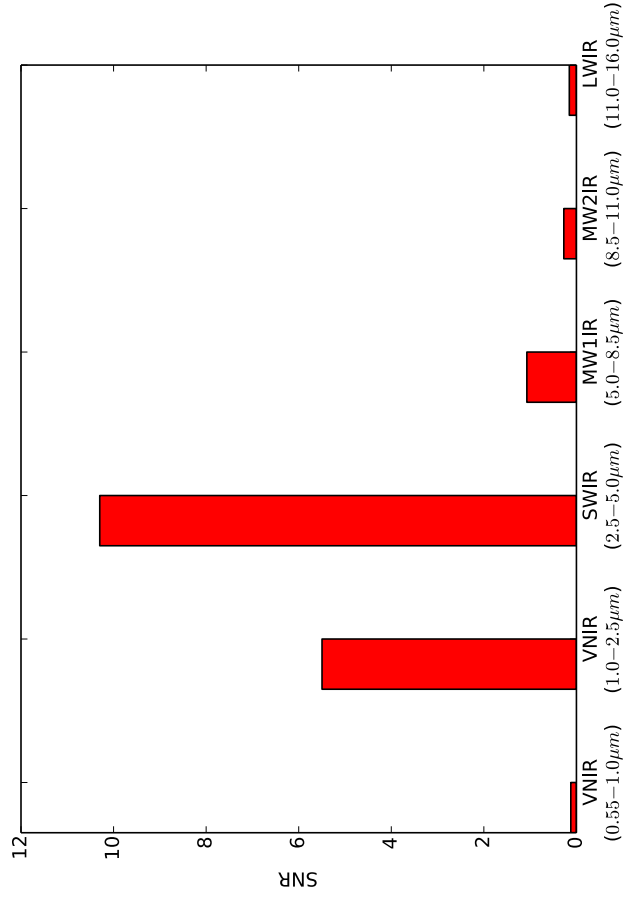
SNR of HATS-2 b (Secondary) Per Channel (1 eclipse = 6.22h)



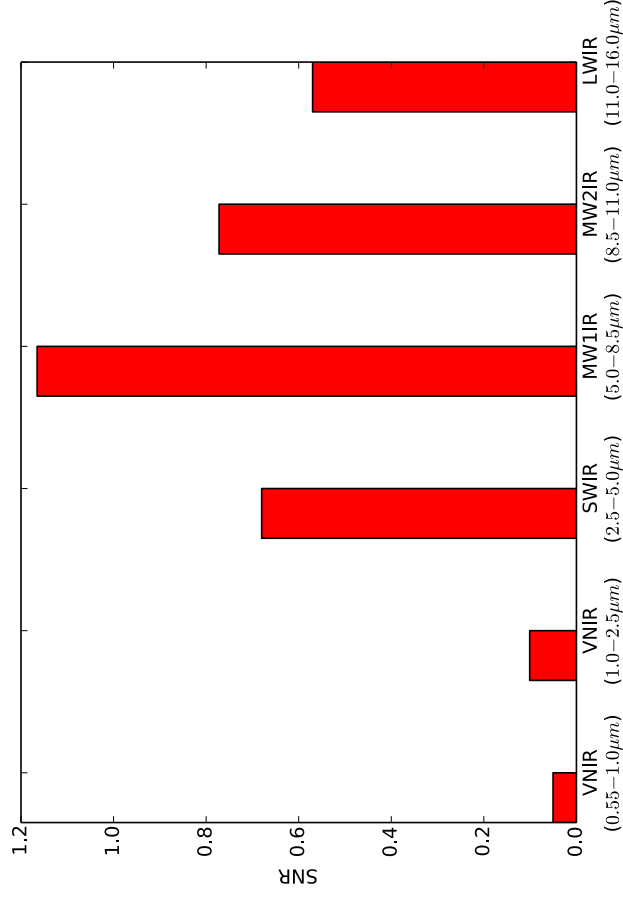
SNR of HATS-2 b (Primary) Per Channel (1 transit = 6.22h)



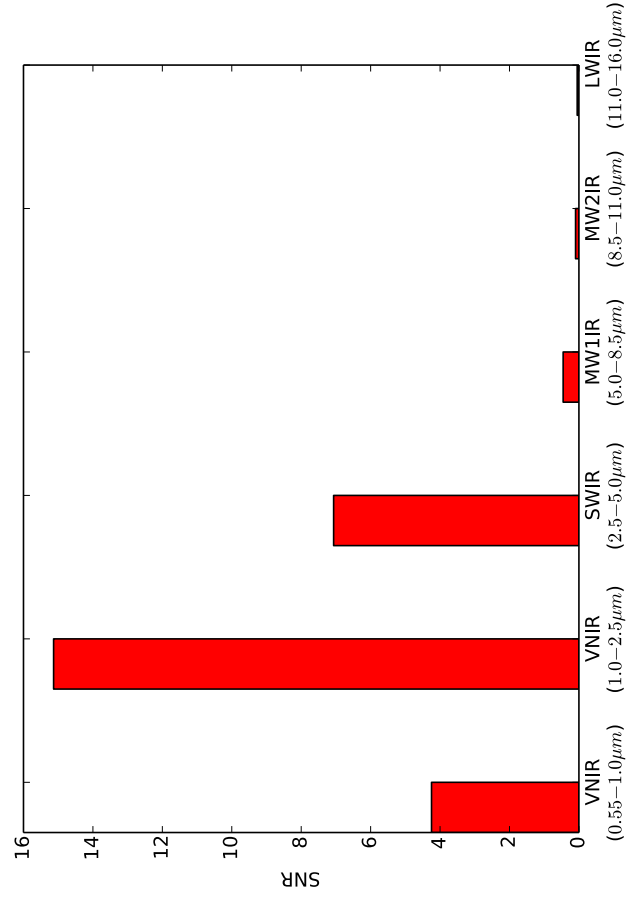
SNR of HATS-3 b (Secondary) Per Channel (1 eclipse = 12.14h)



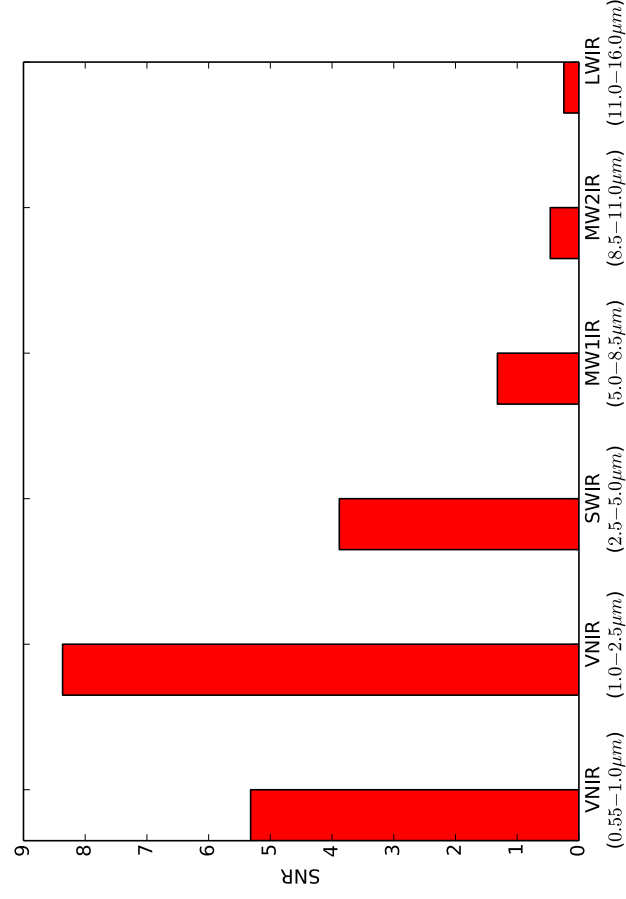
SNR of HD 97658 b (Secondary) Per Channel (1 eclipse = 9.02h)



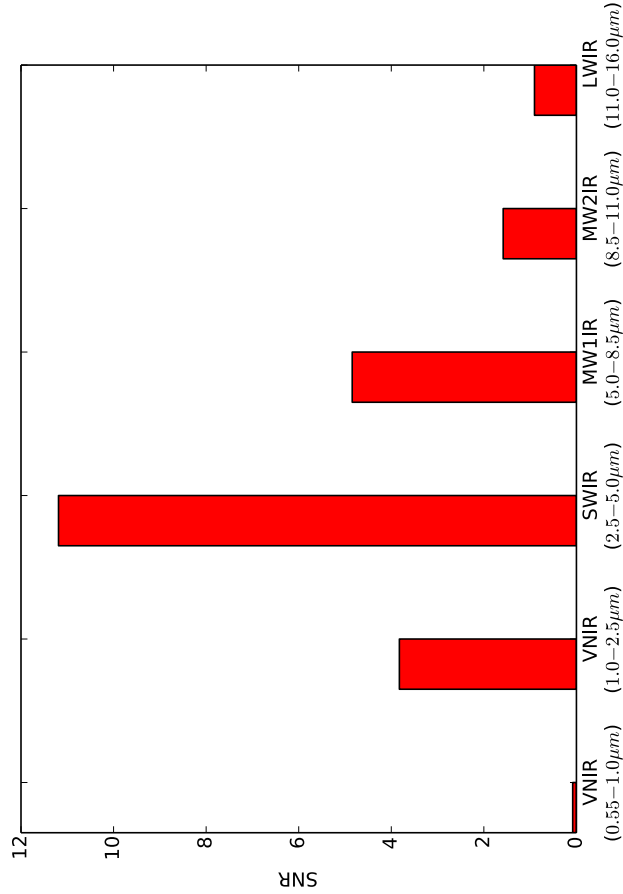
SNR of HATS-3 b (Primary) Per Channel (1 transit = 12.14h)



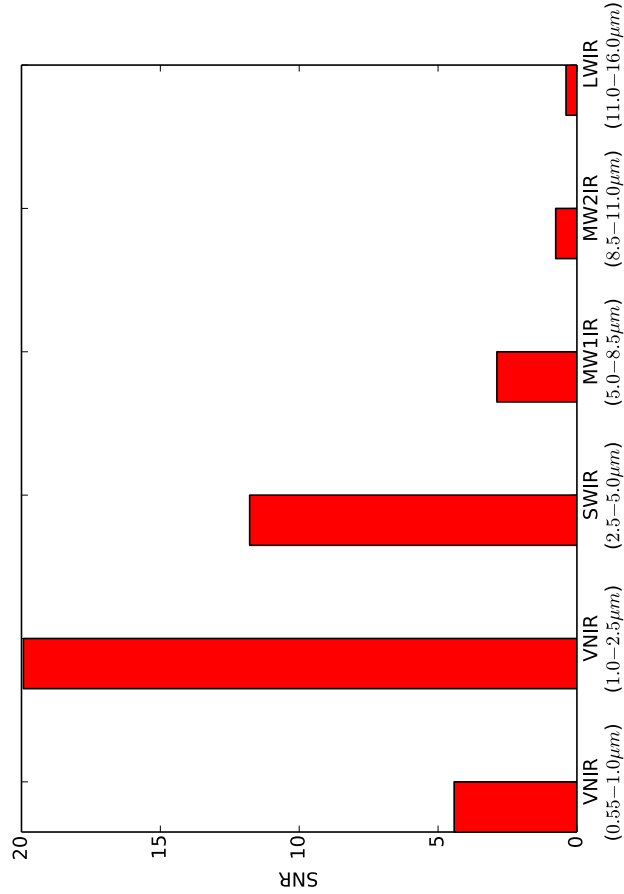
SNR of HD 97658 b (Primary) Per Channel (1 transit = 9.02h)



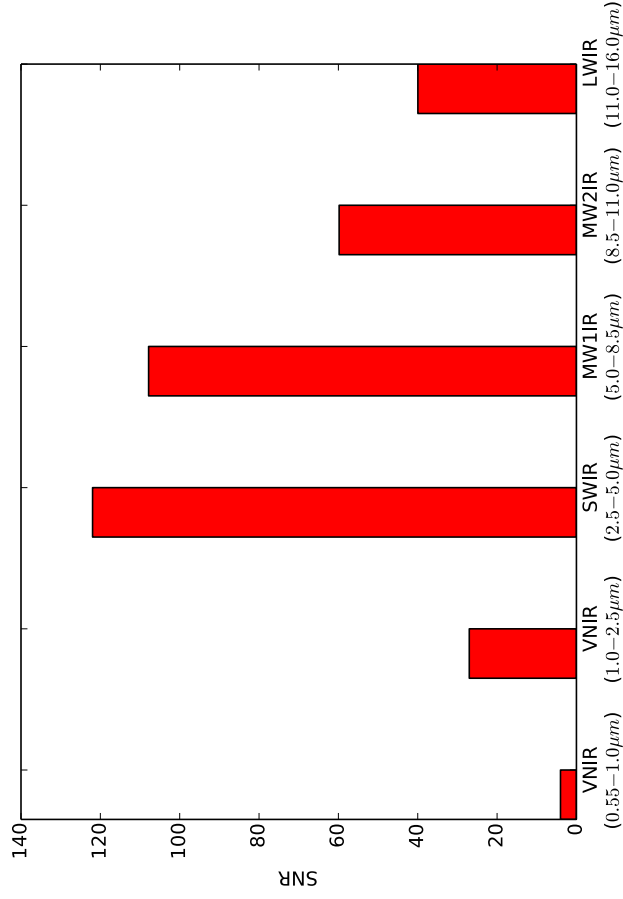
SNR of HD 149026 b (Secondary) Per Channel (1 eclipse = 9.97h)



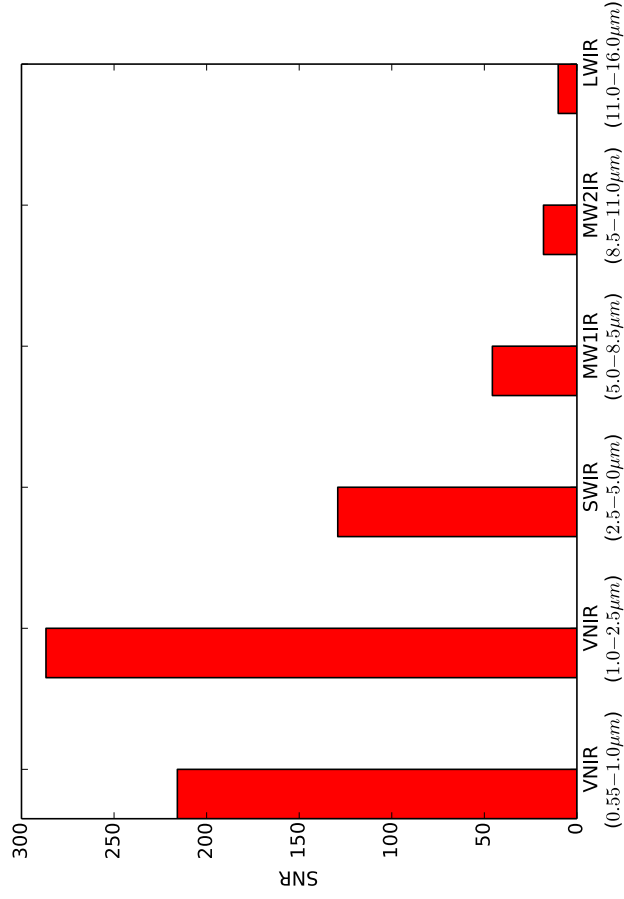
SNR of HD 149026 b (Primary) Per Channel (1 transit = 9.97h)



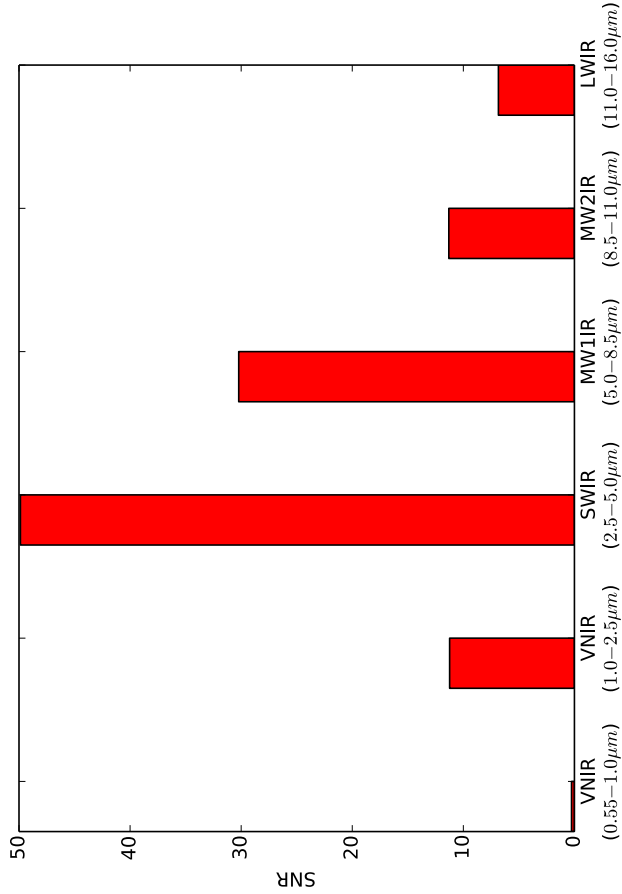
SNR of HD 189733 A b (Secondary) Per Channel (1 eclipse = 5.57h)



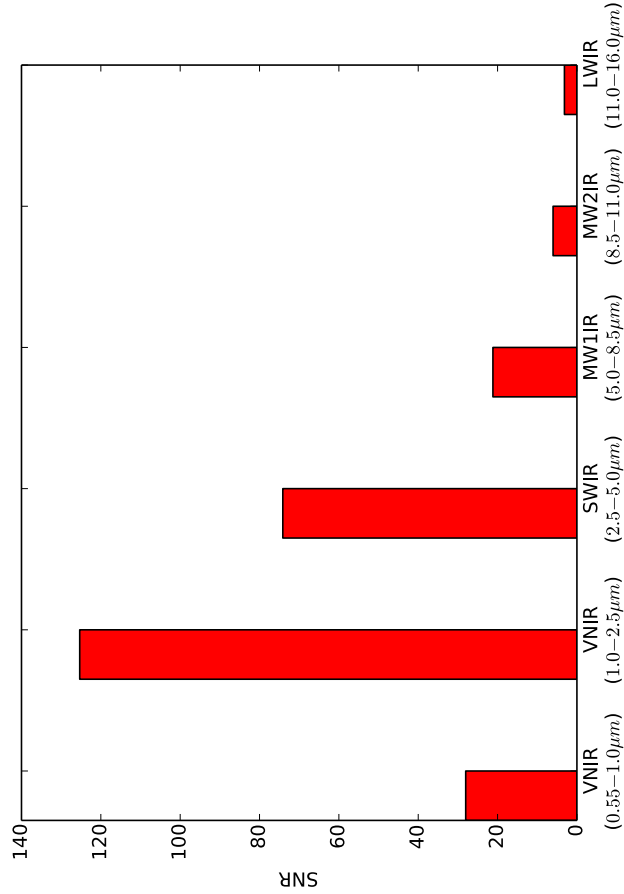
SNR of HD 189733 A b (Primary) Per Channel (1 transit = 5.57h)



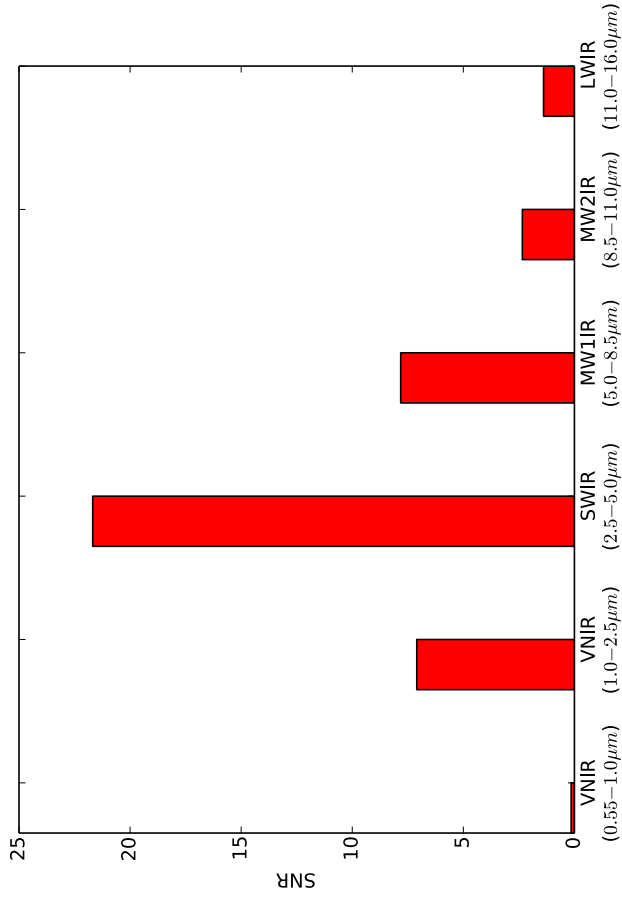
SNR of HD 209458 b (Secondary) Per Channel (1 eclipse = 9.05h)



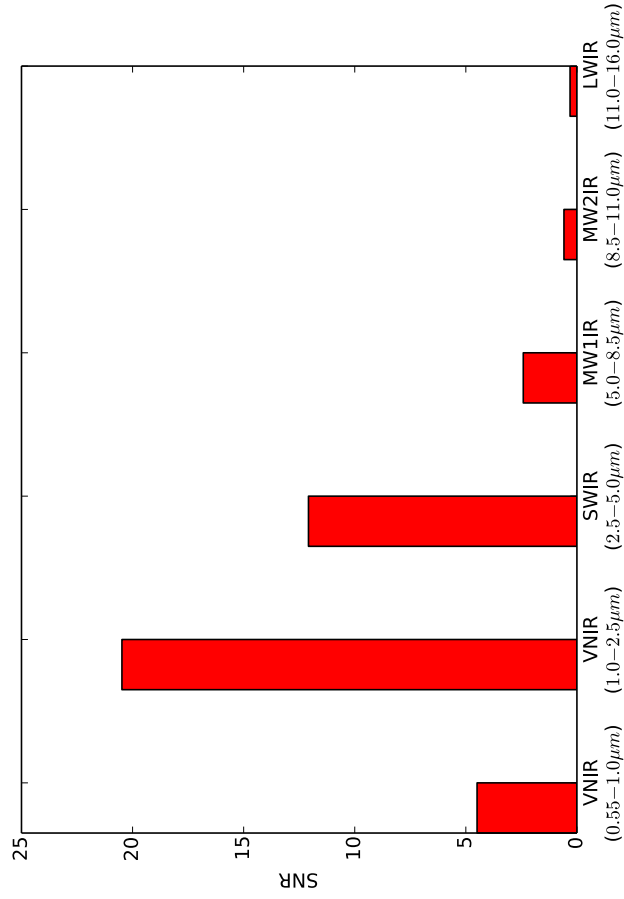
SNR of HD 209458 b (Primary) Per Channel (1 transit = 9.05h)



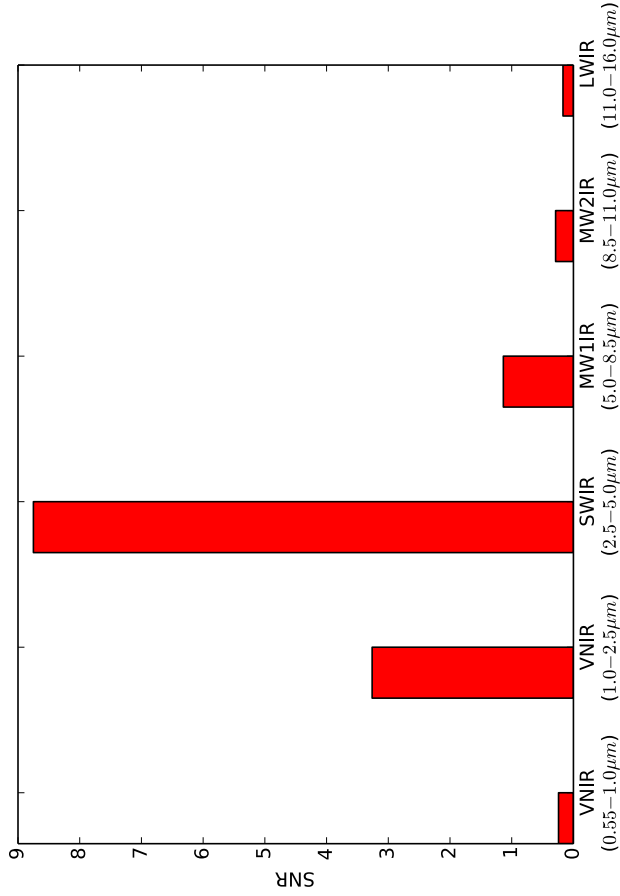
SNR of KELT-2A b (Secondary) Per Channel (1 eclipse = 15.89h)



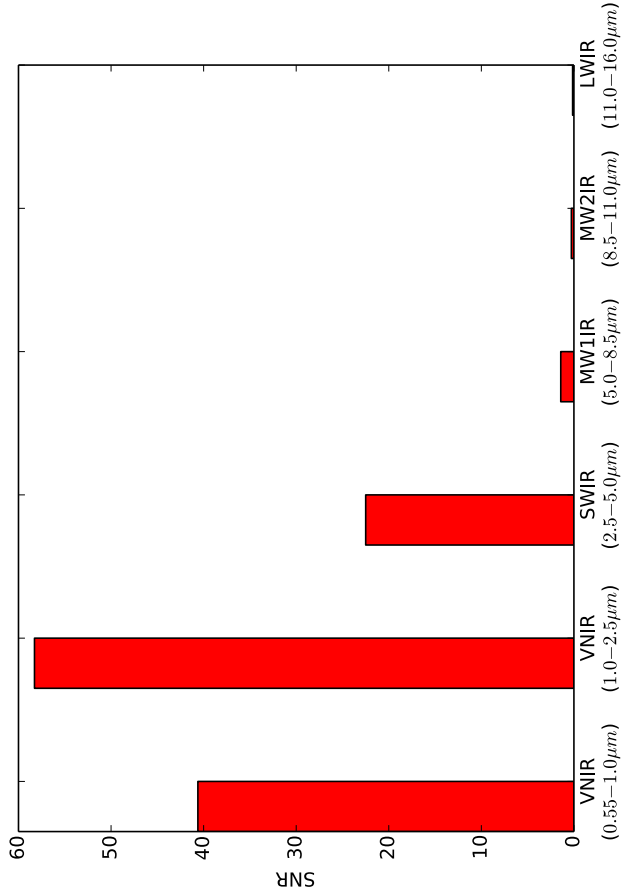
SNR of KELT-2A b (Primary) Per Channel (1 transit = 15.89h)



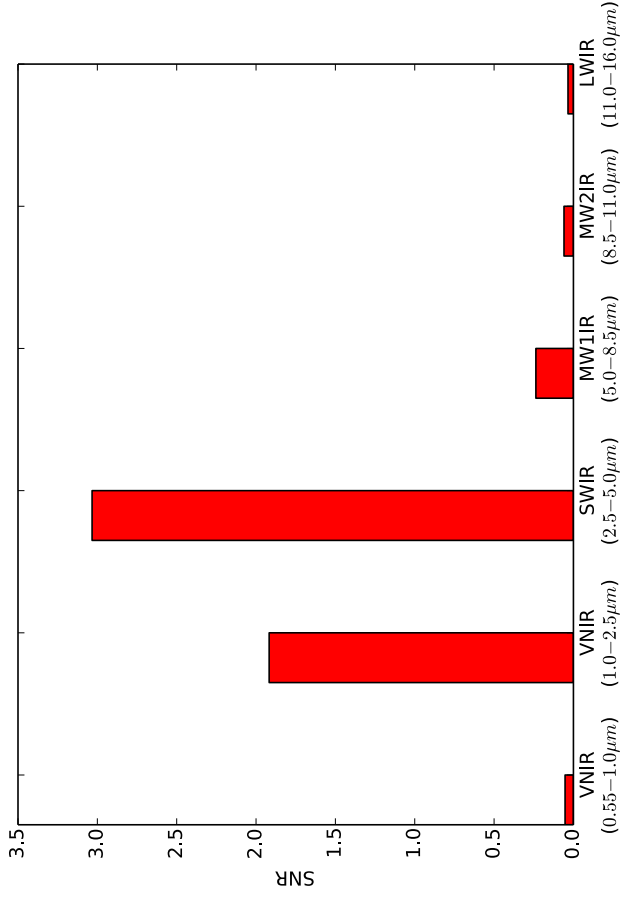
SNR of Kepler-12 b (Secondary) Per Channel (1 eclipse = 14.01h)



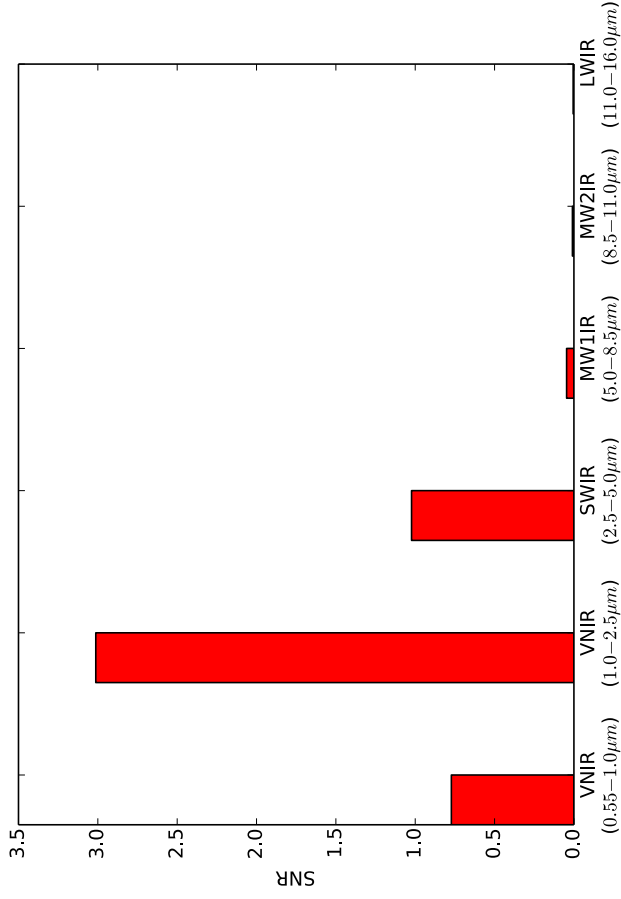
SNR of Kepler-12 b (Primary) Per Channel (1 transit = 14.01h)



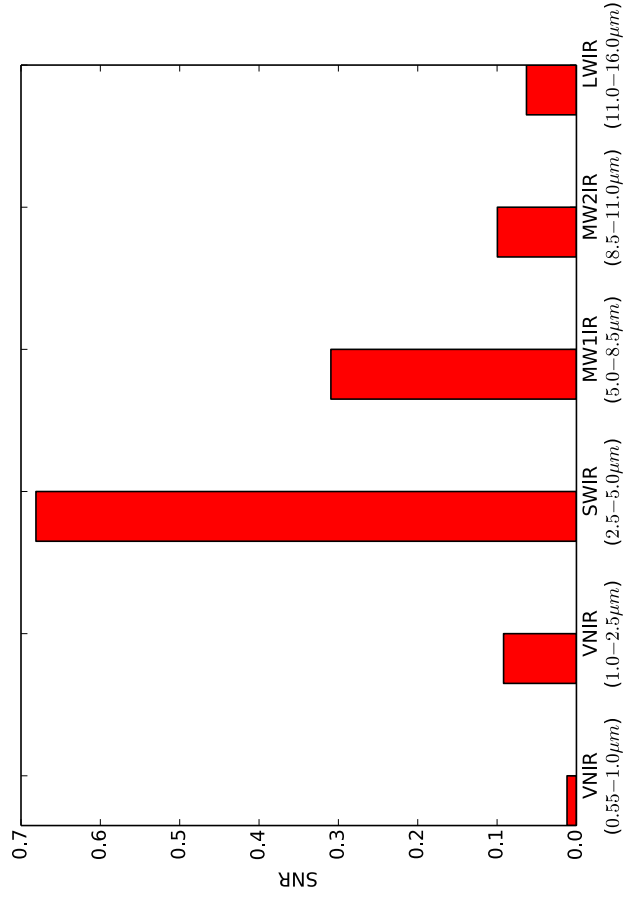
SNR of Kepler-17 b (Secondary) Per Channel (1 eclipse = 7.13h)



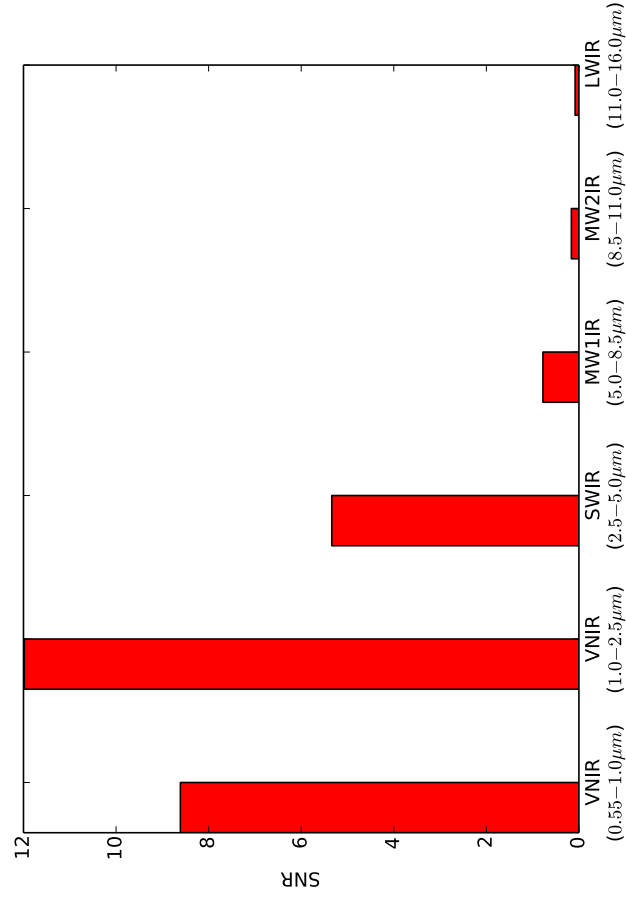
SNR of Kepler-17 b (Primary) Per Channel (1 transit = 7.13h)



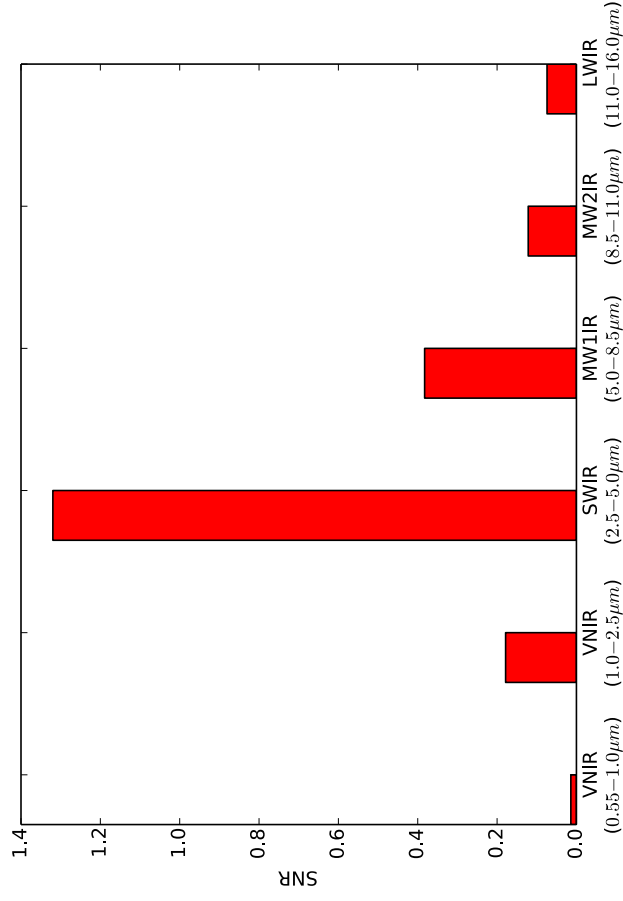
SNR of Kepler-25 c (Secondary) Per Channel (1 eclipse = 17.37h)



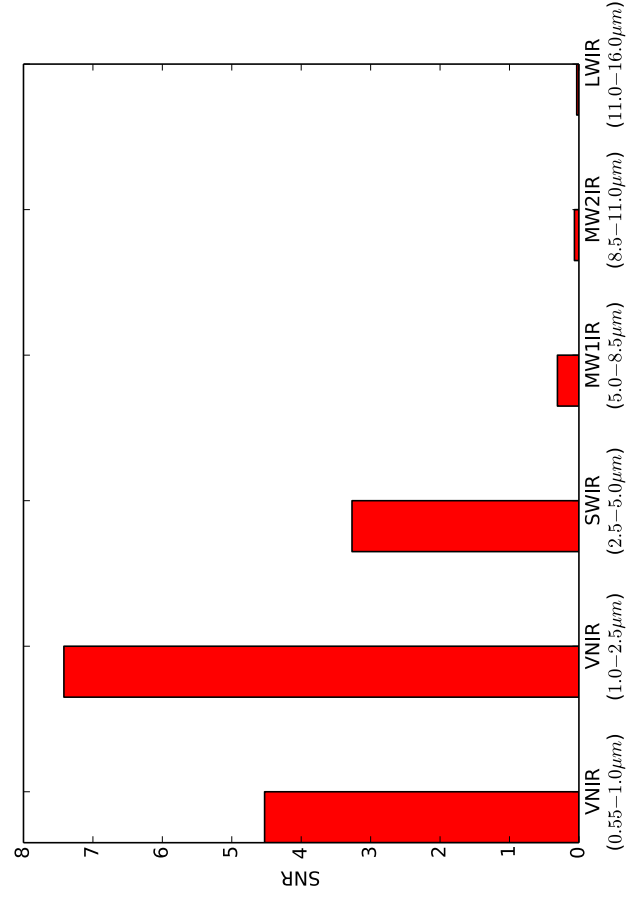
SNR of Kepler-25 c (Primary) Per Channel (1 transit = 17.37h)



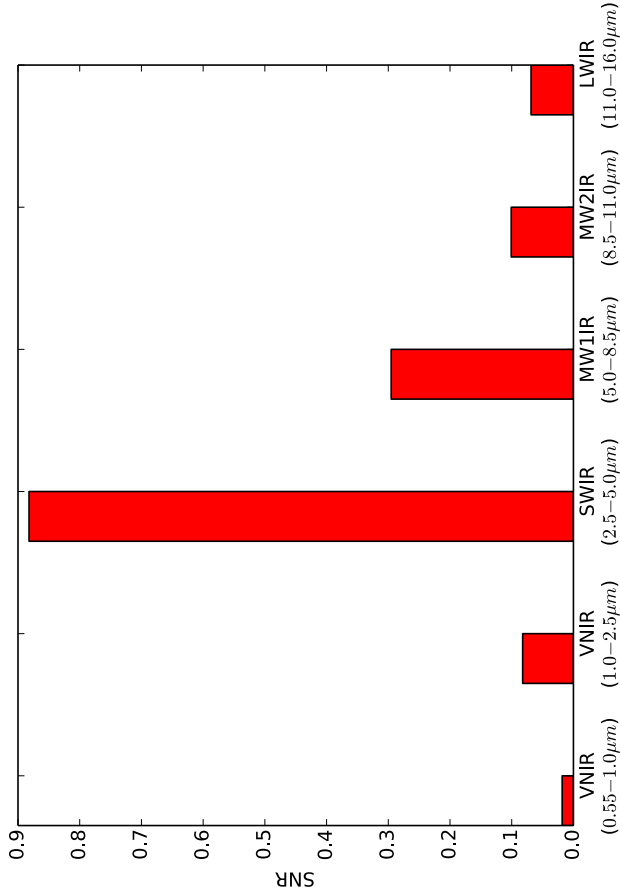
SNR of Kepler-63 b (Secondary) Per Channel (1 eclipse = 8.82h)



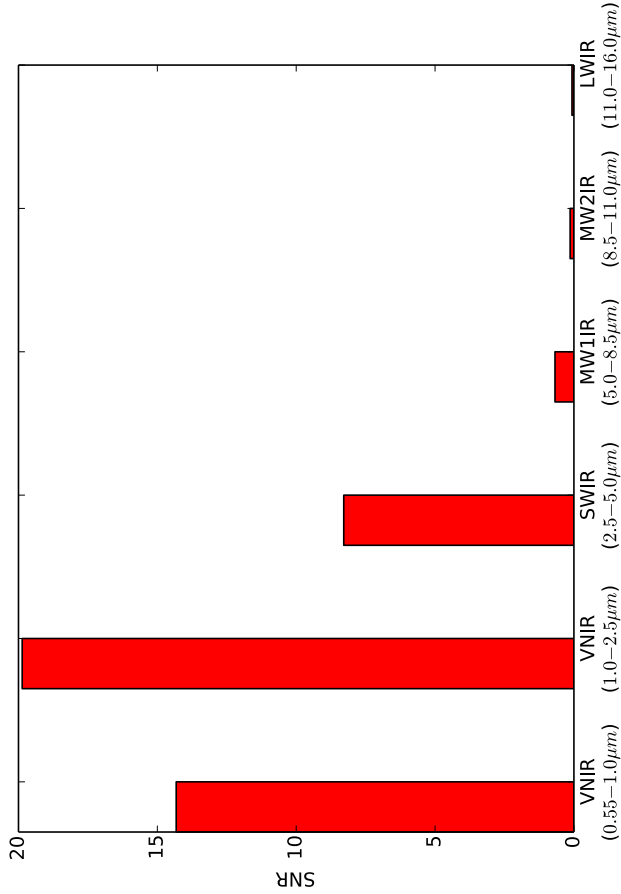
SNR of Kepler-63 b (Primary) Per Channel (1 transit = 8.82h)



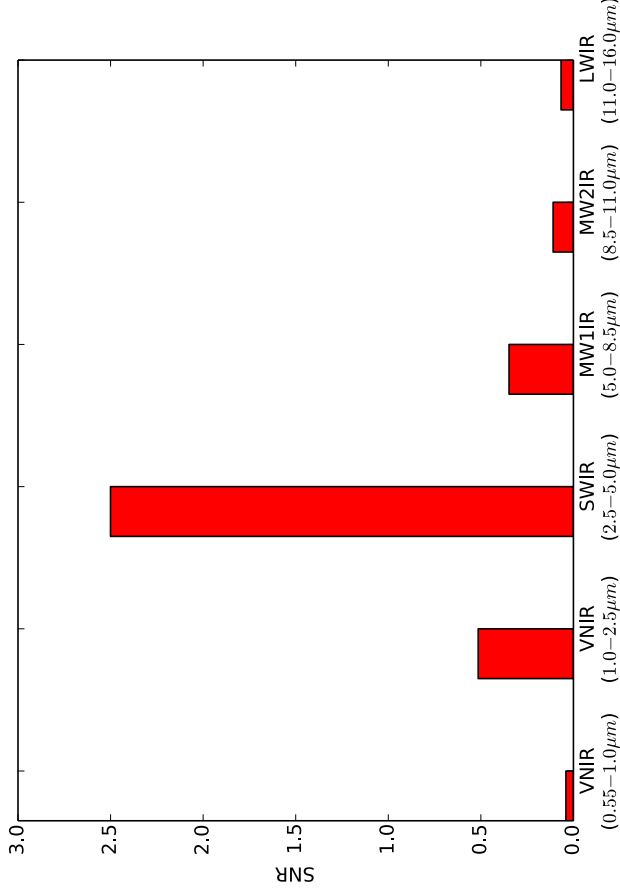
SNR of KOI-94 d (Secondary) Per Channel (1 eclipse = 23.05h)



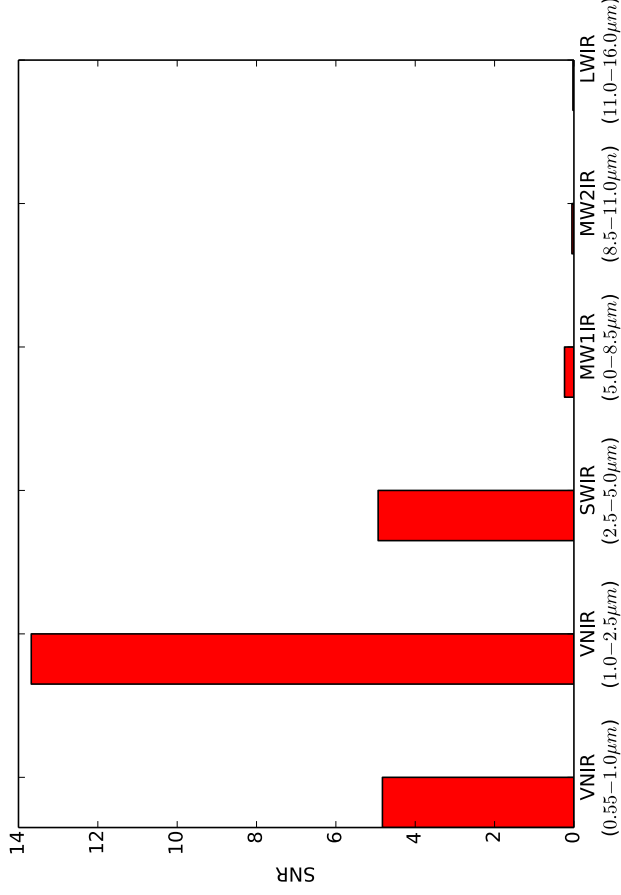
SNR of KOI-94 d (Primary) Per Channel (1 transit = 23.05h)



SNR of KOI-254 b (Secondary) Per Channel (1 eclipse = 5.58h)

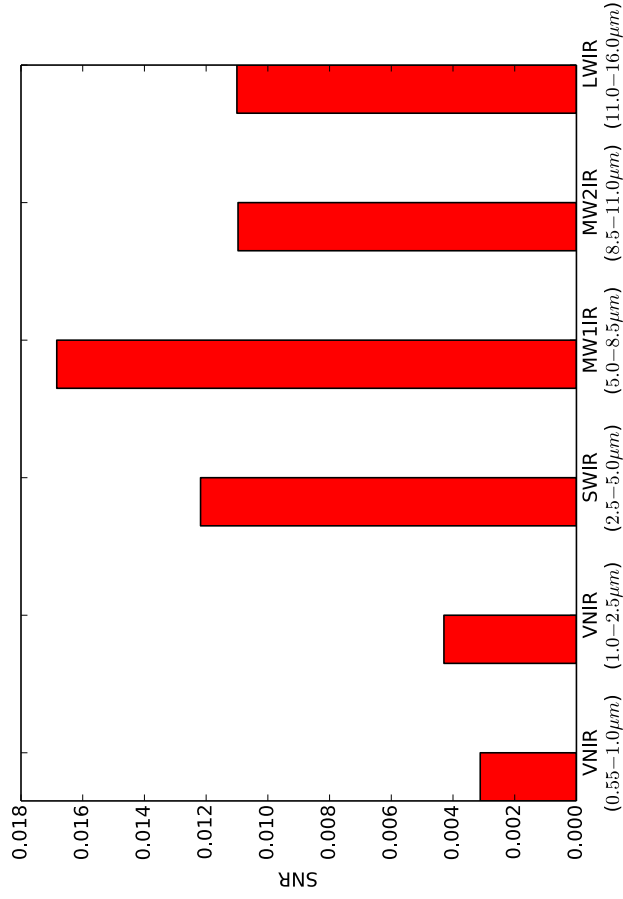


SNR of KOI-254 b (Primary) Per Channel (1 transit = 5.58h)

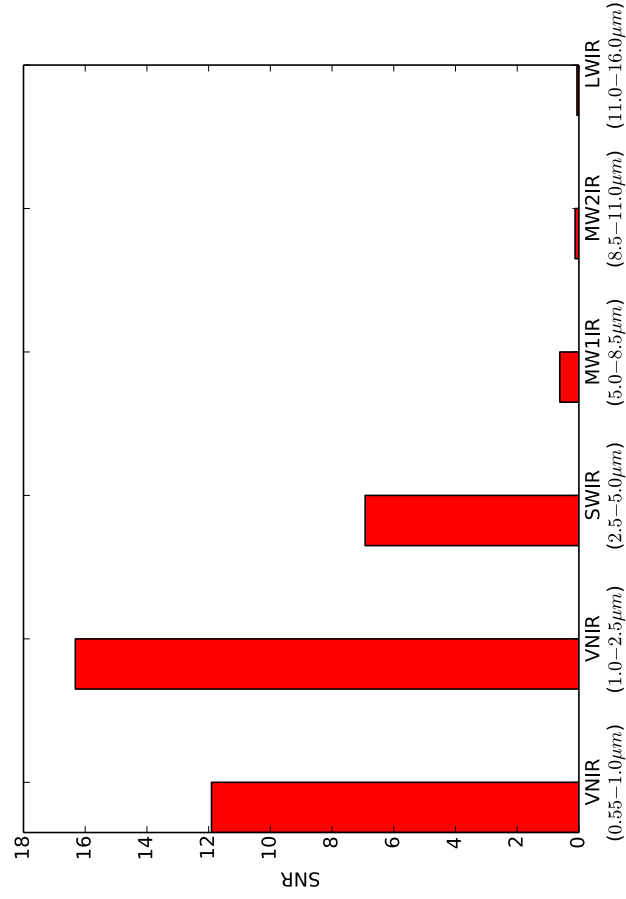




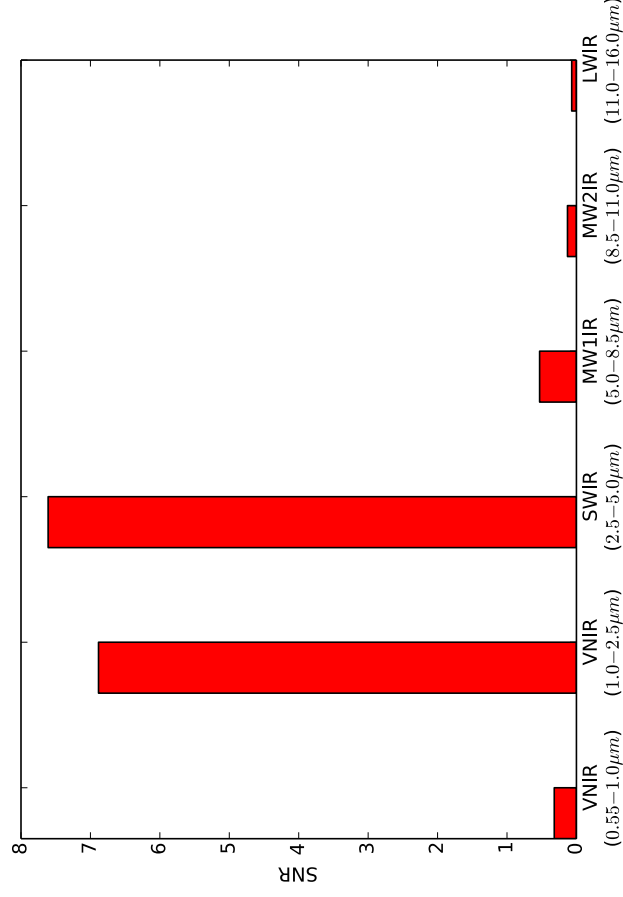
SNR of KOI-2672 b (Secondary) Per Channel (1 eclipse = 27.98h)



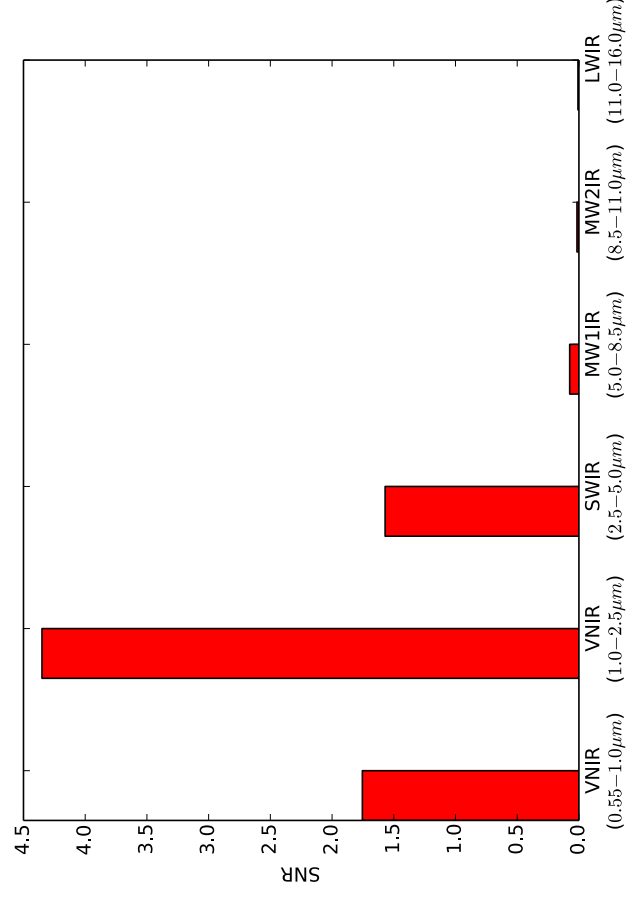
SNR of KOI-2672 b (Primary) Per Channel (1 transit = 27.98h)



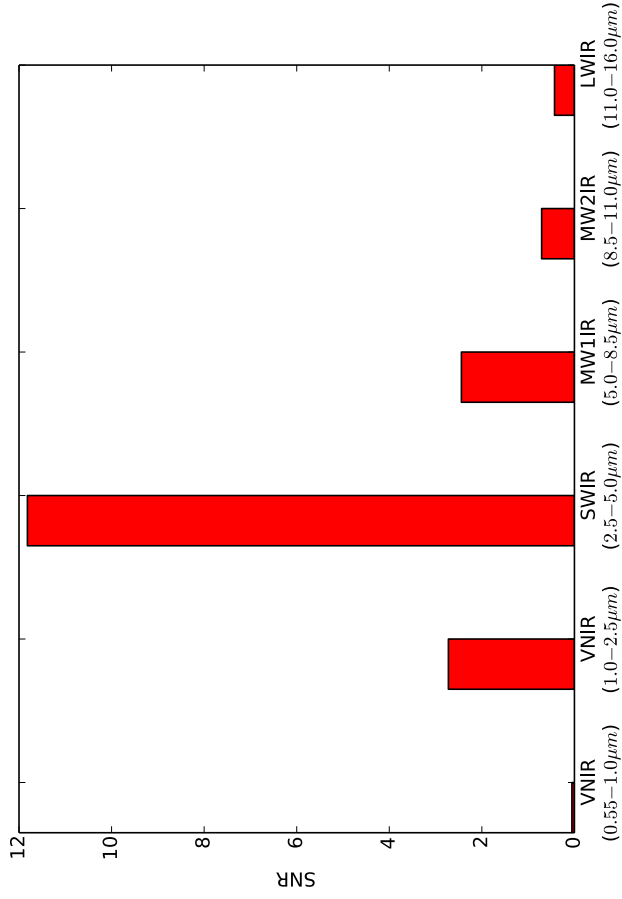
SNR of OGLE2-TR-L9 b (Secondary) Per Channel (1 eclipse = 10.83h)



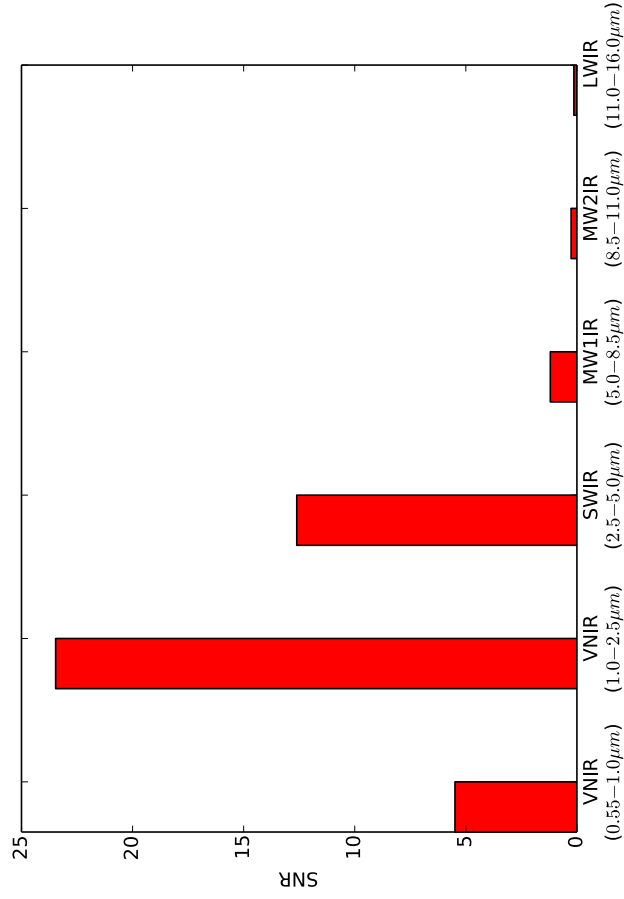
SNR of OGLE2-TR-L9 b (Primary) Per Channel (1 transit = 10.83h)



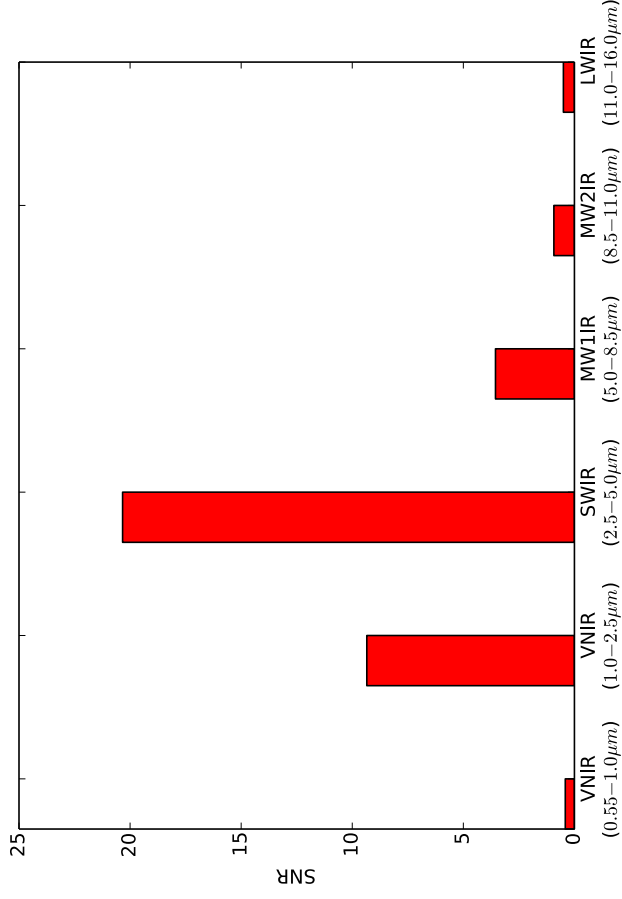
SNR of TrES-1 b (Secondary) Per Channel (1 eclipse = 7.71h)



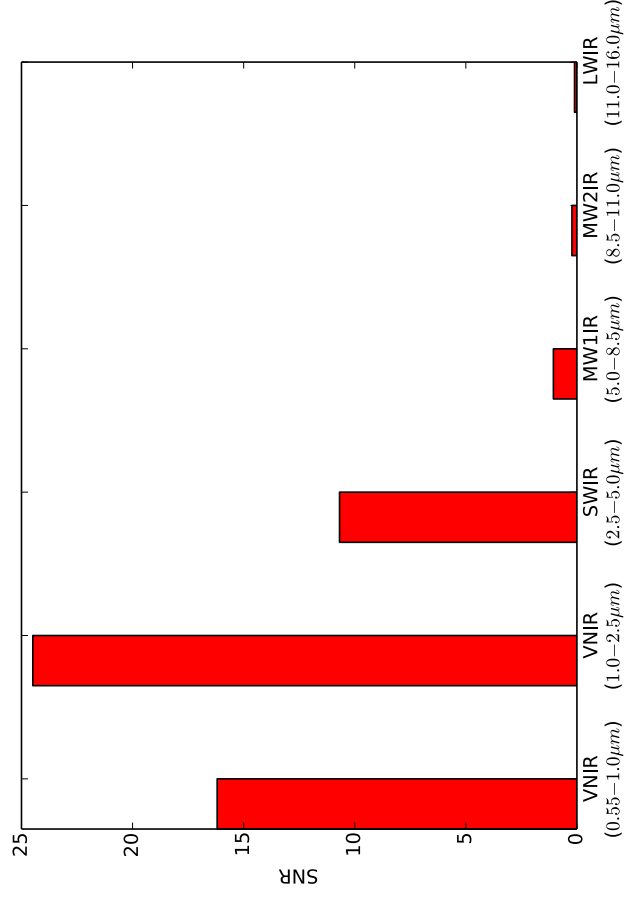
SNR of TrES-1 b (Primary) Per Channel (1 transit = 7.71h)



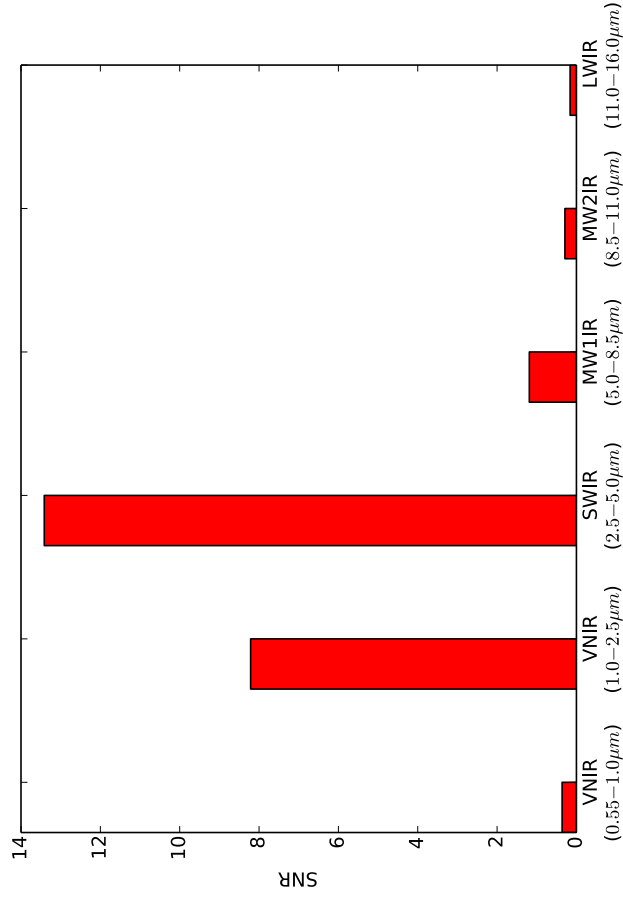
SNR of TrES-2 A b (Secondary) Per Channel (1 eclipse = 5.79h)



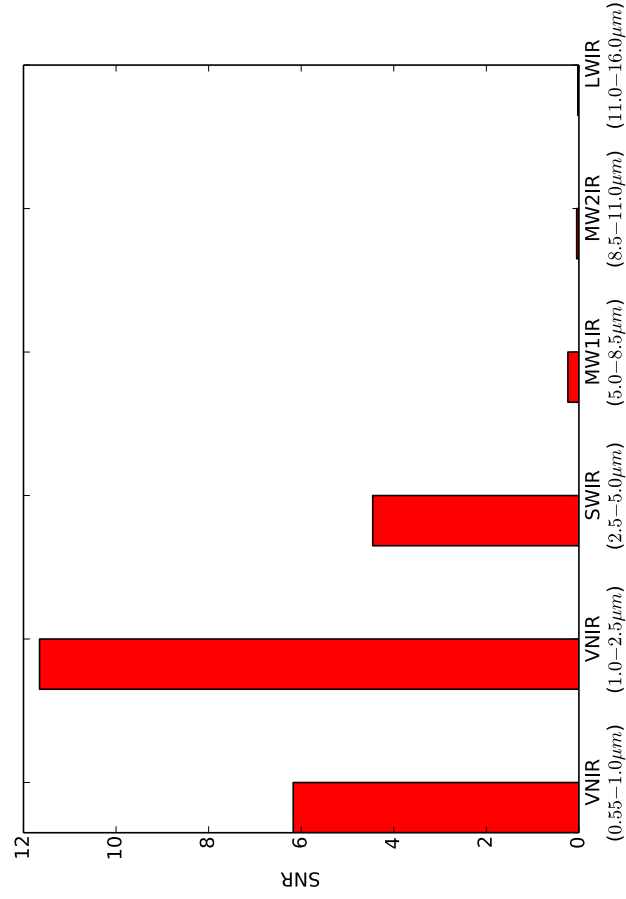
SNR of TrES-2 A b (Primary) Per Channel (1 transit = 5.79h)



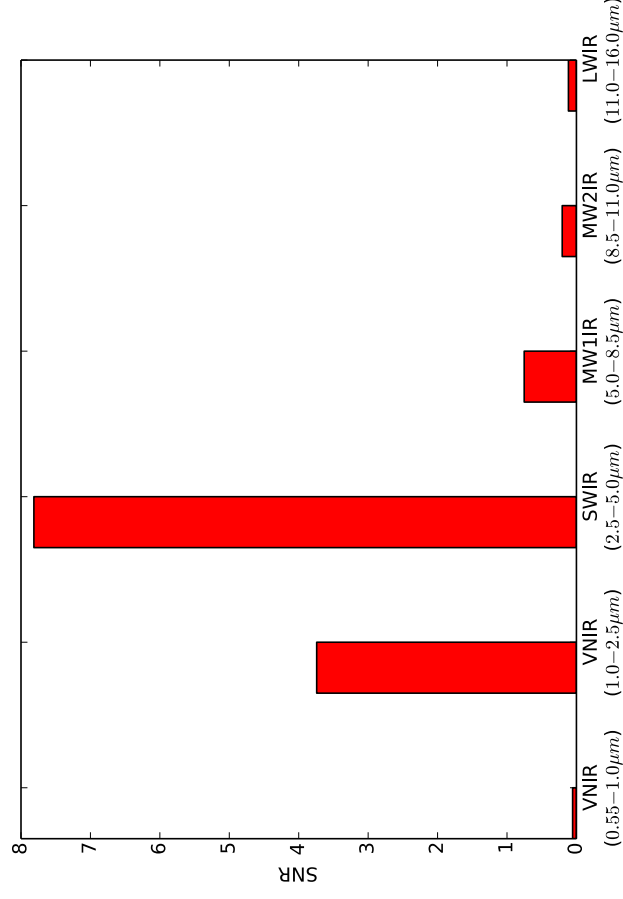
SNR of TrES-3 b (Secondary) Per Channel (1 eclipse = 4.55h)



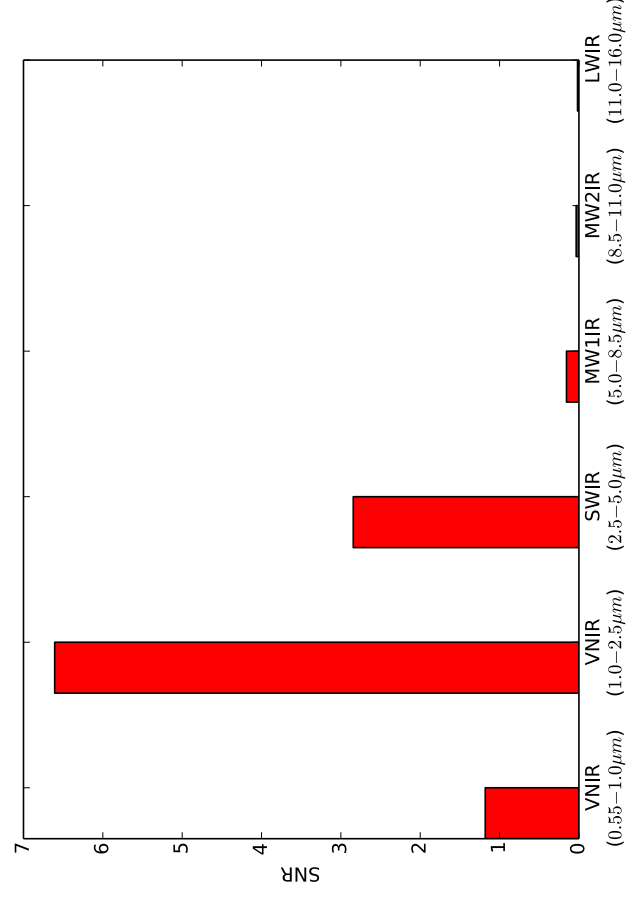
SNR of TrES-3 b (Primary) Per Channel (1 transit = 4.55h)



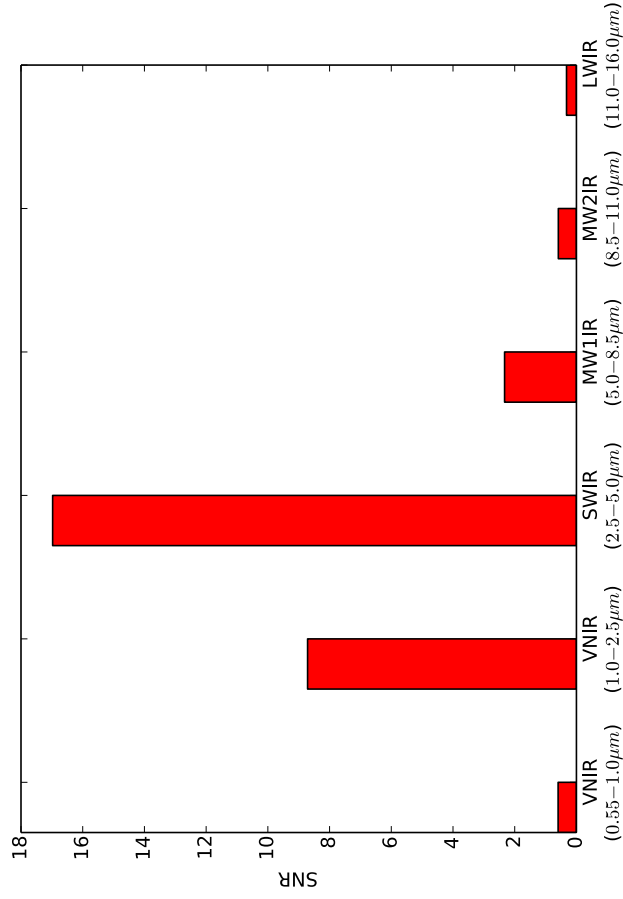
SNR of TrES-5 b (Secondary) Per Channel (1 eclipse = 5.46h)



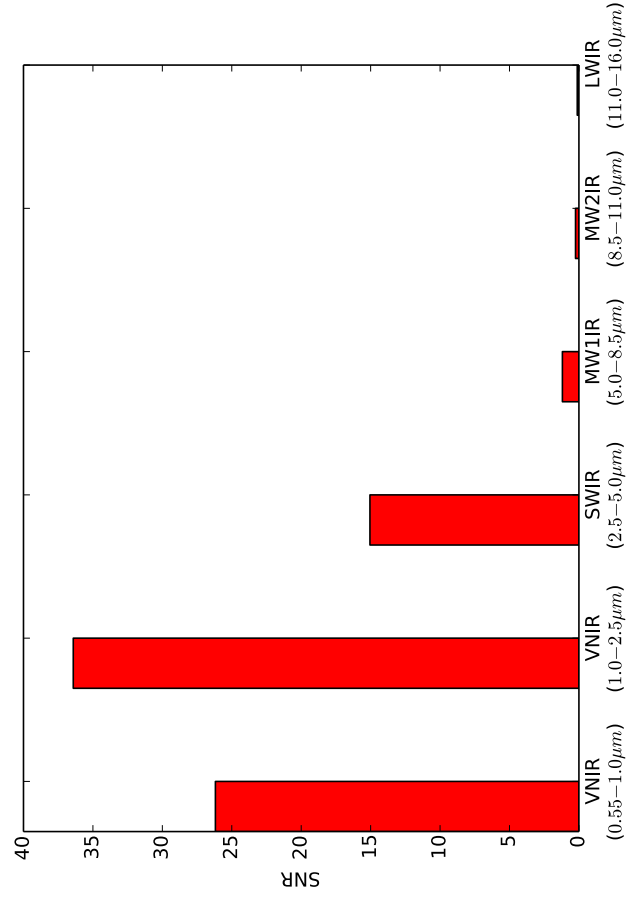
SNR of TrES-5 b (Primary) Per Channel (1 transit = 5.46h)



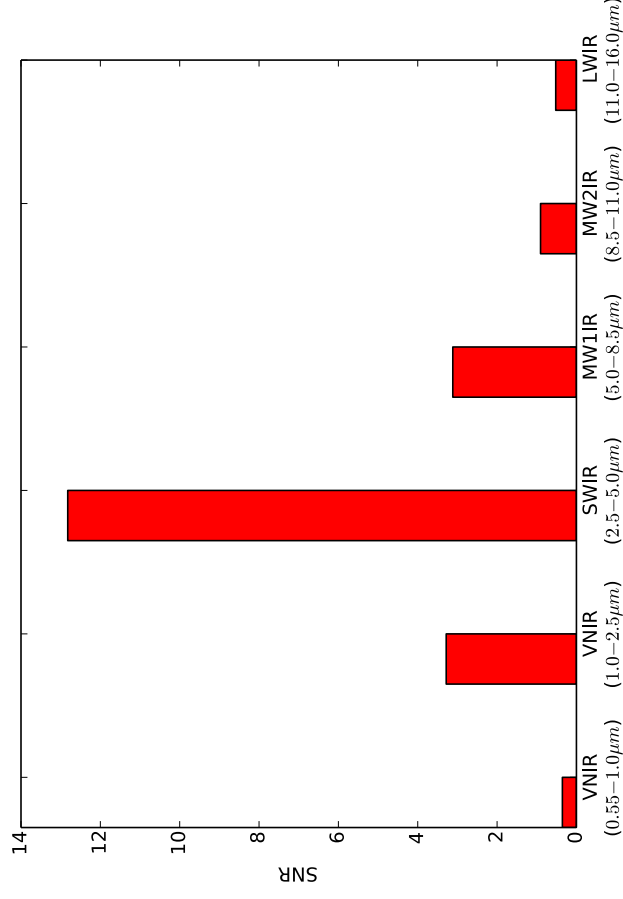
SNR of WASP-1 b (Secondary) Per Channel (1 eclipse = 10.80h)



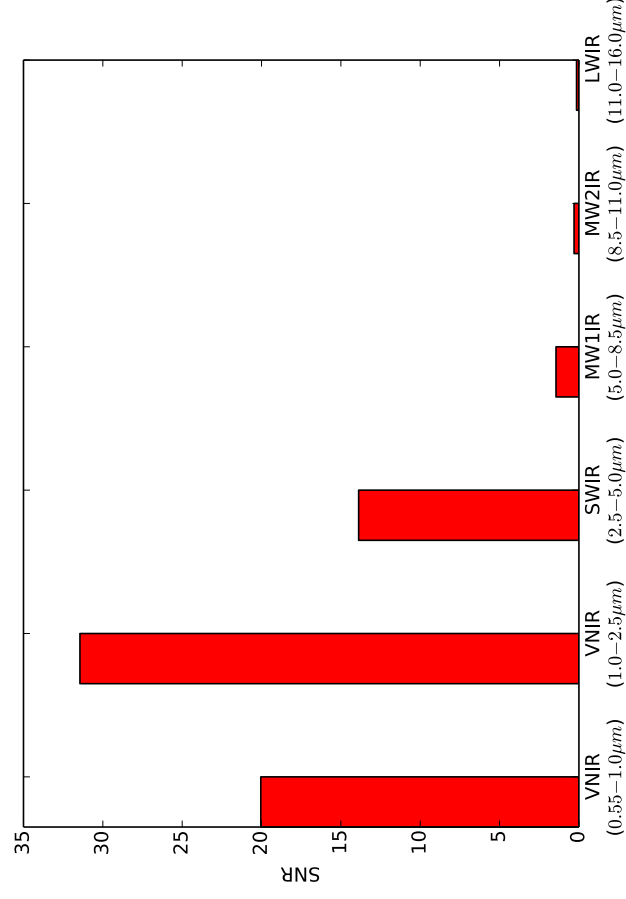
SNR of WASP-1 b (Primary) Per Channel (1 transit = 10.80h)



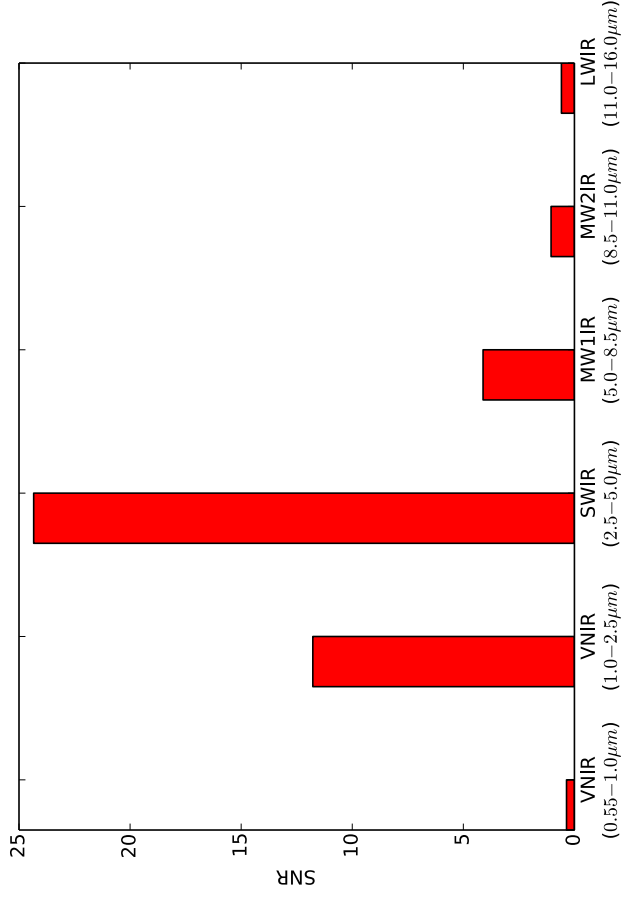
SNR of WASP-2 A b (Secondary) Per Channel (1 eclipse = 5.36h)



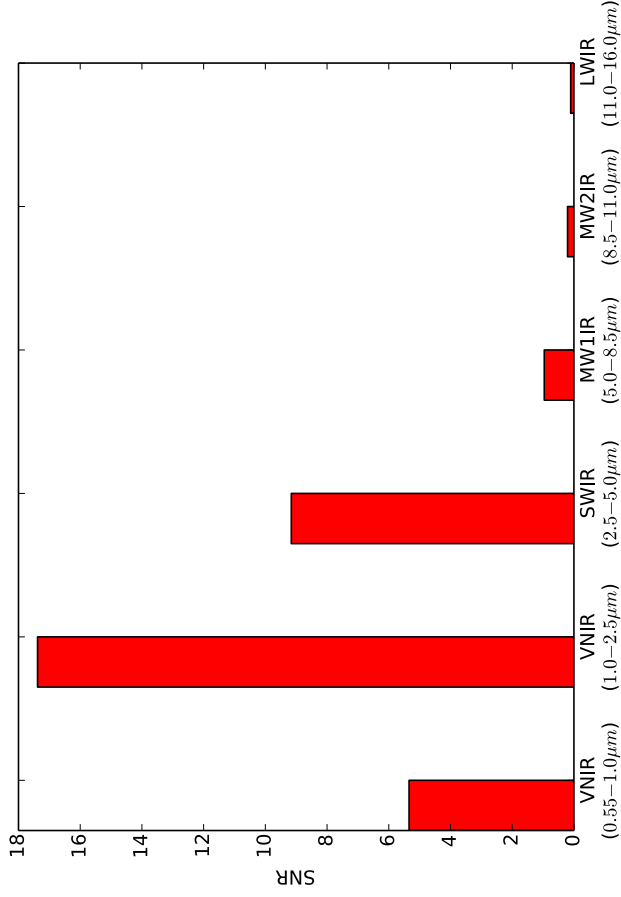
SNR of WASP-2 A b (Primary) Per Channel (1 transit = 5.36h)



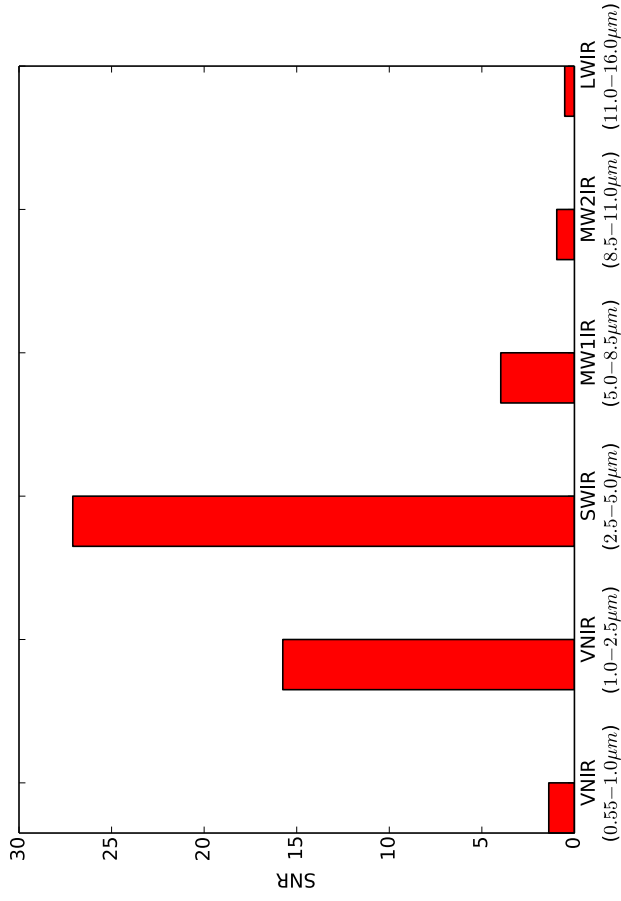
SNR of WASP-3 b (Secondary) Per Channel (1 eclipse = 8.54h)



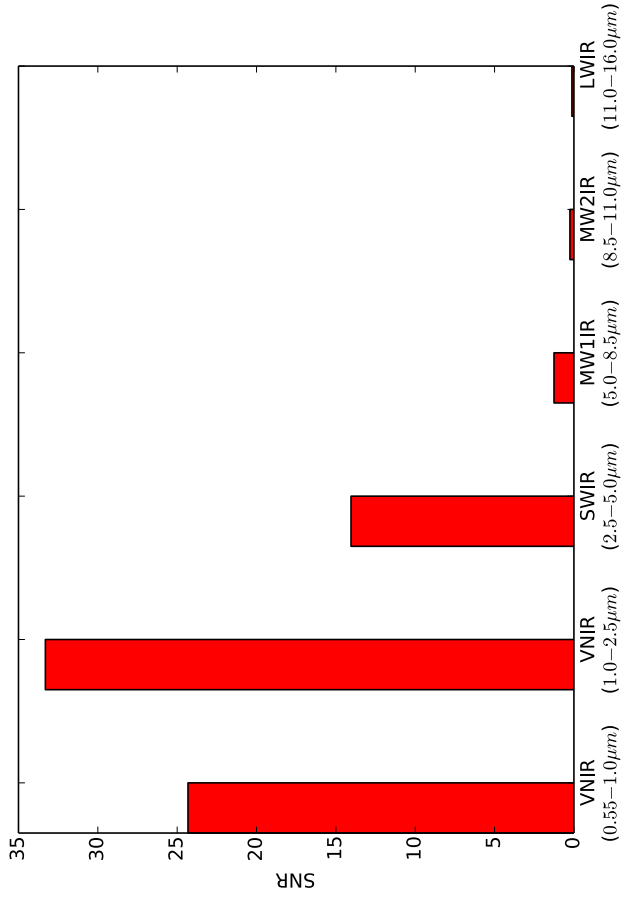
SNR of WASP-3 b (Primary) Per Channel (1 transit = 8.54h)



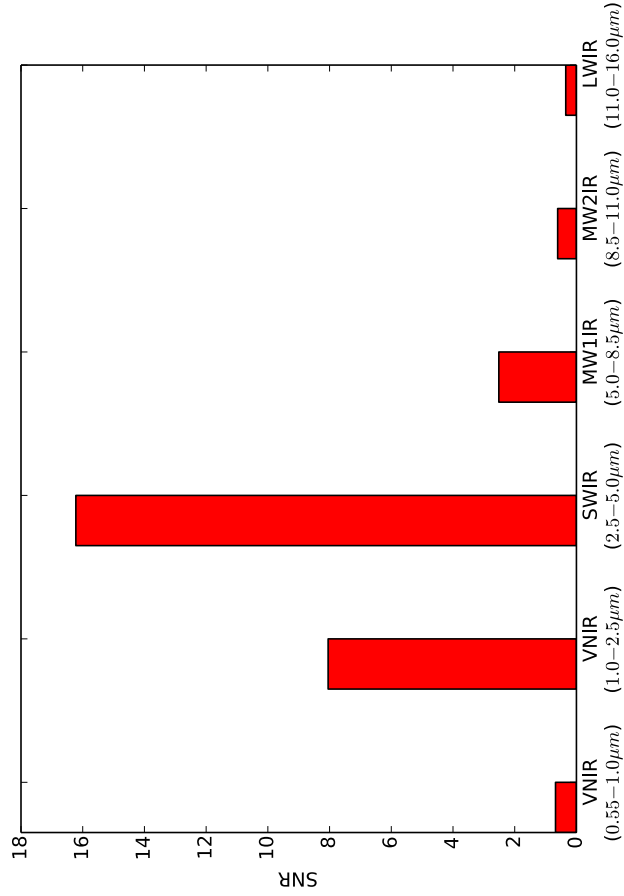
SNR of WASP-4 b (Secondary) Per Channel (1 eclipse = 8.05h)



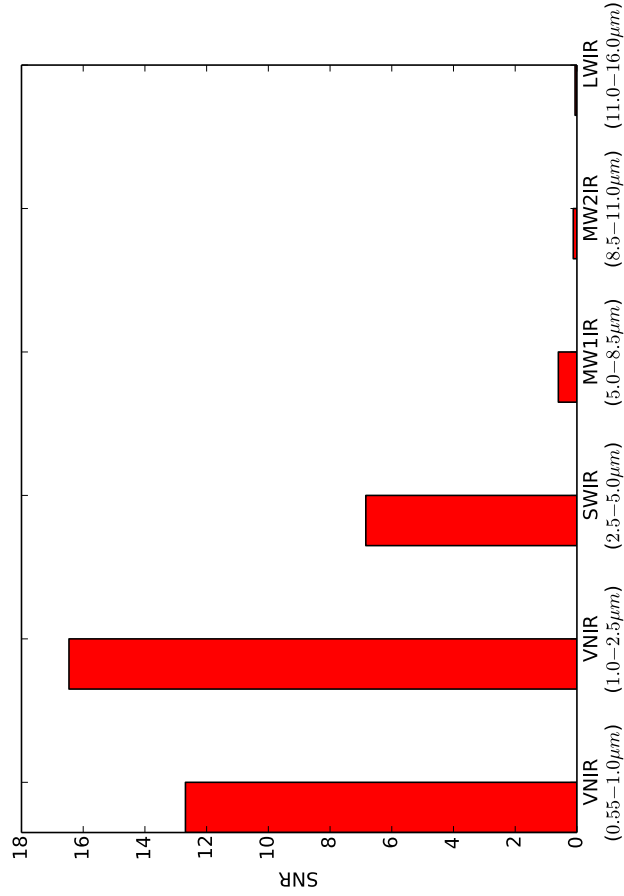
SNR of WASP-4 b (Primary) Per Channel (1 transit = 8.05h)



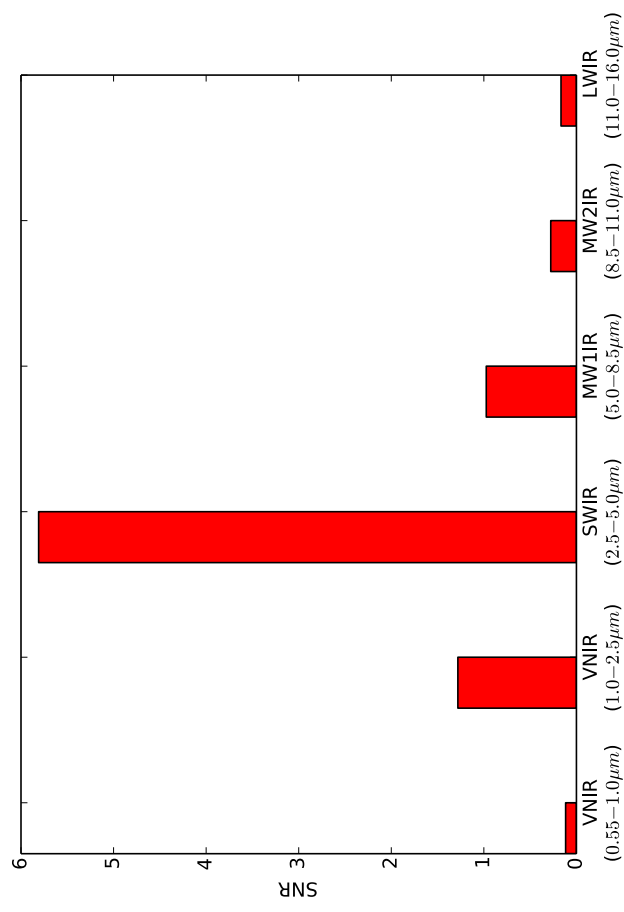
SNR of WASP-5 b (Secondary) Per Channel (1 eclipse = 7.24h)



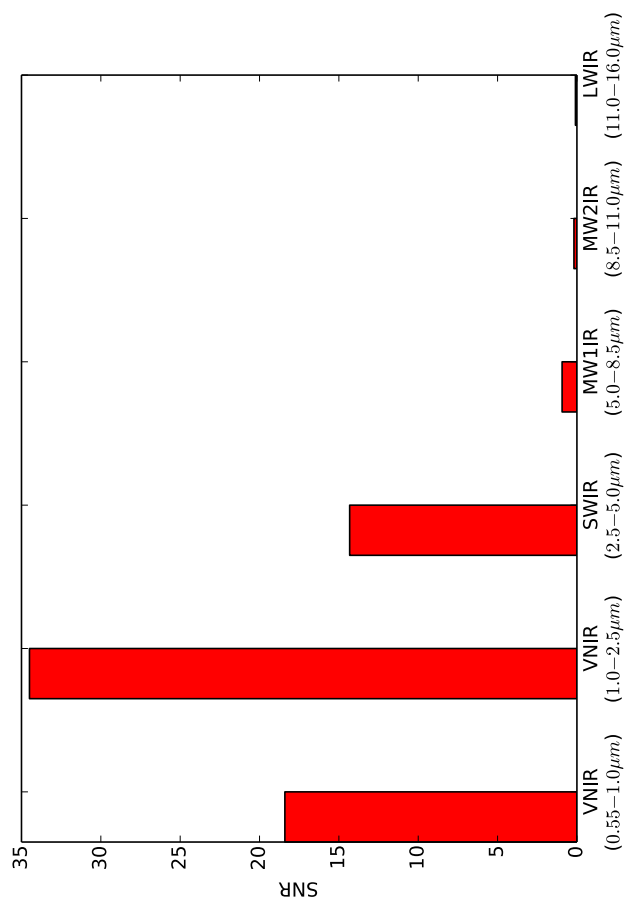
SNR of WASP-5 b (Primary) Per Channel (1 transit = 7.24h)



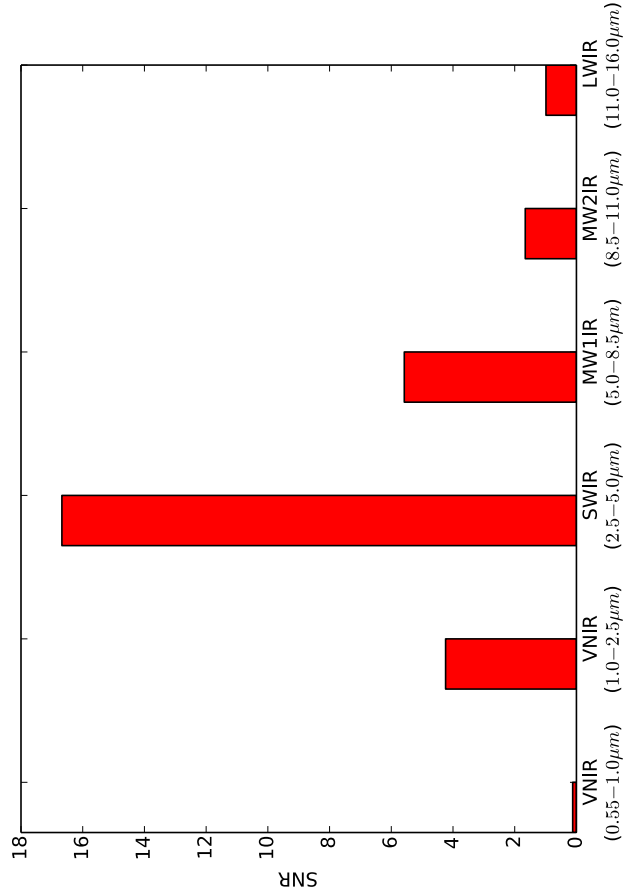
SNR of WASP-6 b (Secondary) Per Channel (1 eclipse = 8.26h)



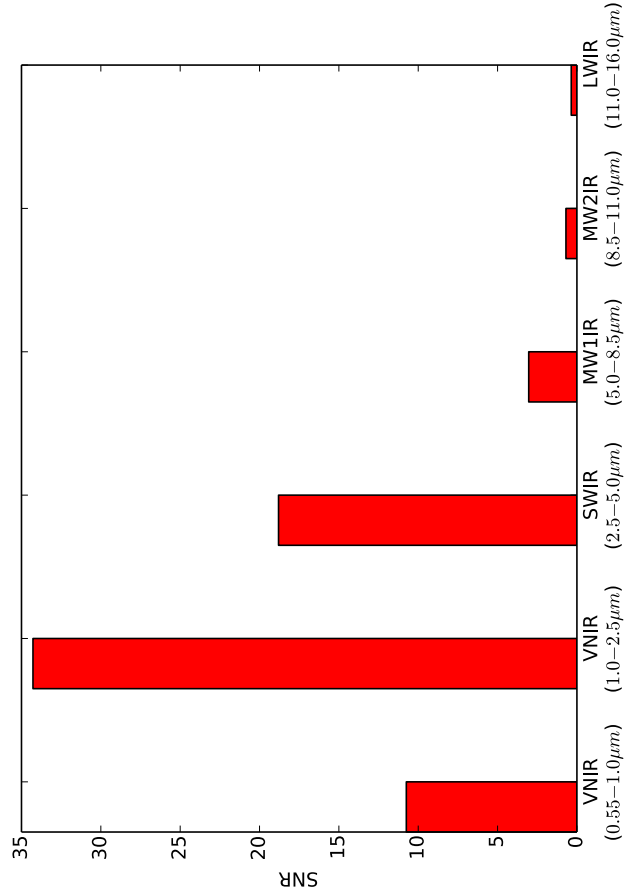
SNR of WASP-6 b (Primary) Per Channel (1 transit = 8.26h)



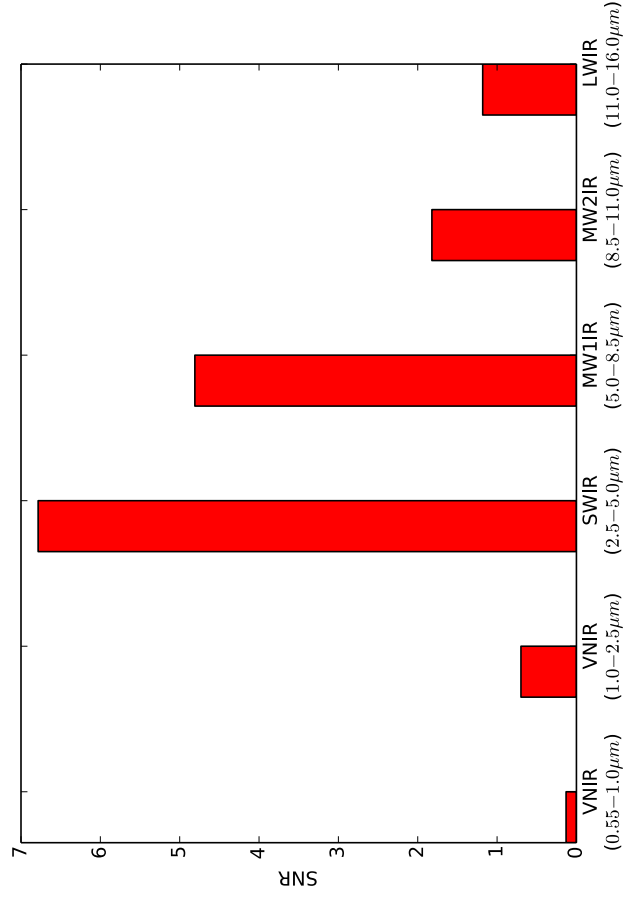
SNR of WASP-7 b (Secondary) Per Channel (1 eclipse = 12.15h)



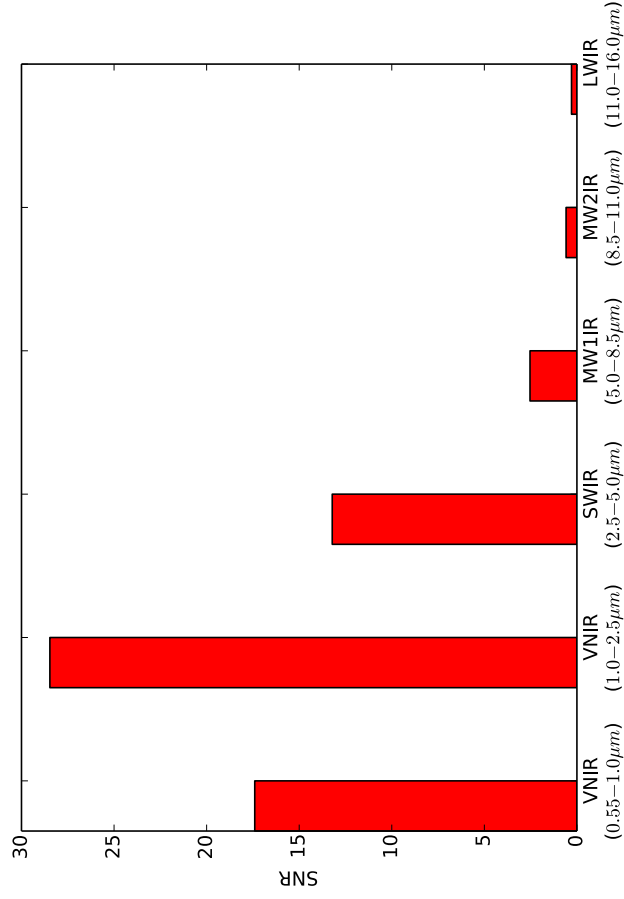
SNR of WASP-7 b (Primary) Per Channel (1 transit = 12.15h)



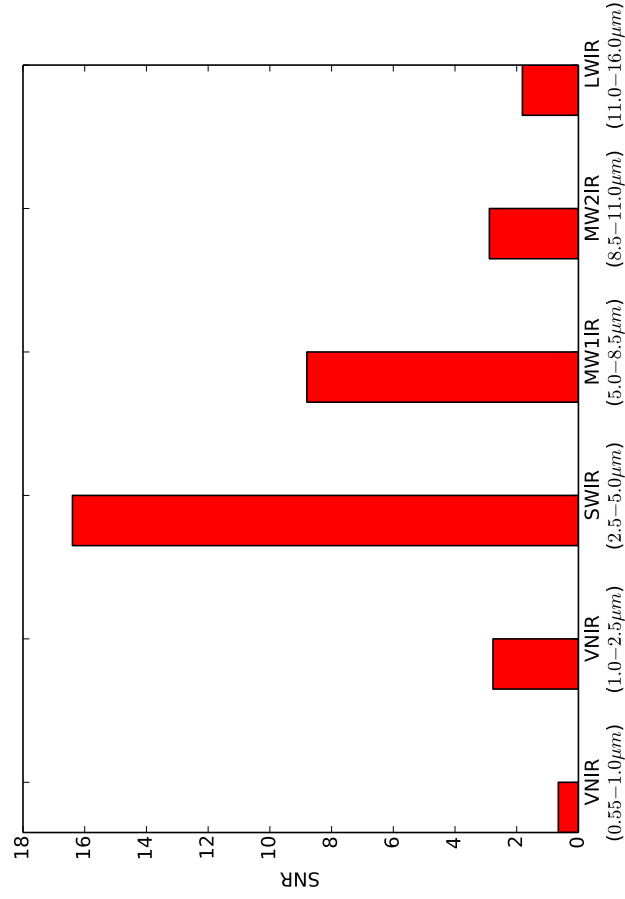
SNR of WASP-8 b (Secondary) Per Channel (1 eclipse = 10.53h)



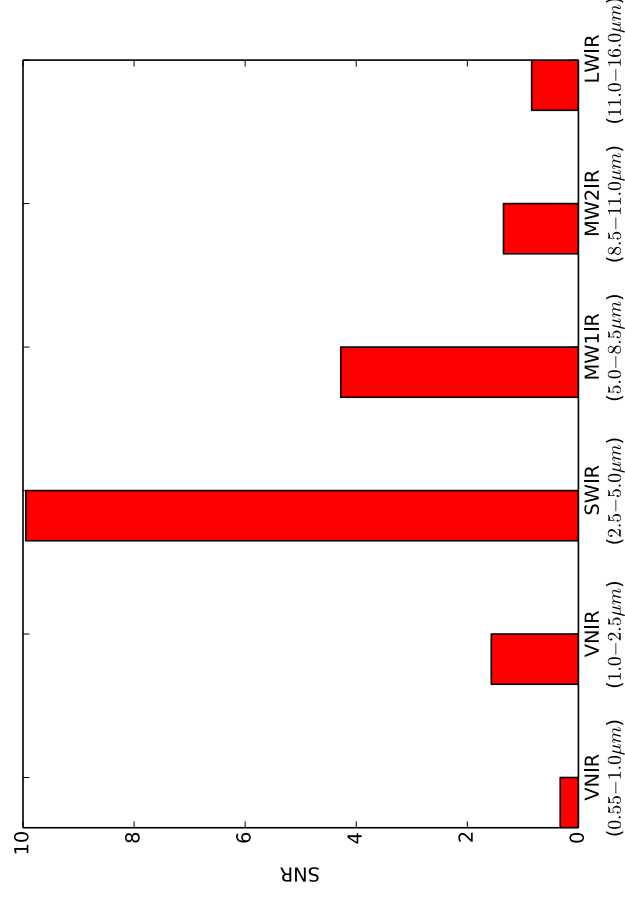
SNR of WASP-8 b (Primary) Per Channel (1 transit = 10.53h)



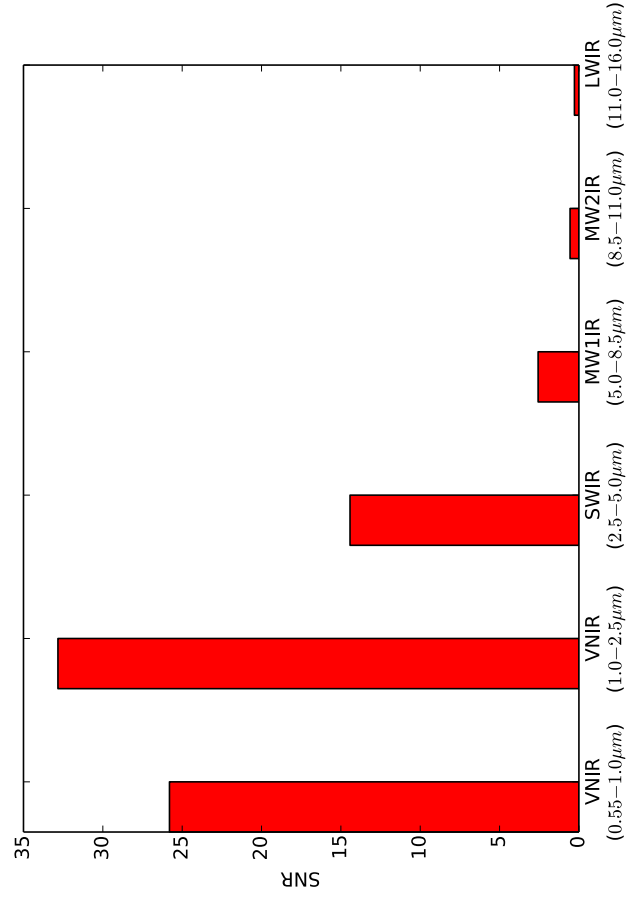
SNR of WASP-10 b (Secondary) Per Channel (1 eclipse = 6.93h)



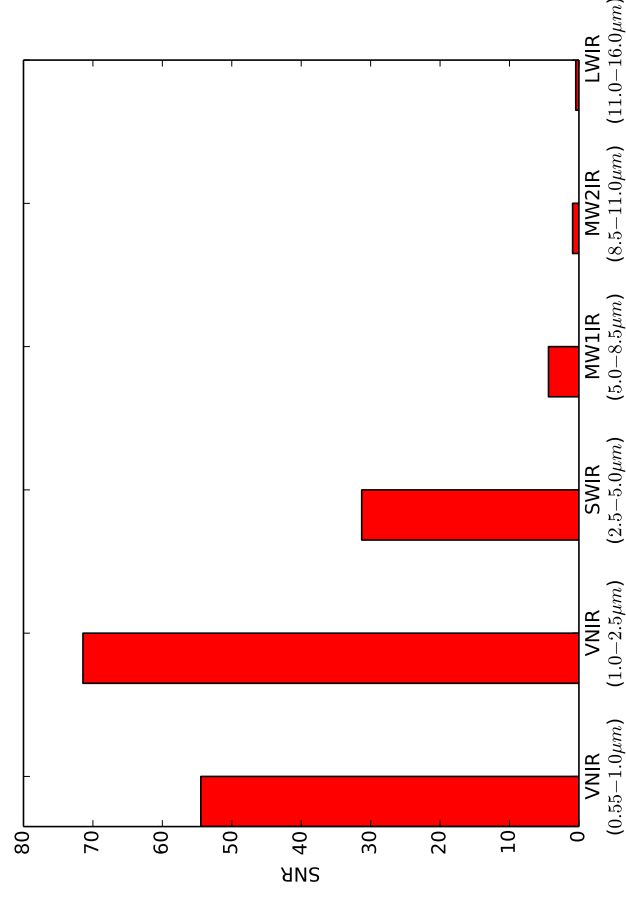
SNR of WASP-11 b (Secondary) Per Channel (1 eclipse = 8.02h)



SNR of WASP-10 b (Primary) Per Channel (1 transit = 6.93h)

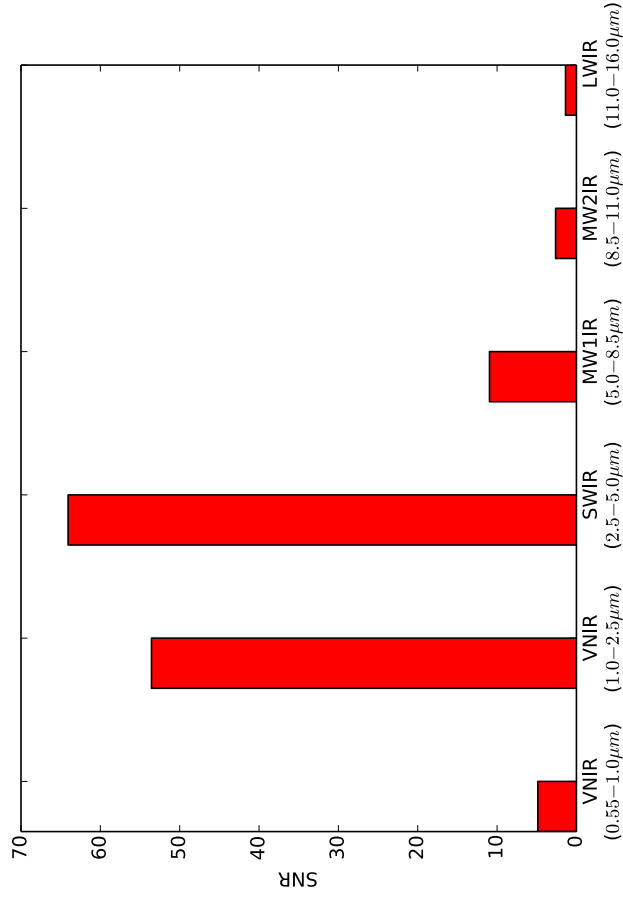


SNR of WASP-11 b (Primary) Per Channel (1 transit = 8.02h)

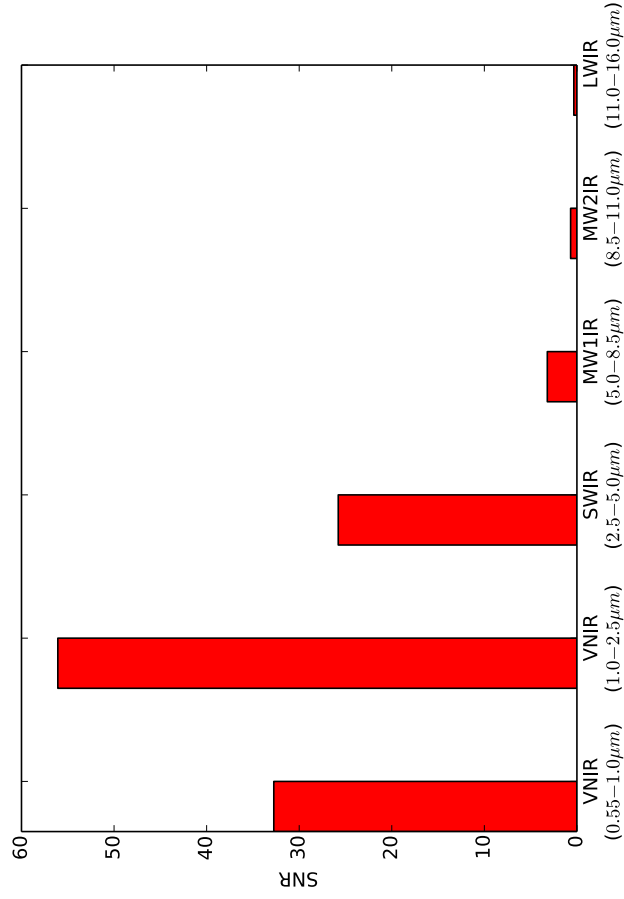




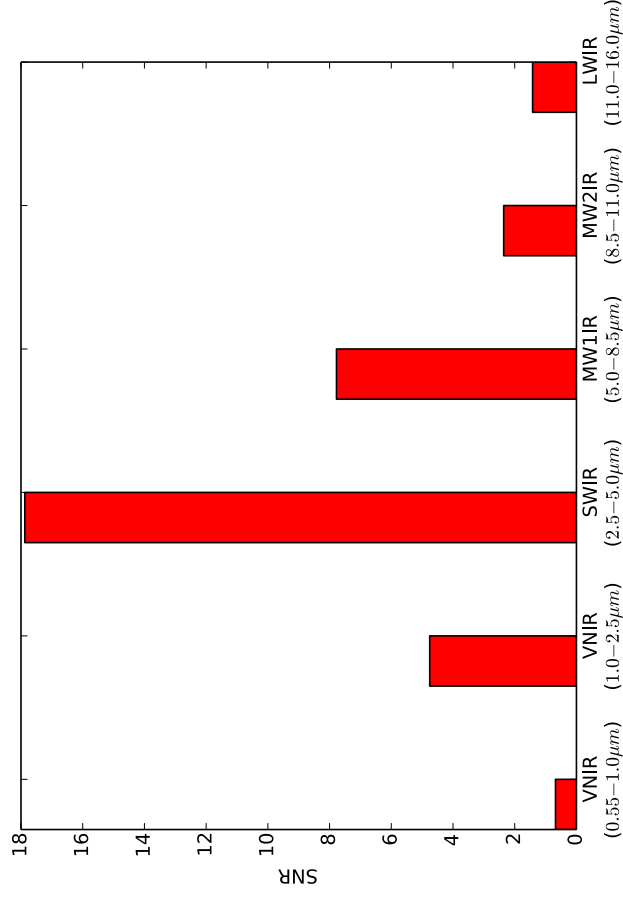
SNR of WASP-12 b (Secondary) Per Channel (1 eclipse = 9.09h)



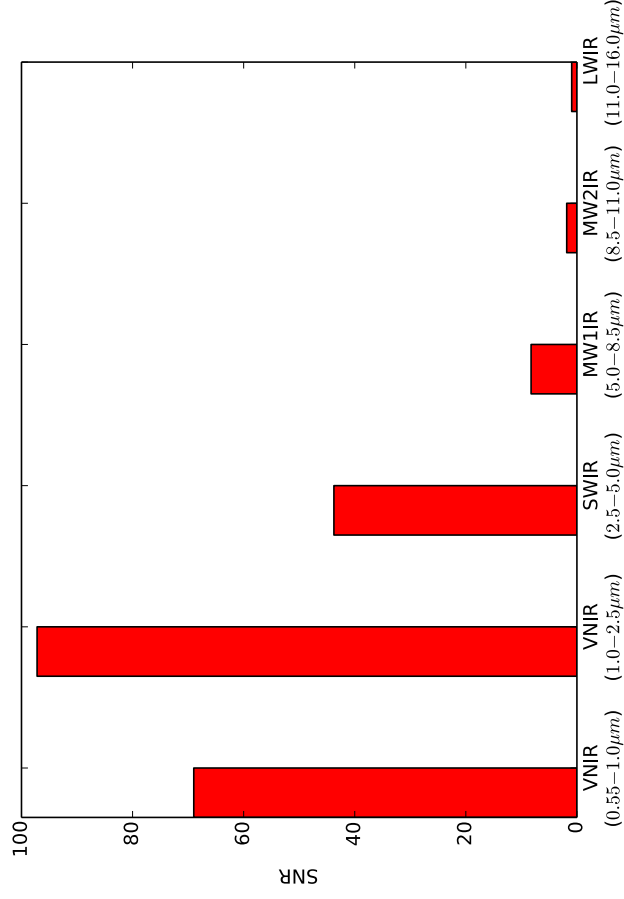
SNR of WASP-12 b (Primary) Per Channel (1 transit = 9.09h)



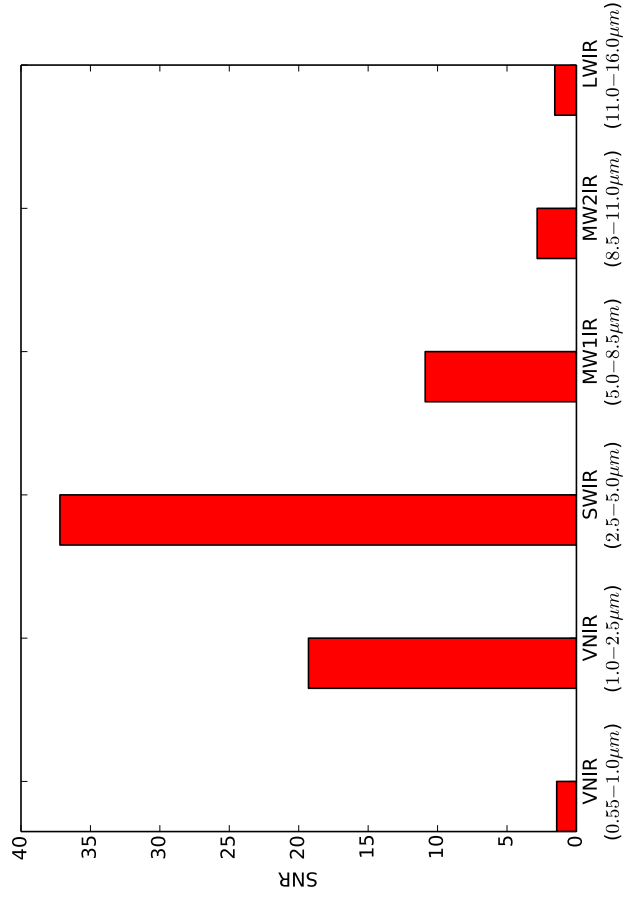
SNR of WASP-13 b (Secondary) Per Channel (1 eclipse = 12.69h)



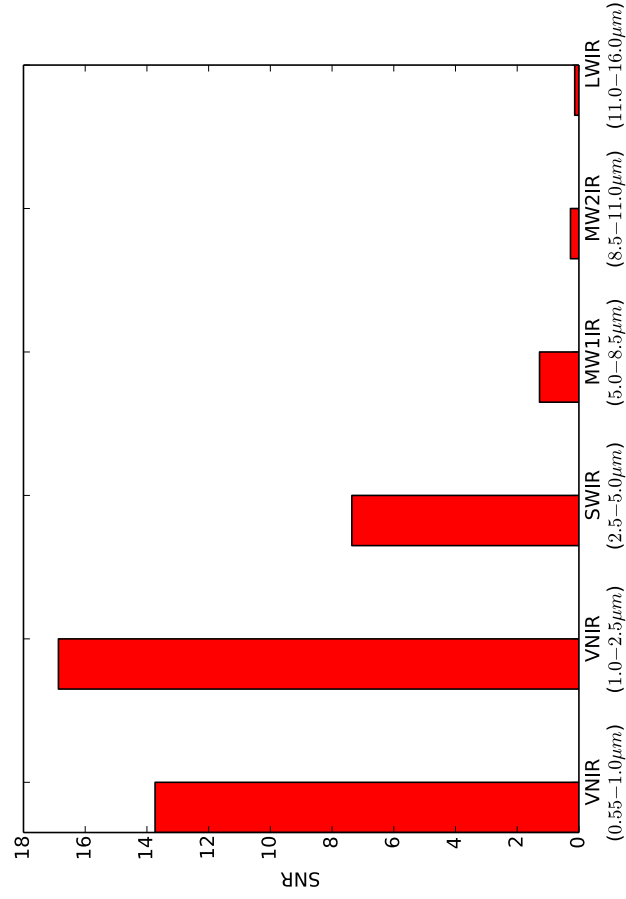
SNR of WASP-13 b (Primary) Per Channel (1 transit = 12.69h)



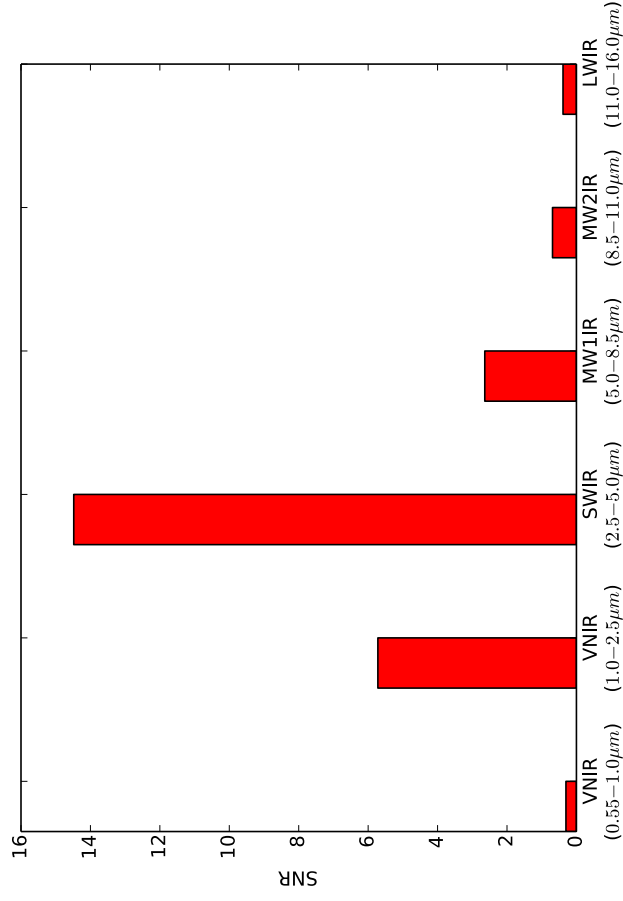
SNR of WASP-14 b (Secondary) Per Channel (1 eclipse = 8.44h)



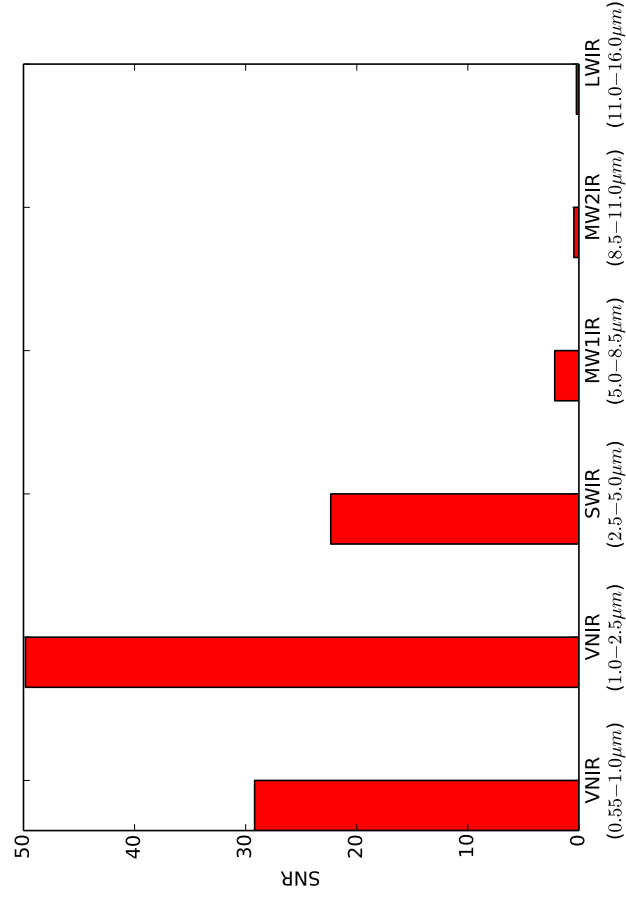
SNR of WASP-14 b (Primary) Per Channel (1 transit = 8.44h)



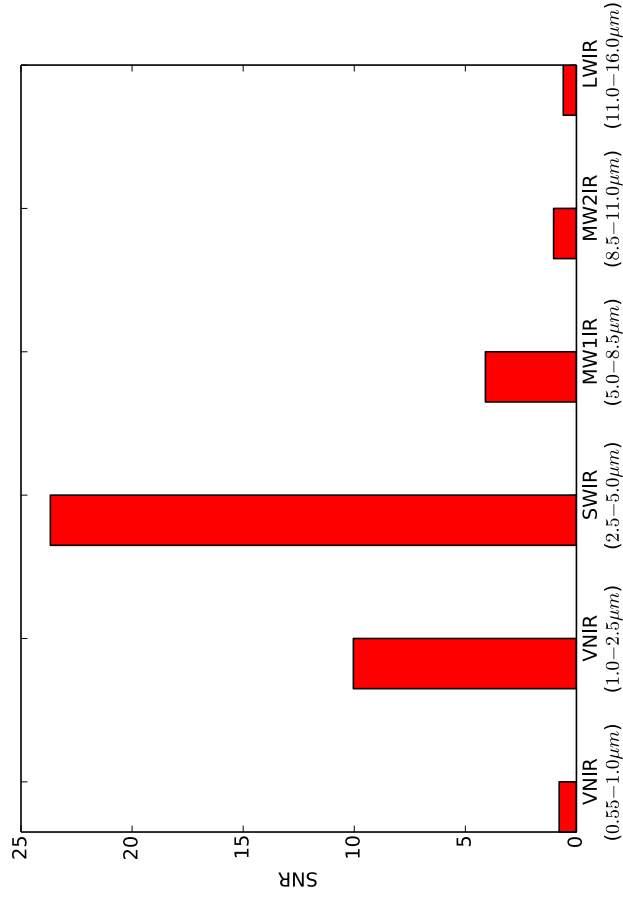
SNR of WASP-15 b (Secondary) Per Channel (1 eclipse = 11.24h)



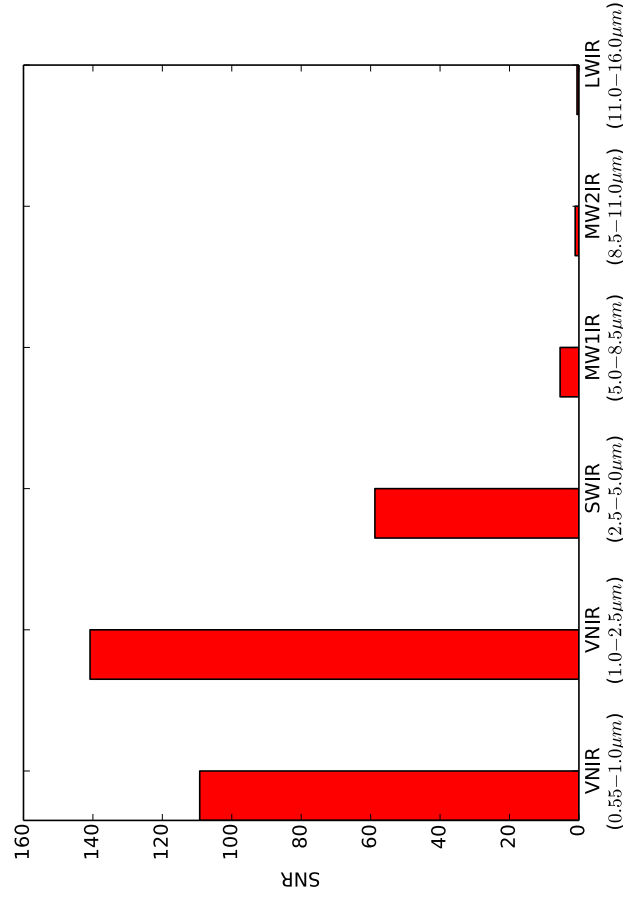
SNR of WASP-15 b (Primary) Per Channel (1 transit = 11.24h)



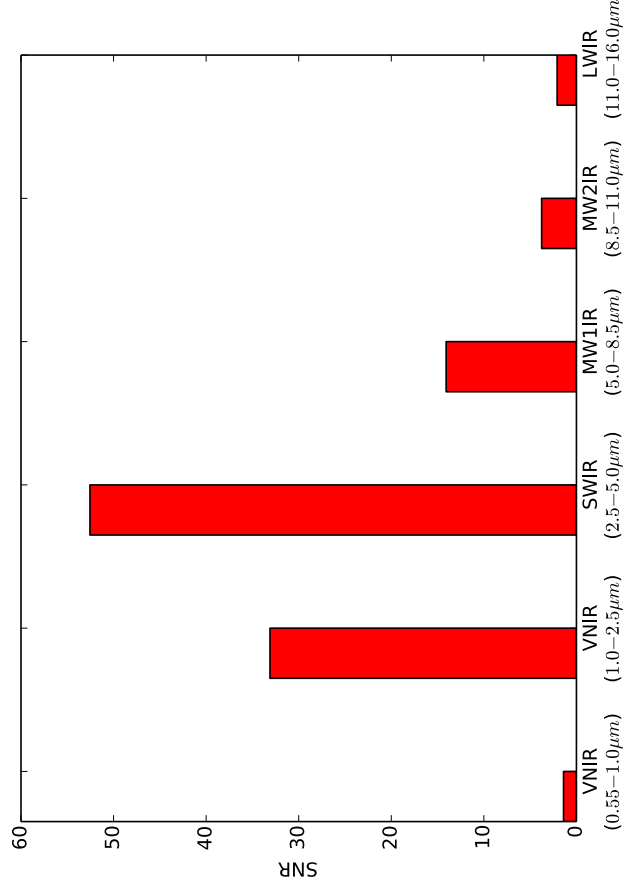
SNR of WASP-17 b (Secondary) Per Channel (1 eclipse = 13.00h)



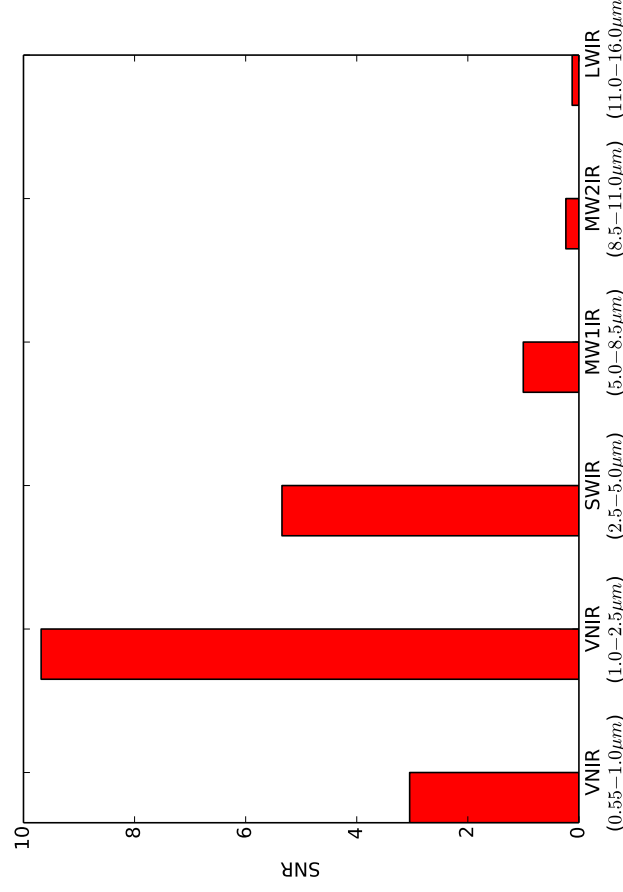
SNR of WASP-17 b (Primary) Per Channel (1 transit = 13.00h)



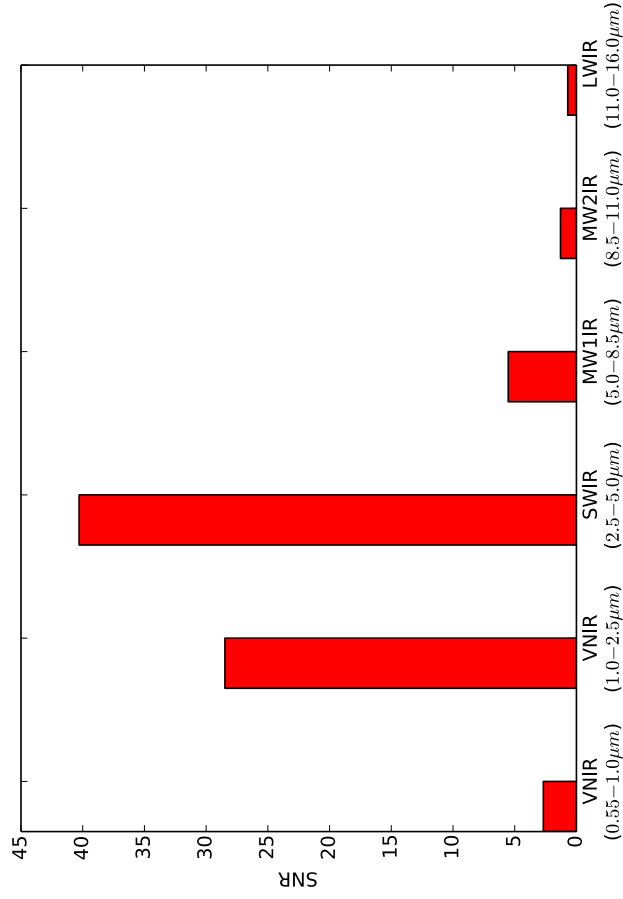
SNR of WASP-18 b (Secondary) Per Channel (1 eclipse = 6.58h)



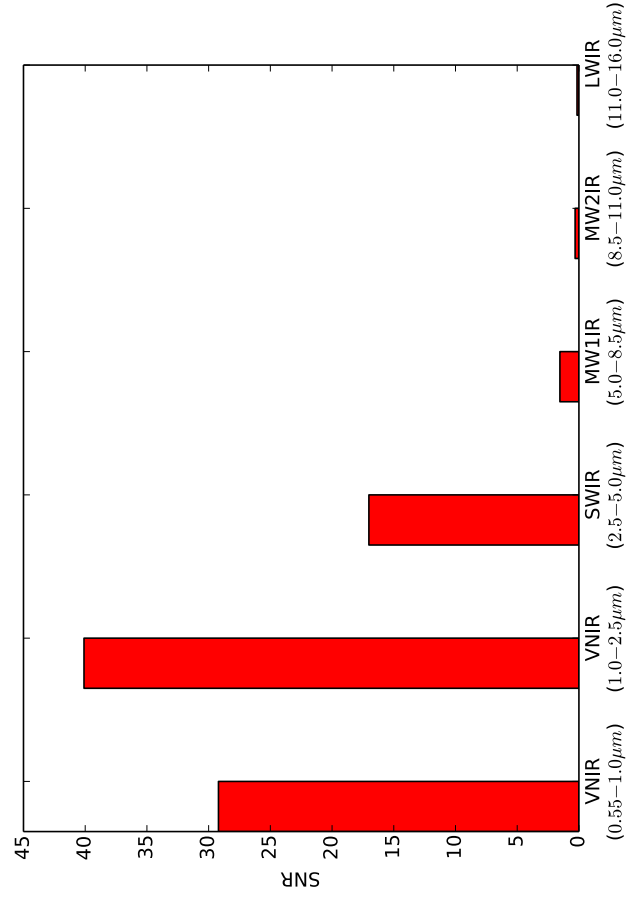
SNR of WASP-18 b (Primary) Per Channel (1 transit = 6.58h)



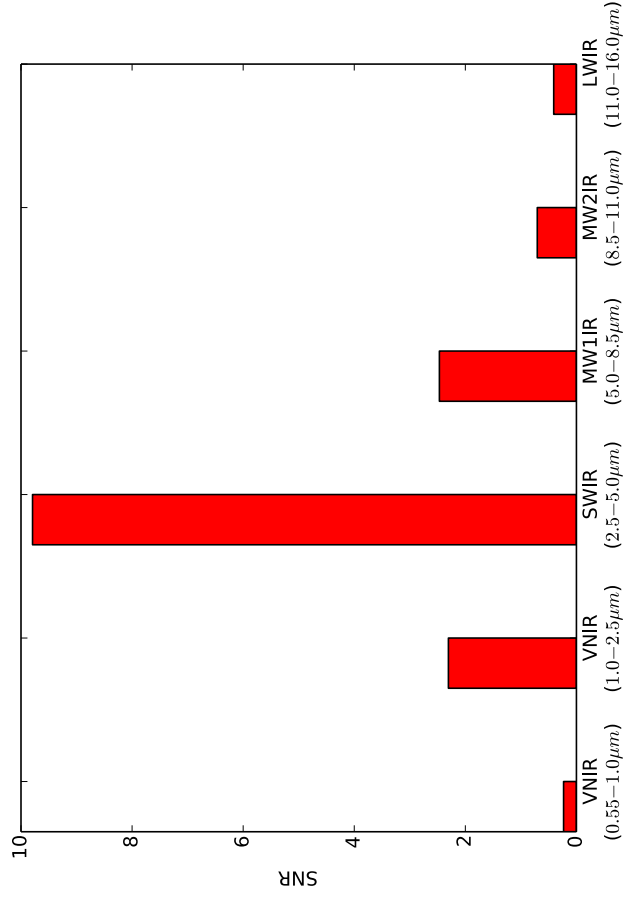
SNR of WASP-19 b (Secondary) Per Channel (1 eclipse = 4.85h)



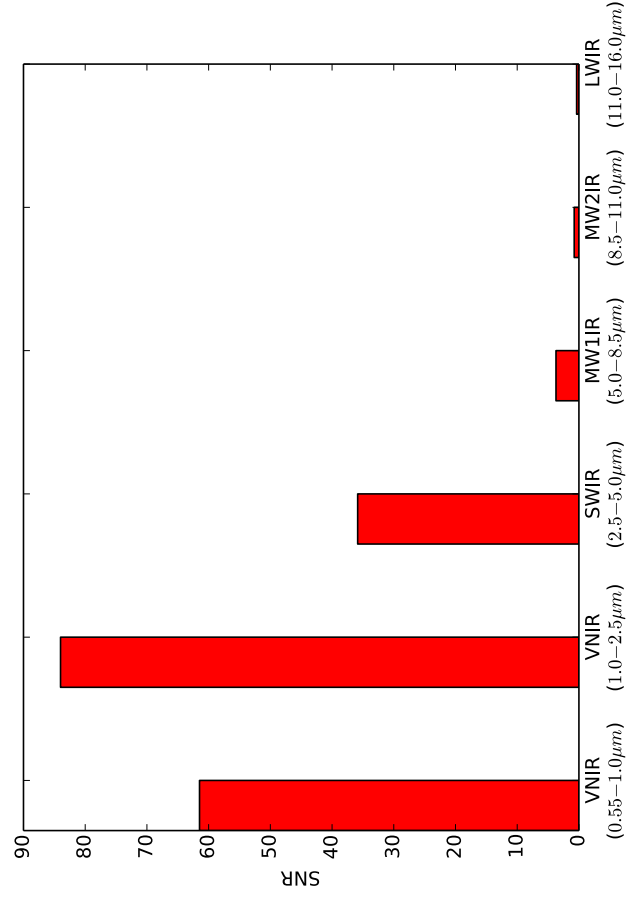
SNR of WASP-19 b (Primary) Per Channel (1 transit = 4.85h)



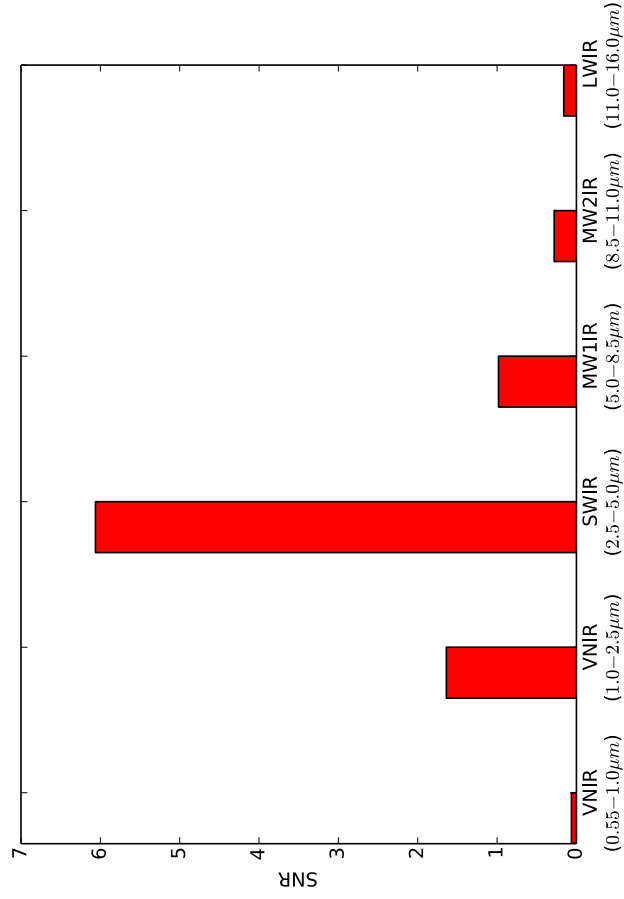
SNR of WASP-21 b (Secondary) Per Channel (1 eclipse = 9.44h)



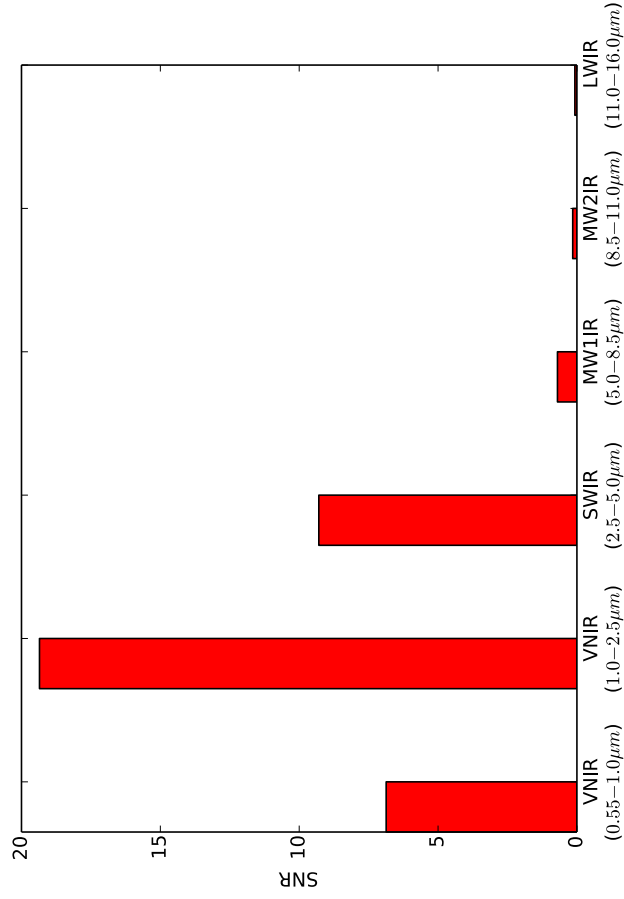
SNR of WASP-21 b (Primary) Per Channel (1 transit = 9.44h)



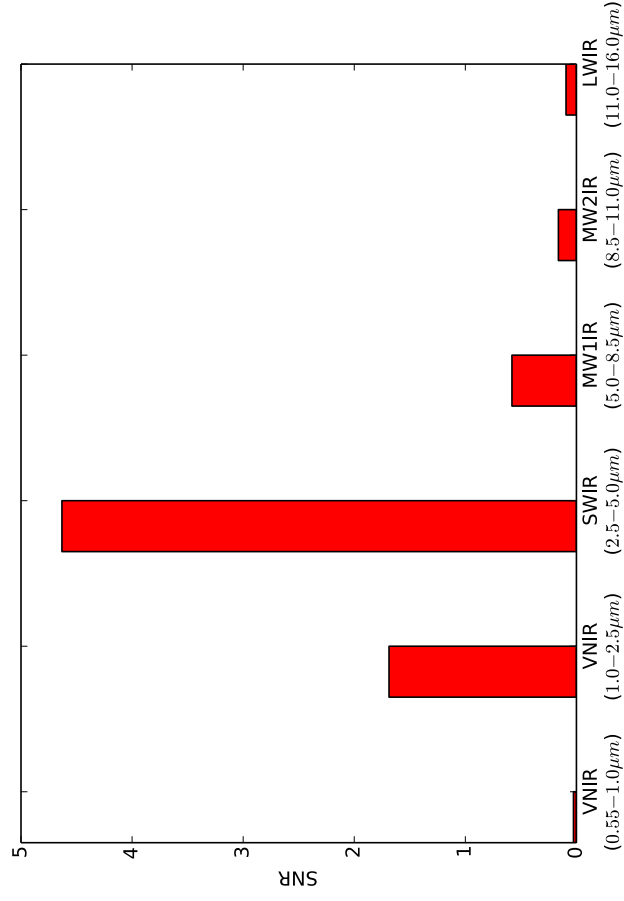
SNR of WASP-22 b (Secondary) Per Channel (1 eclipse = 9.76h)



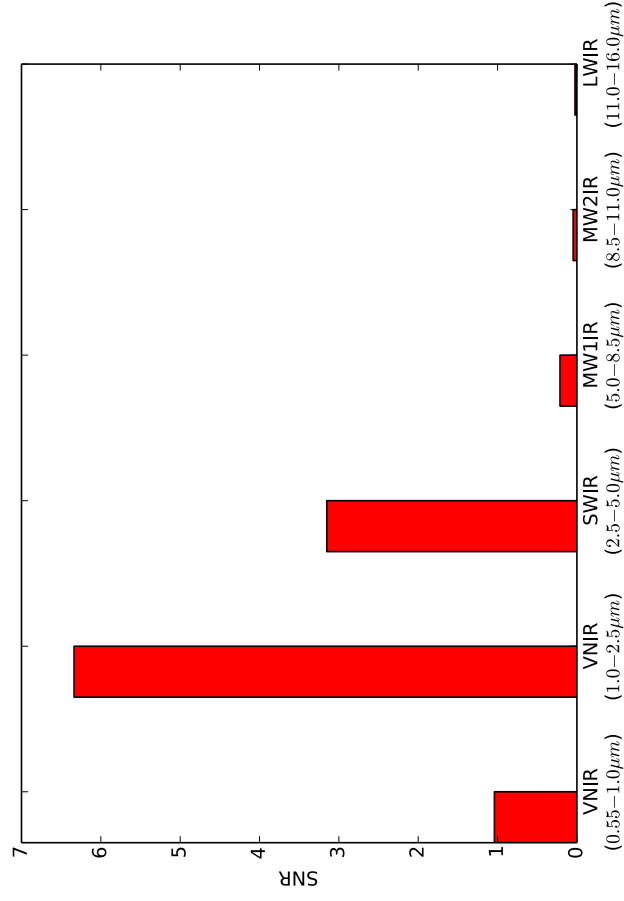
SNR of WASP-22 b (Primary) Per Channel (1 transit = 9.76h)



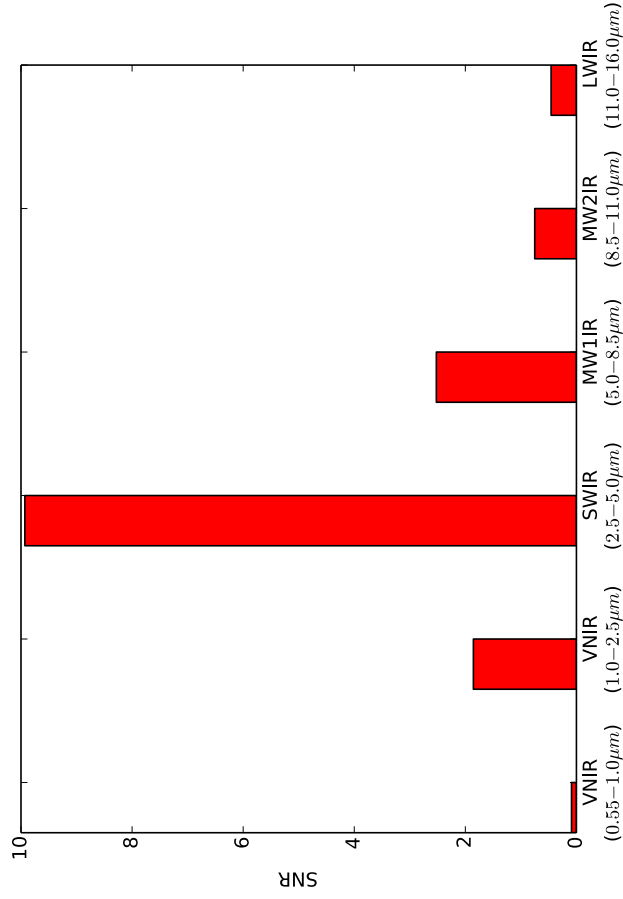
SNR of WASP-24 b (Secondary) Per Channel (1 eclipse = 6.53h)



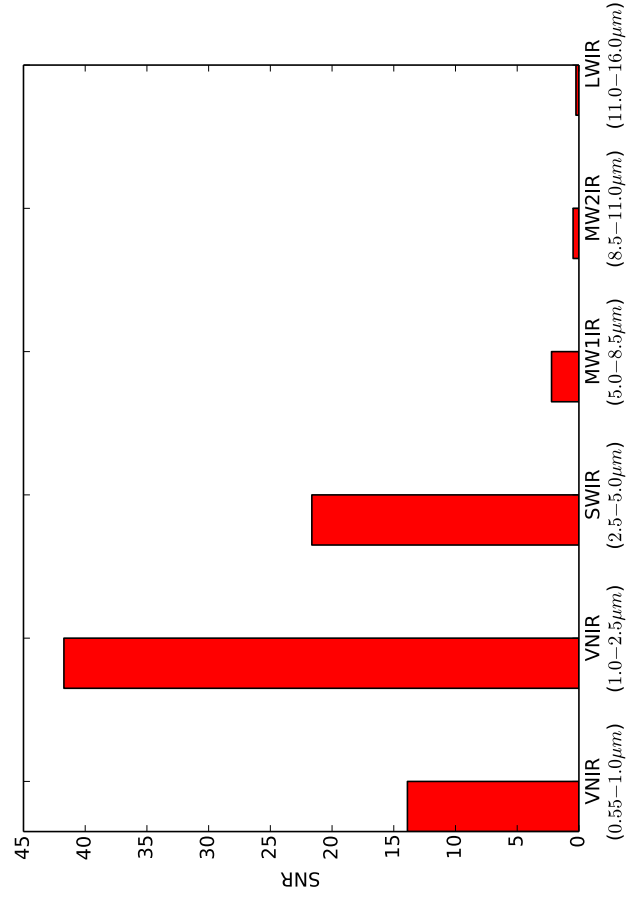
SNR of WASP-24 b (Primary) Per Channel (1 transit = 6.53h)



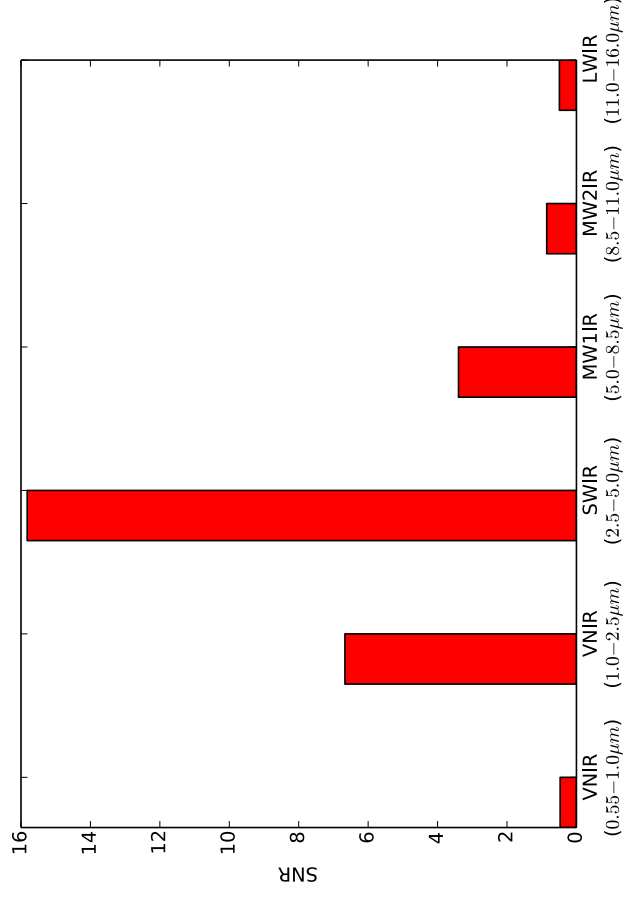
SNR of WASP-25 b (Secondary) Per Channel (1 eclipse = 8.50h)



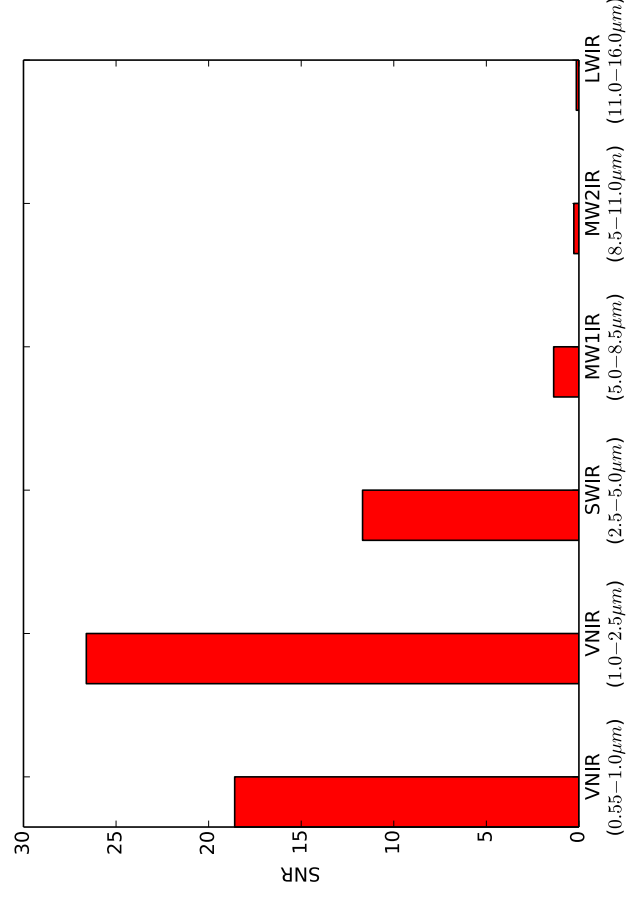
SNR of WASP-25 b (Primary) Per Channel (1 transit = 8.50h)



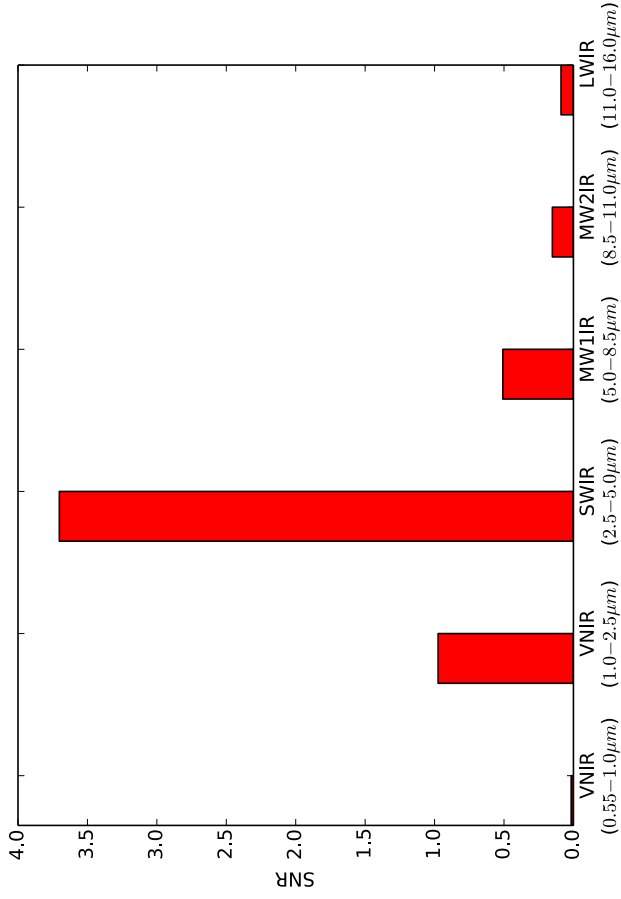
SNR of WASP-26 b (Secondary) Per Channel (1 eclipse = 7.67h)



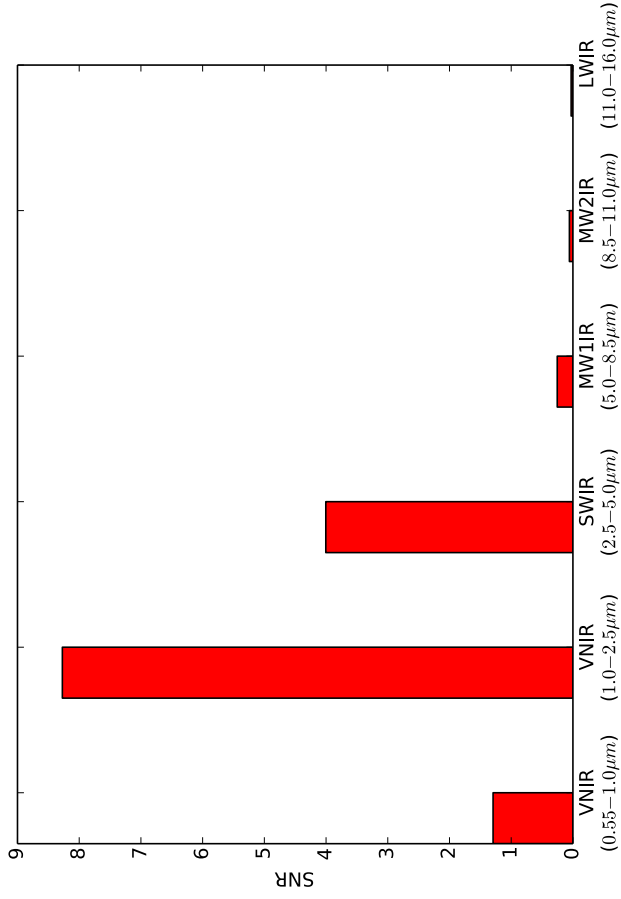
SNR of WASP-26 b (Primary) Per Channel (1 transit = 7.67h)



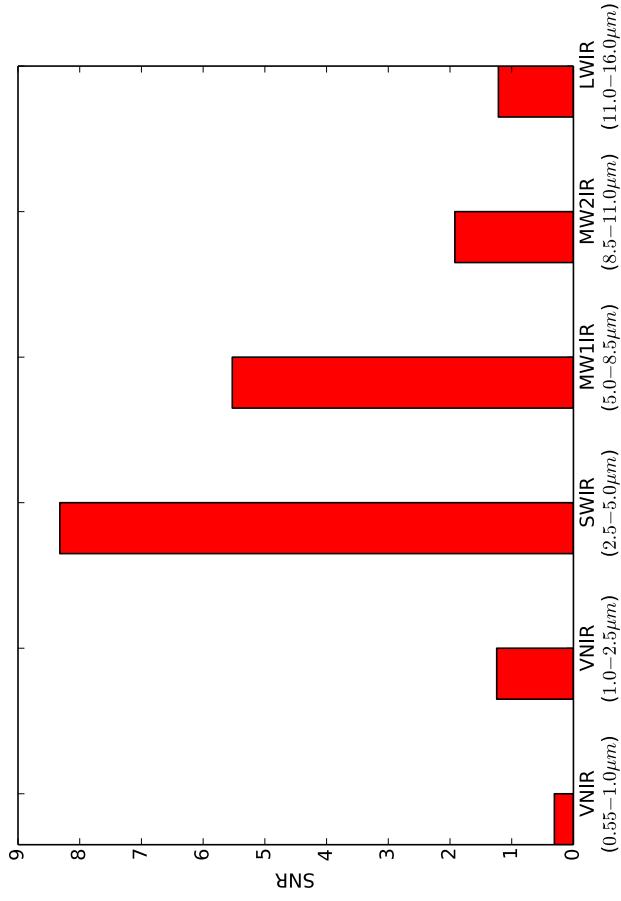
SNR of WASP-28 b (Secondary) Per Channel (1 eclipse = 9.27h)



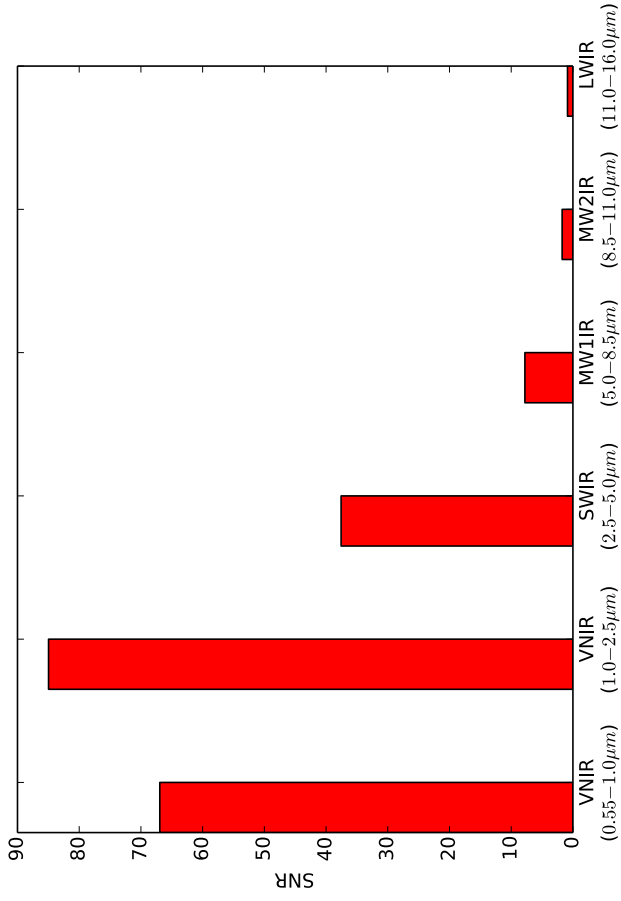
SNR of WASP-28 b (Primary) Per Channel (1 transit = 9.27h)



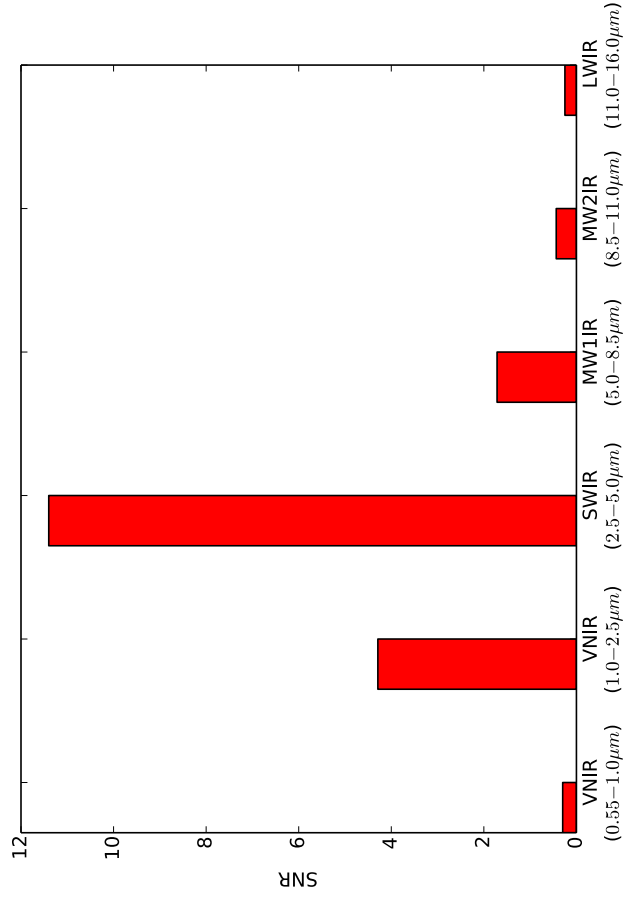
SNR of WASP-29 b (Secondary) Per Channel (1 eclipse = 8.31h)



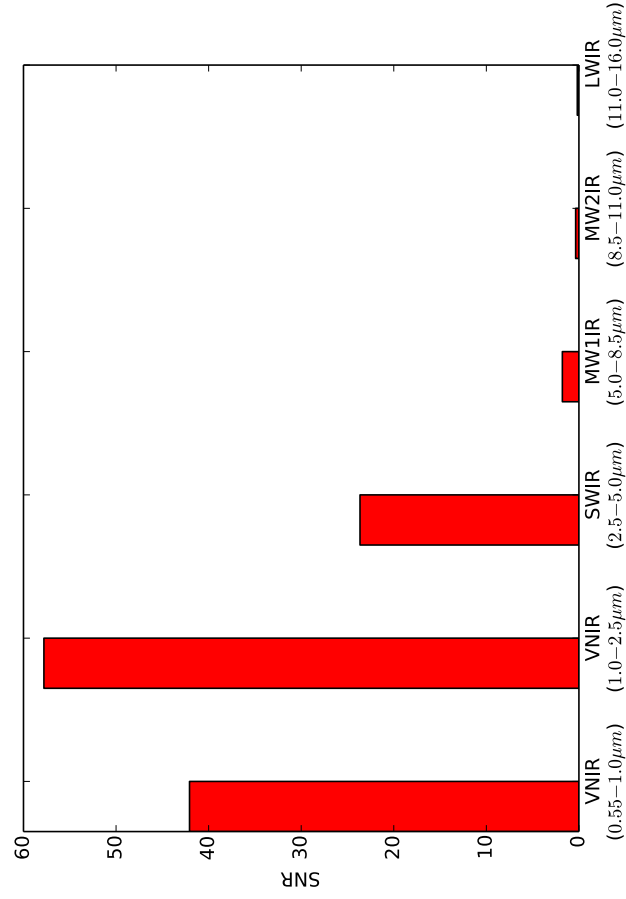
SNR of WASP-29 b (Primary) Per Channel (1 transit = 8.31h)



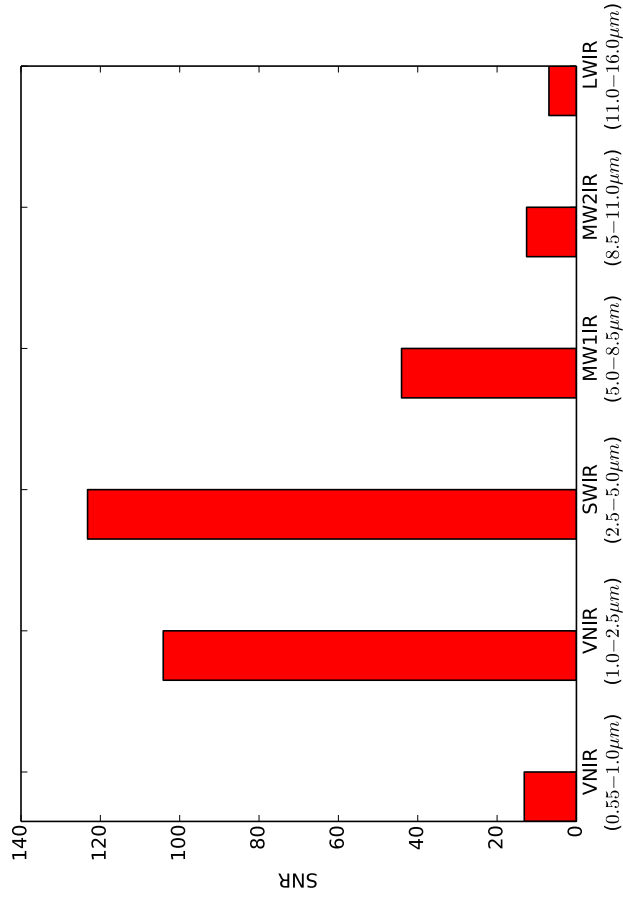
SNR of WASP-31 b (Secondary) Per Channel (1 eclipse = 8.06h)



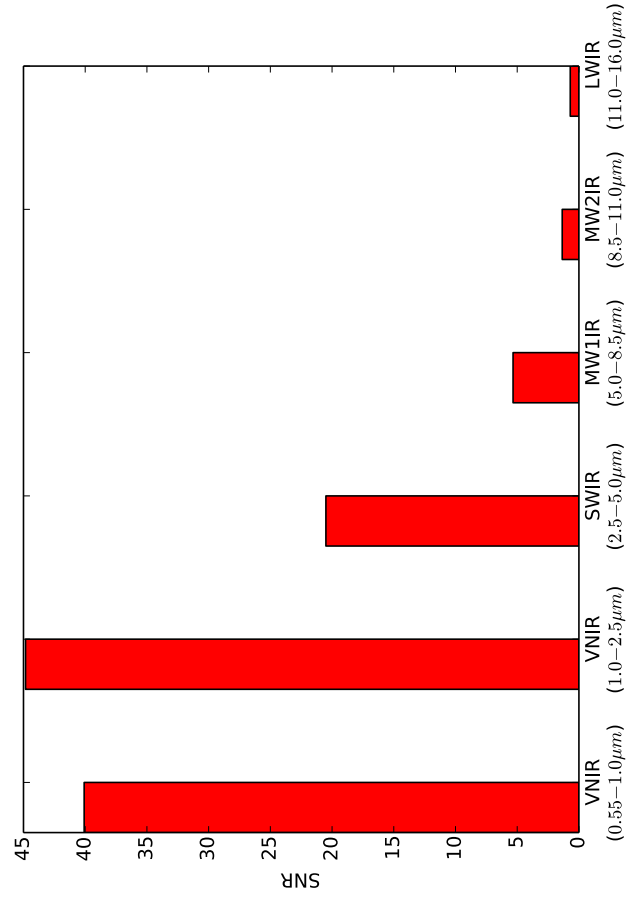
SNR of WASP-31 b (Primary) Per Channel (1 transit = 8.06h)



SNR of WASP-33 b (Secondary) Per Channel (1 eclipse = 8.16h)

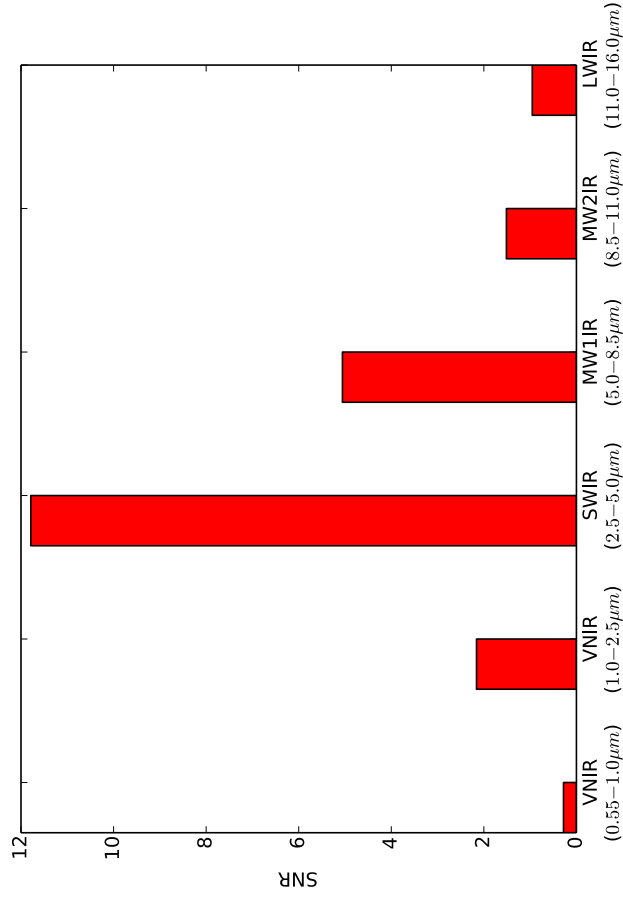


SNR of WASP-33 b (Primary) Per Channel (1 transit = 8.16h)

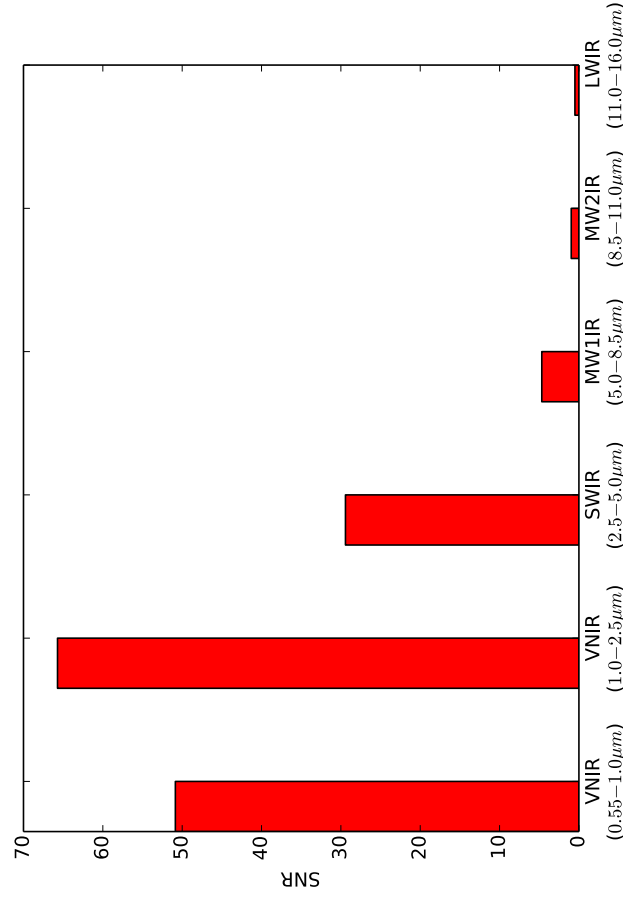




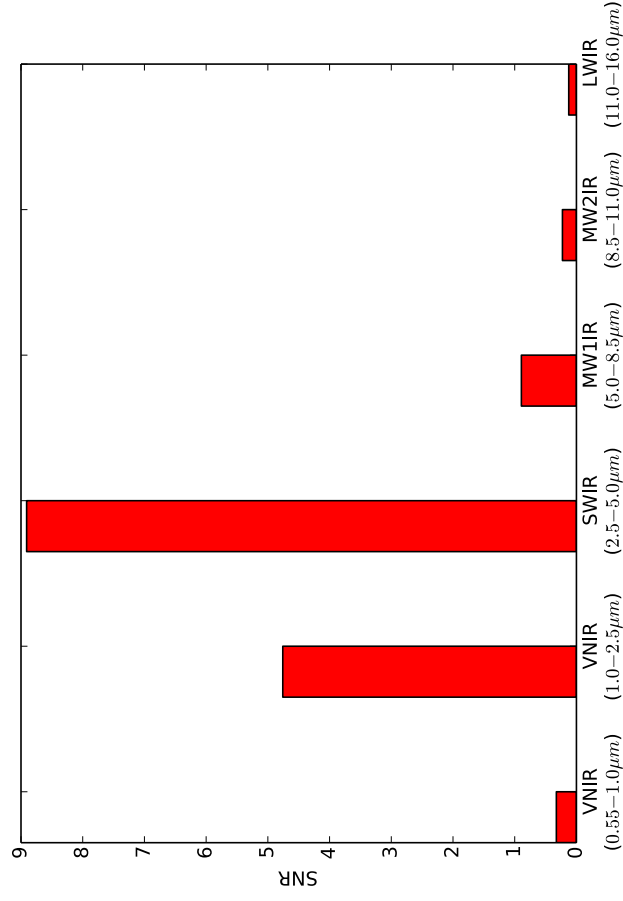
SNR of WASP-34 b (Secondary) Per Channel (1 eclipse = 4.23h)



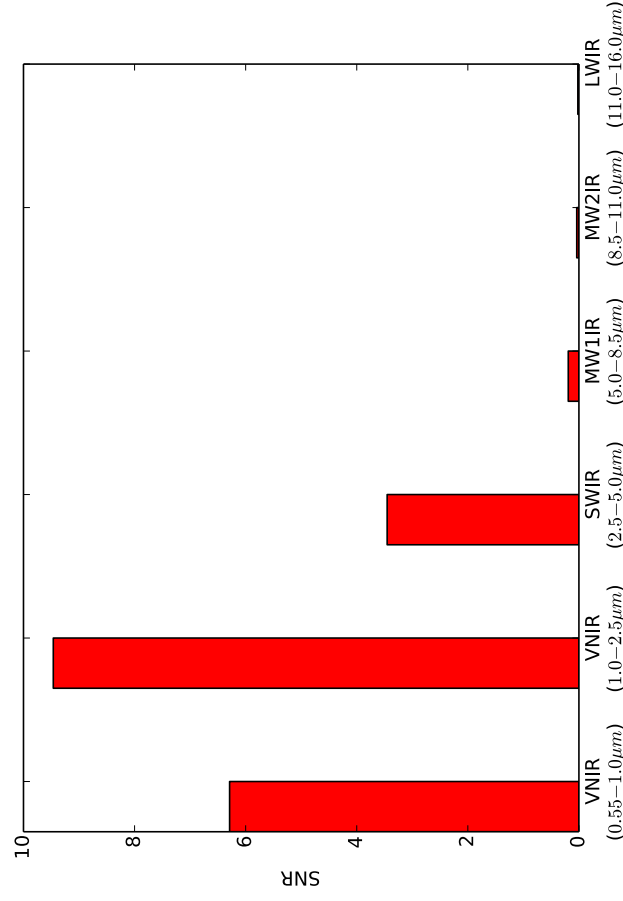
SNR of WASP-34 b (Primary) Per Channel (1 transit = 4.23h)



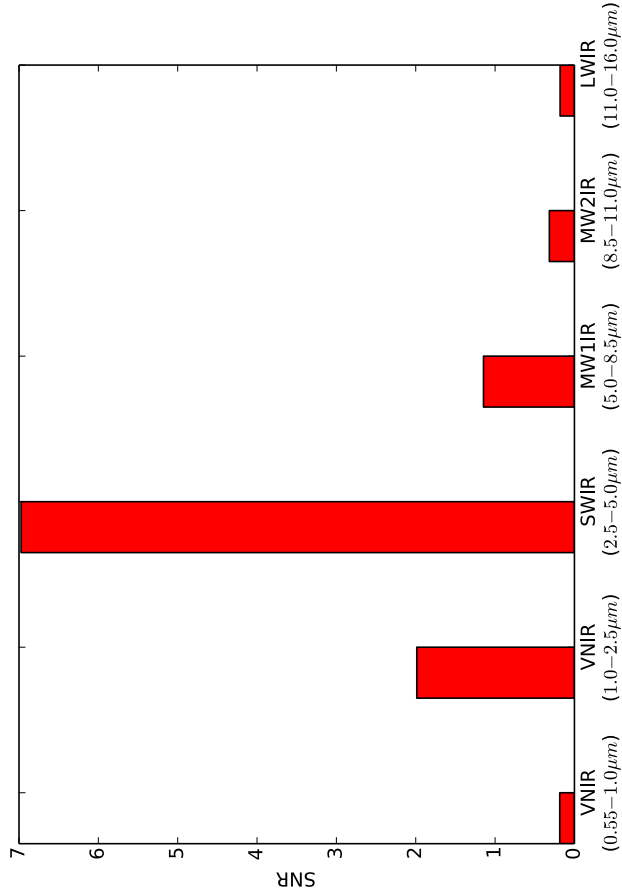
SNR of WASP-36 b (Secondary) Per Channel (1 eclipse = 5.53h)



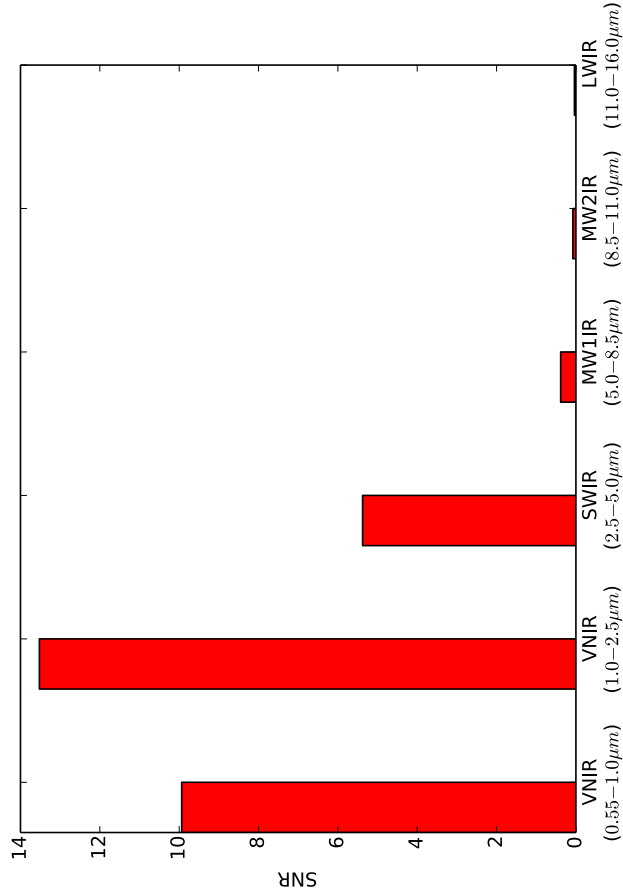
SNR of WASP-36 b (Primary) Per Channel (1 transit = 5.53h)



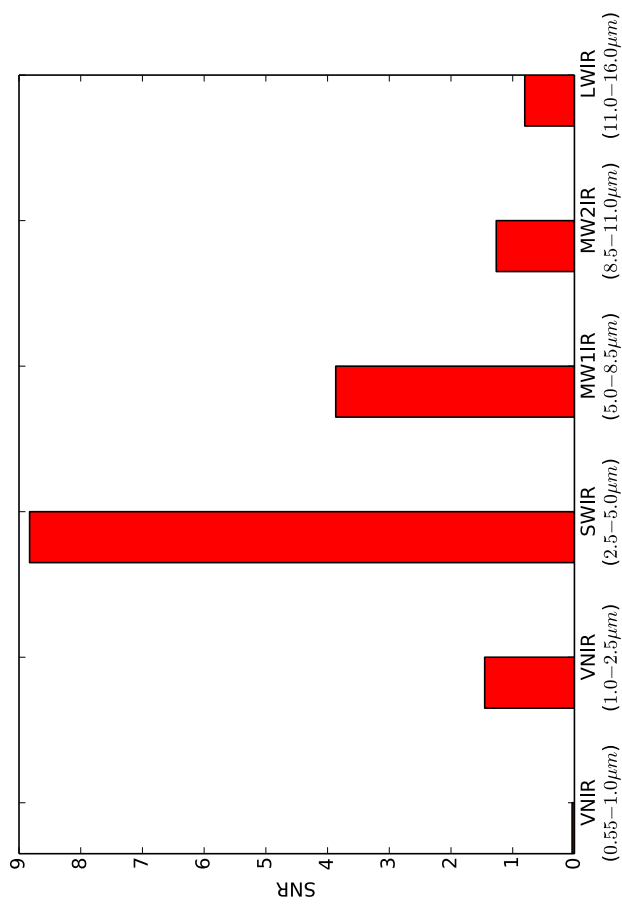
SNR of WASP-37 b (Secondary) Per Channel (1 eclipse = 9.50h)



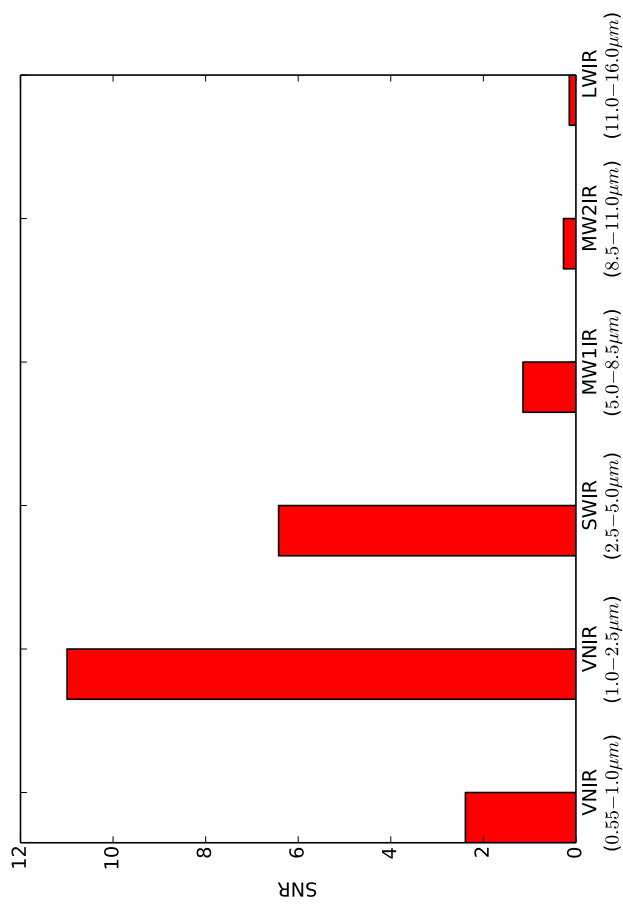
SNR of WASP-37 b (Primary) Per Channel (1 transit = 9.50h)



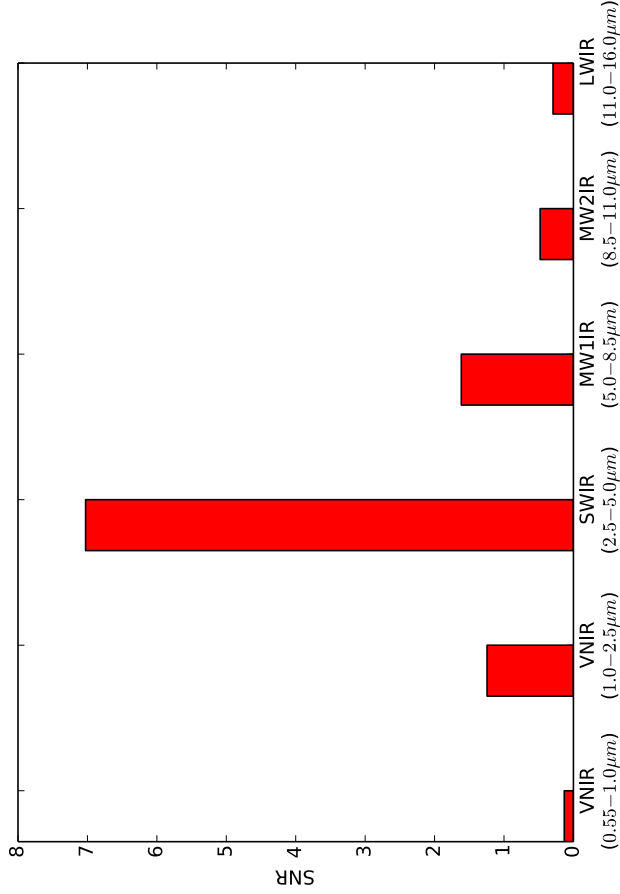
SNR of WASP-38 b (Secondary) Per Channel (1 eclipse = 14.13h)



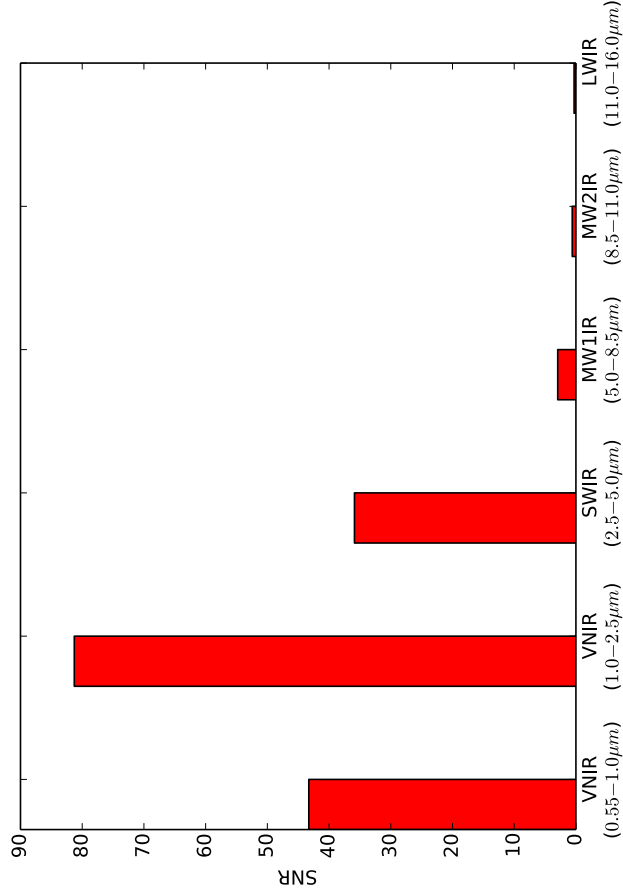
SNR of WASP-38 b (Primary) Per Channel (1 transit = 14.13h)



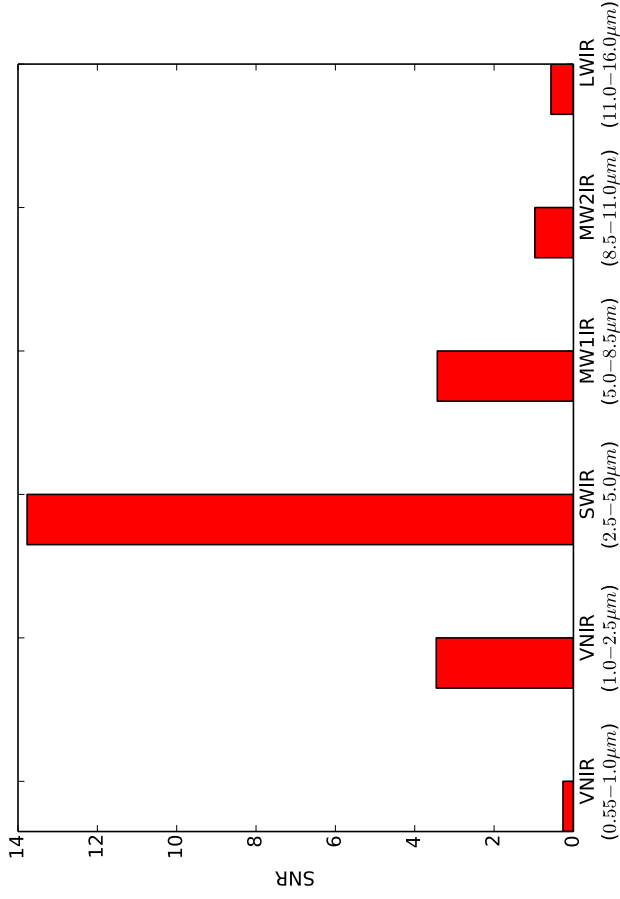
SNR of WASP-39 b (Secondary) Per Channel (1 eclipse = 8.45h)



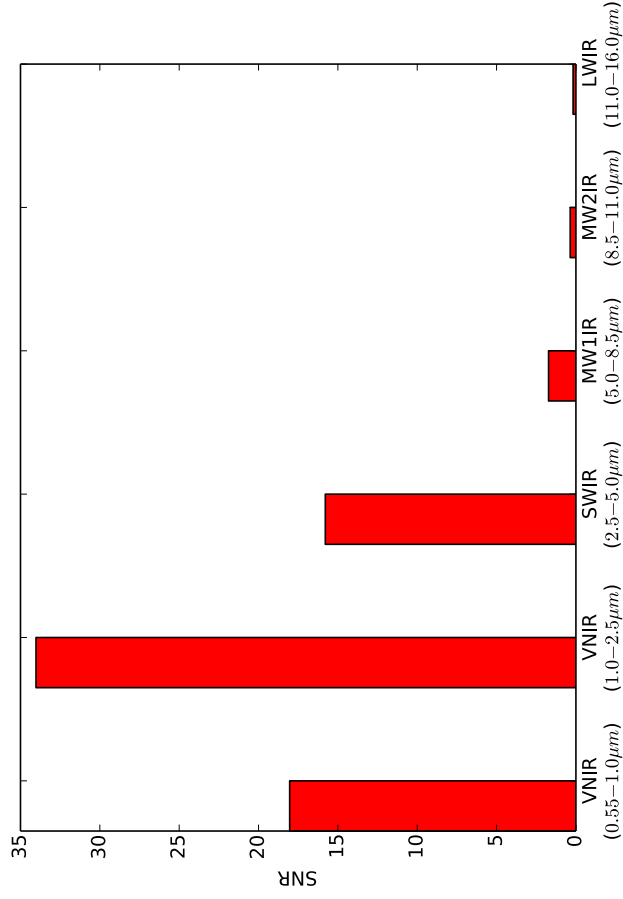
SNR of WASP-39 b (Primary) Per Channel (1 transit = 8.45h)



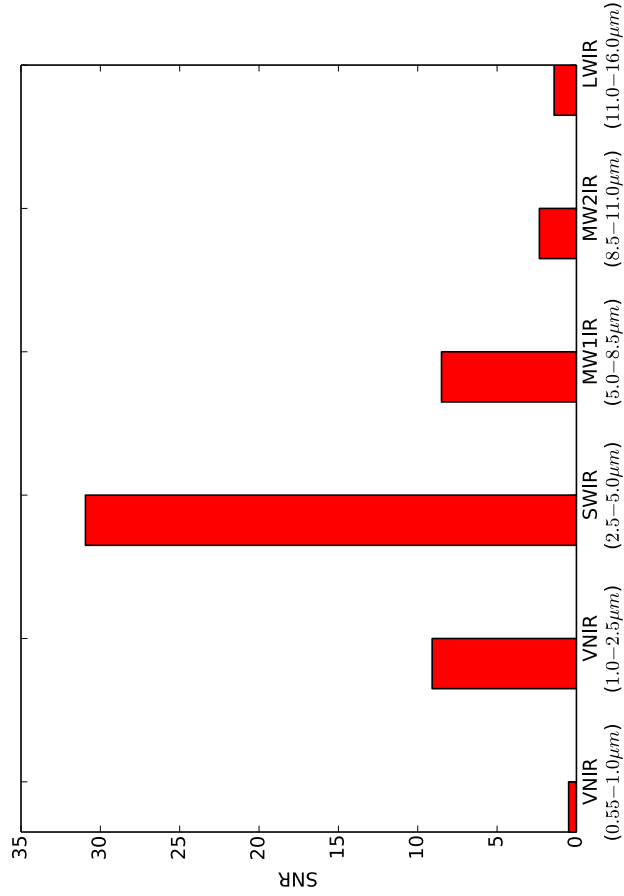
SNR of WASP-41 b (Secondary) Per Channel (1 eclipse = 8.67h)



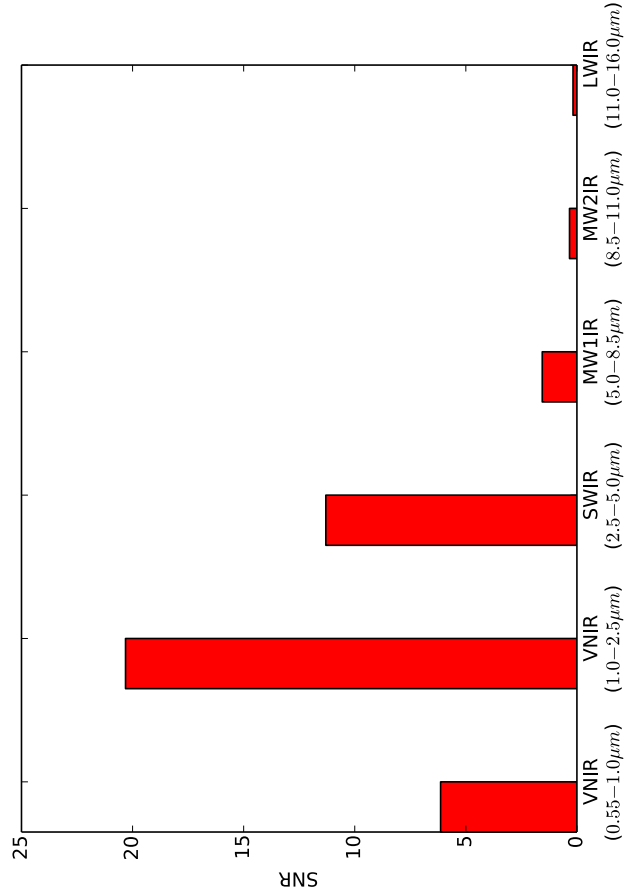
SNR of WASP-41 b (Primary) Per Channel (1 transit = 8.67h)



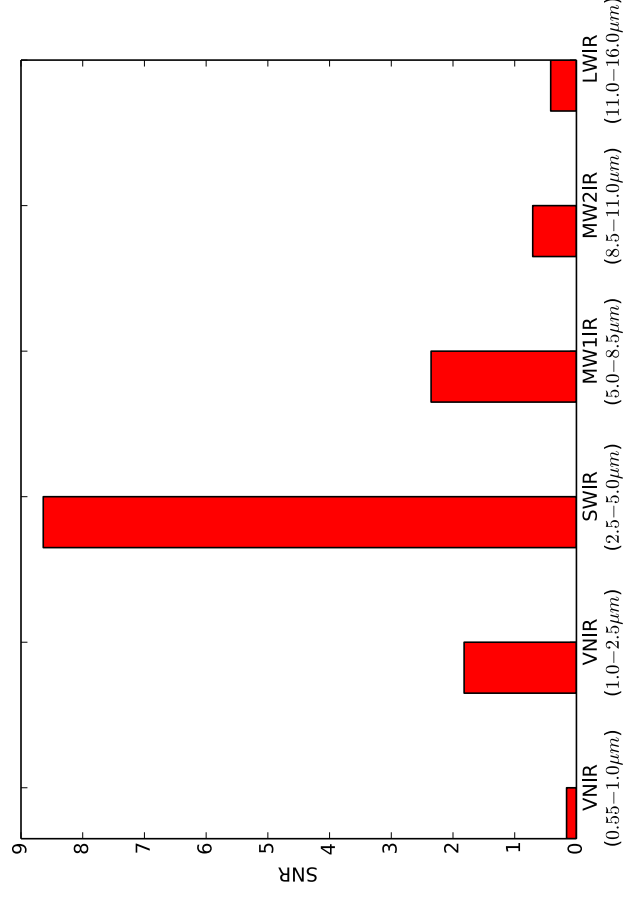
SNR of WASP-43 b (Secondary) Per Channel (1 eclipse = 3.69h)



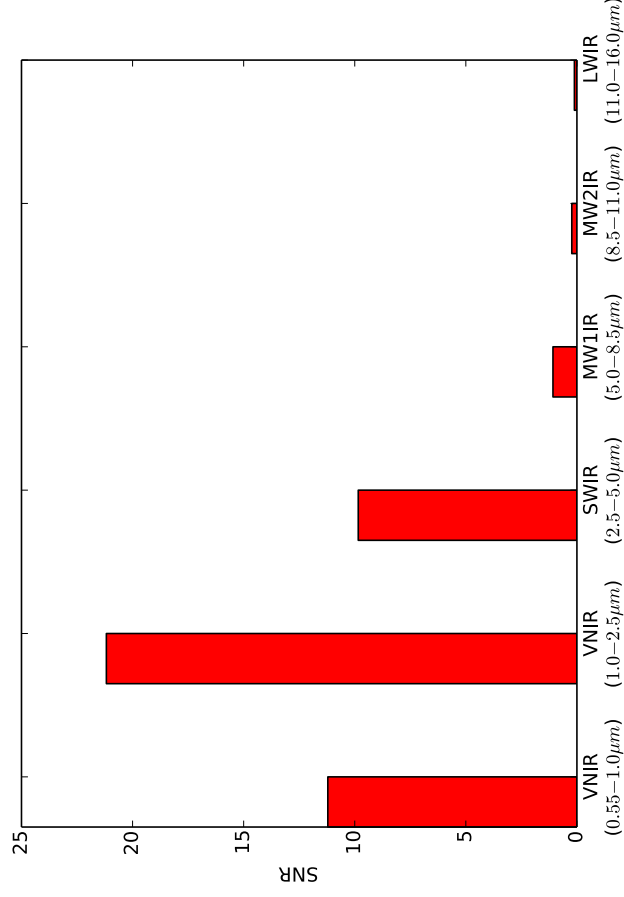
SNR of WASP-43 b (Primary) Per Channel (1 transit = 3.69h)



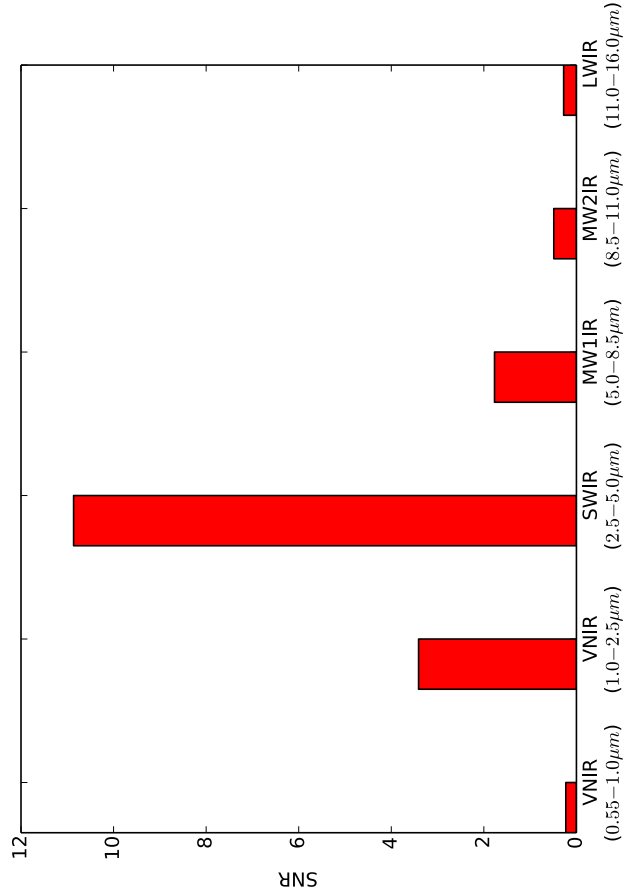
SNR of WASP-47 b (Secondary) Per Channel (1 eclipse = 10.78h)



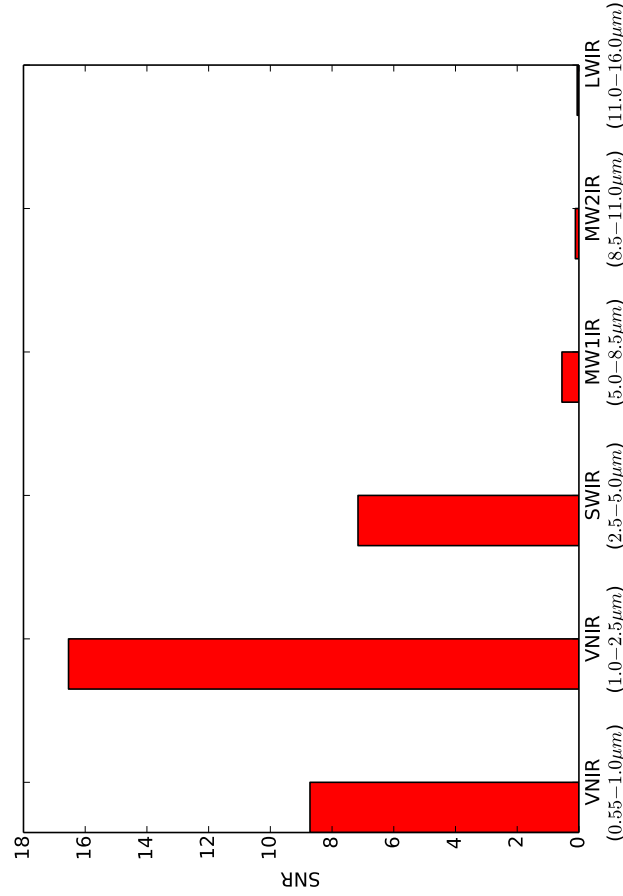
SNR of WASP-47 b (Primary) Per Channel (1 transit = 10.78h)



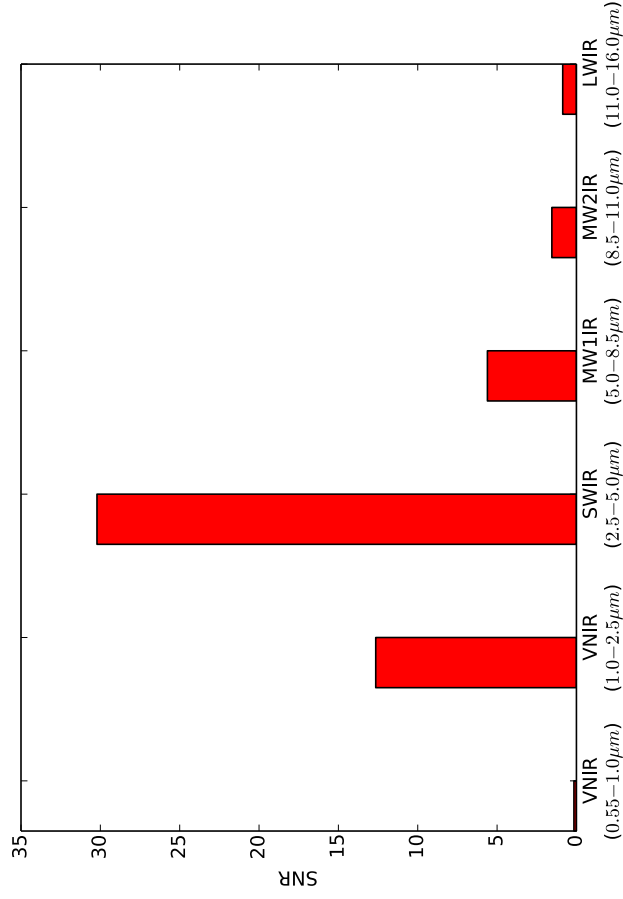
SNR of WASP-50 b (Secondary) Per Channel (1 eclipse = 5.45h)



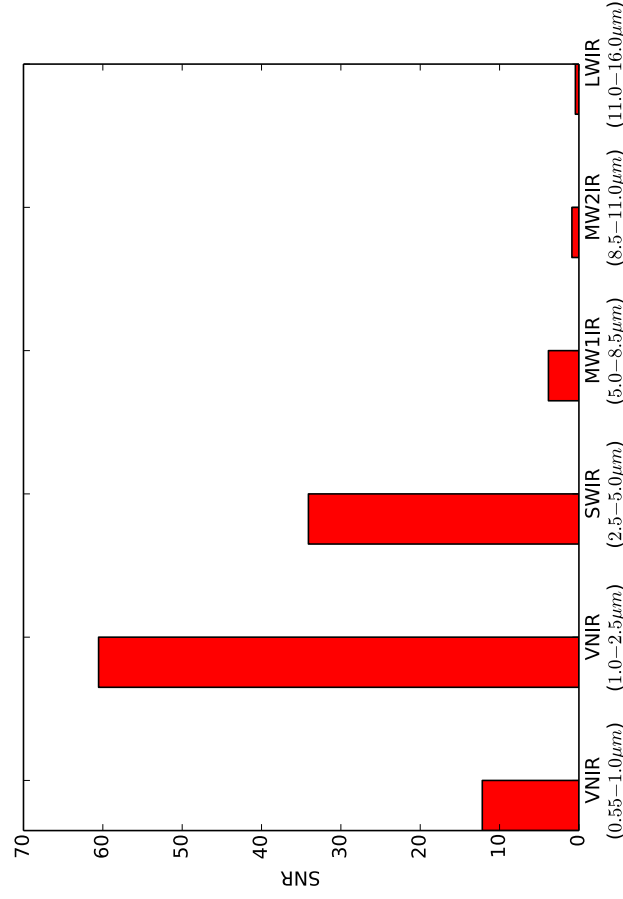
SNR of WASP-50 b (Primary) Per Channel (1 transit = 5.45h)



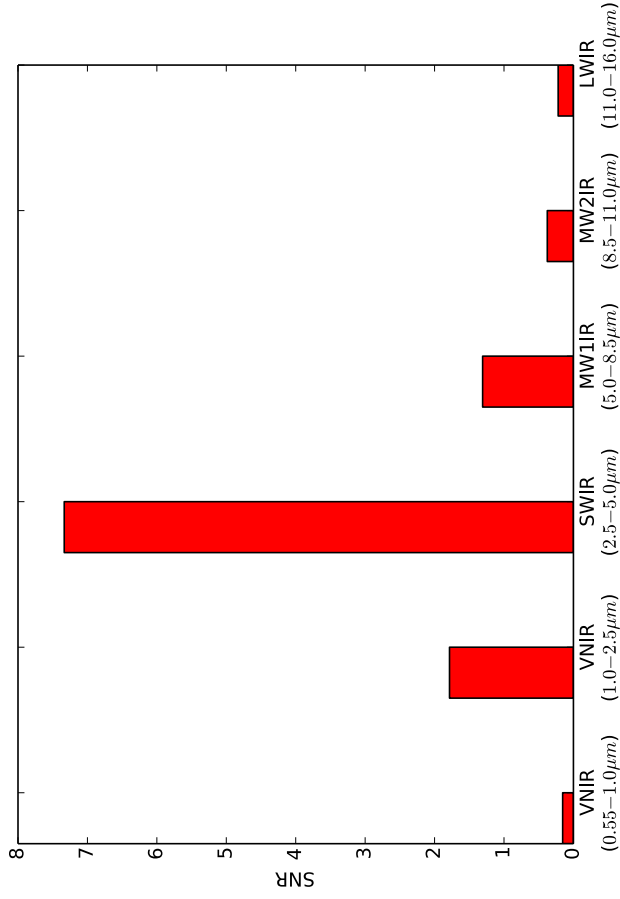
SNR of WASP-54 b (Secondary) Per Channel (1 eclipse = 10.02h)



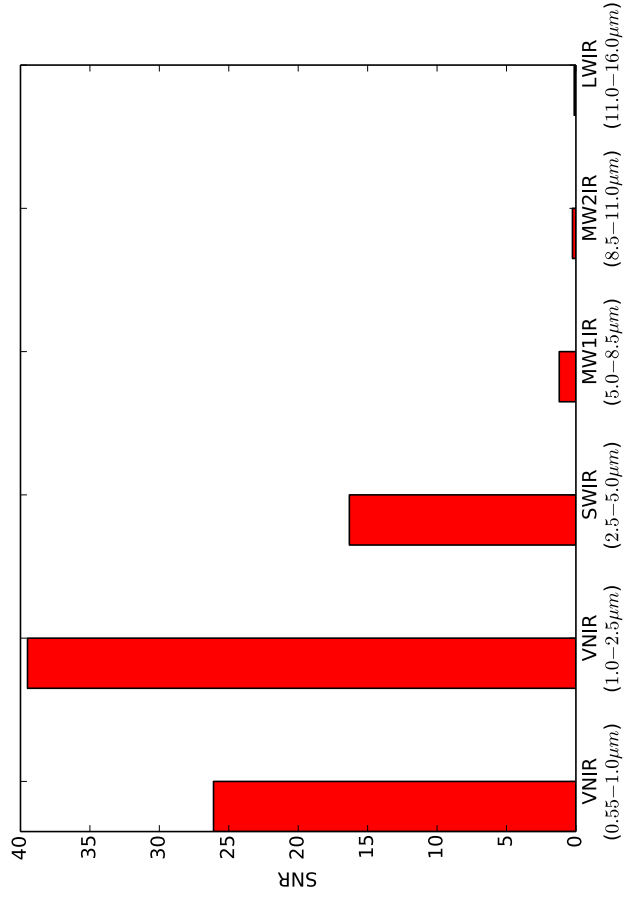
SNR of WASP-54 b (Primary) Per Channel (1 transit = 10.02h)



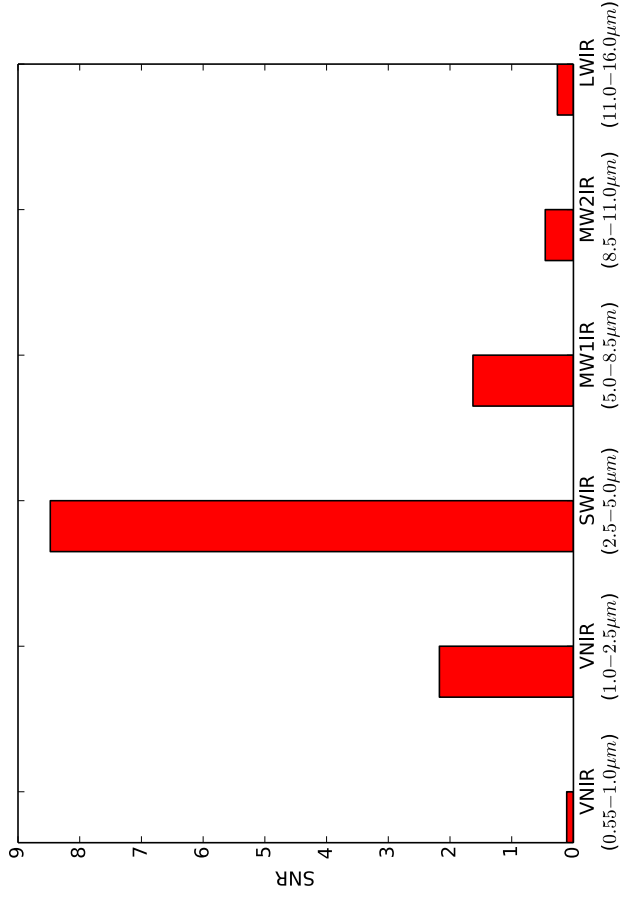
SNR of WASP-55 b (Secondary) Per Channel (1 eclipse = 10.61h)



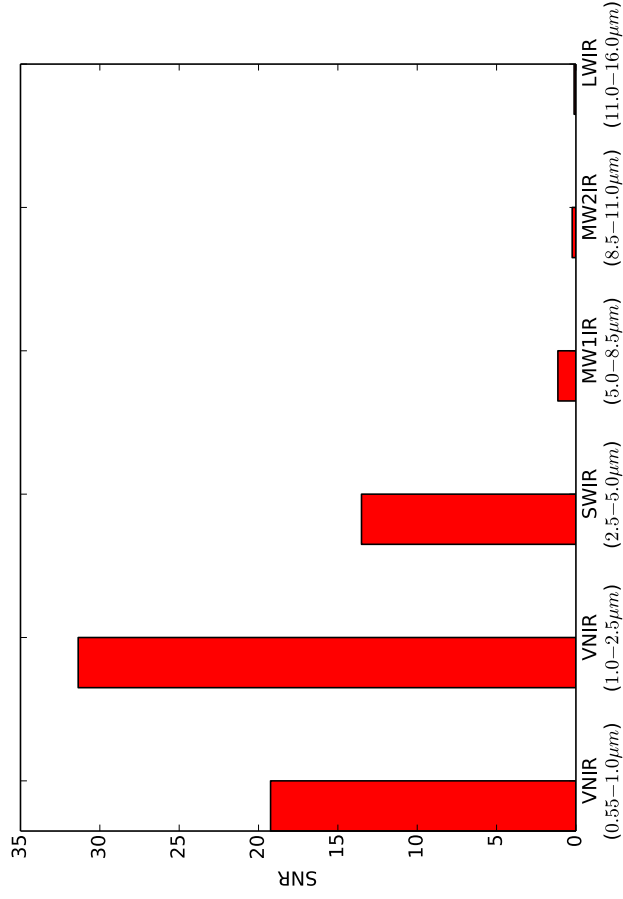
SNR of WASP-55 b (Primary) Per Channel (1 transit = 10.61h)



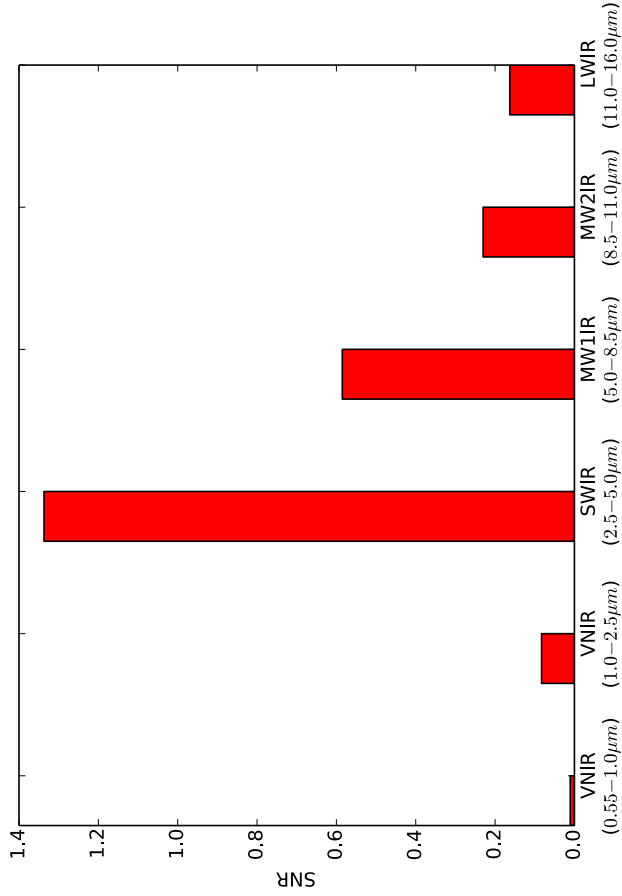
SNR of WASP-56 b (Secondary) Per Channel (1 eclipse = 9.59h)



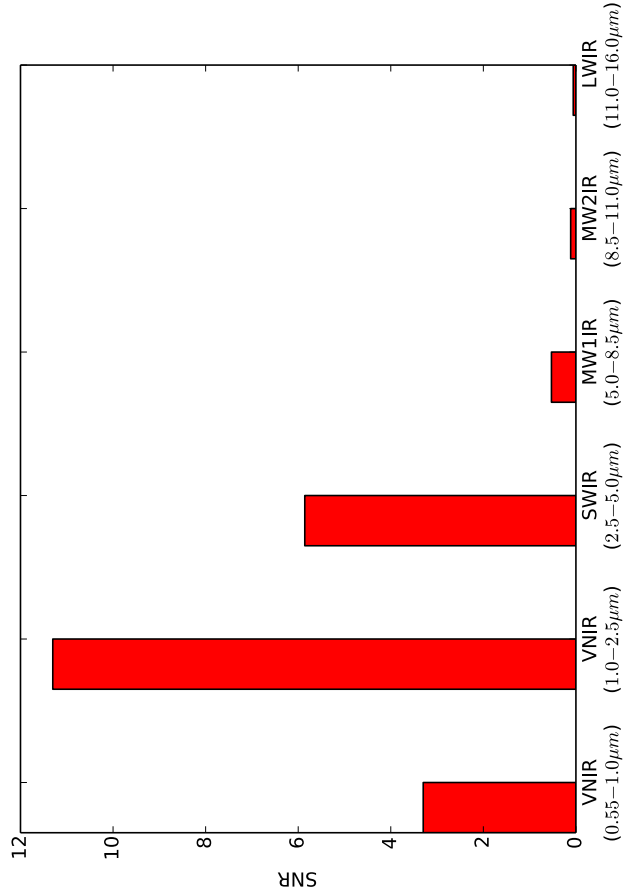
SNR of WASP-56 b (Primary) Per Channel (1 transit = 9.59h)



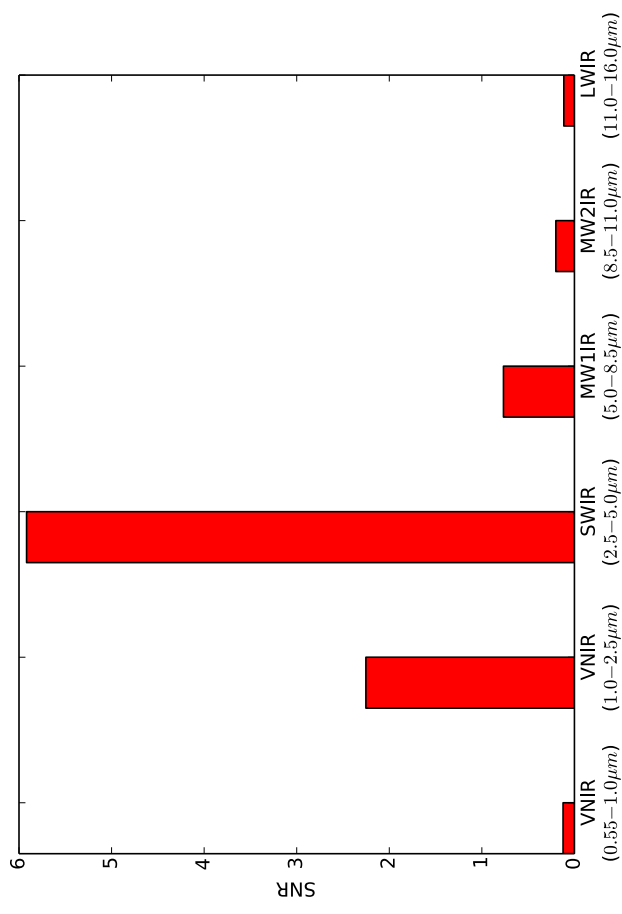
SNR of WASP-59 b (Secondary) Per Channel (1 eclipse = 8.09h)



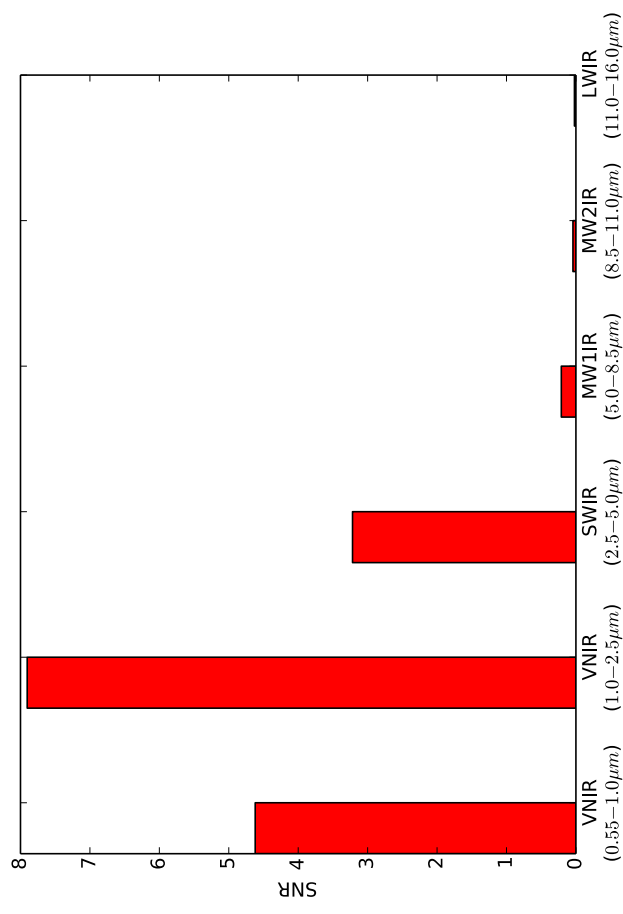
SNR of WASP-59 b (Primary) Per Channel (1 transit = 8.09h)



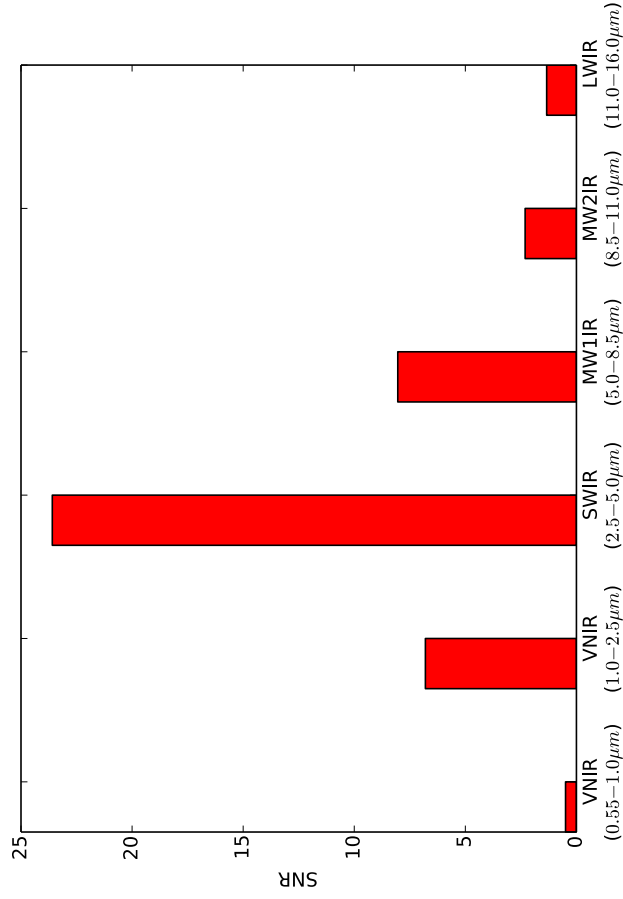
SNR of WASP-61 b (Secondary) Per Channel (1 eclipse = 11.92h)



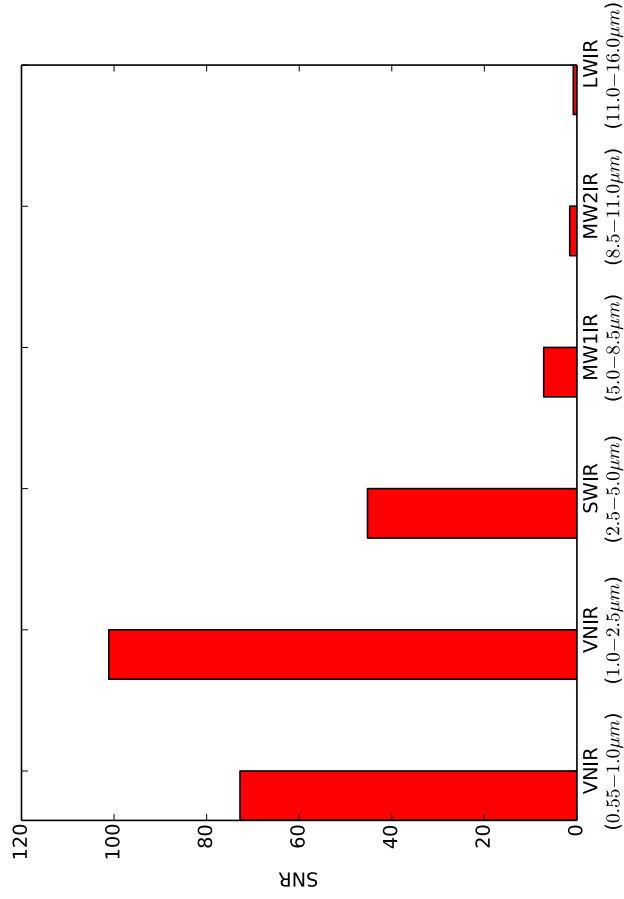
SNR of WASP-61 b (Primary) Per Channel (1 transit = 11.92h)



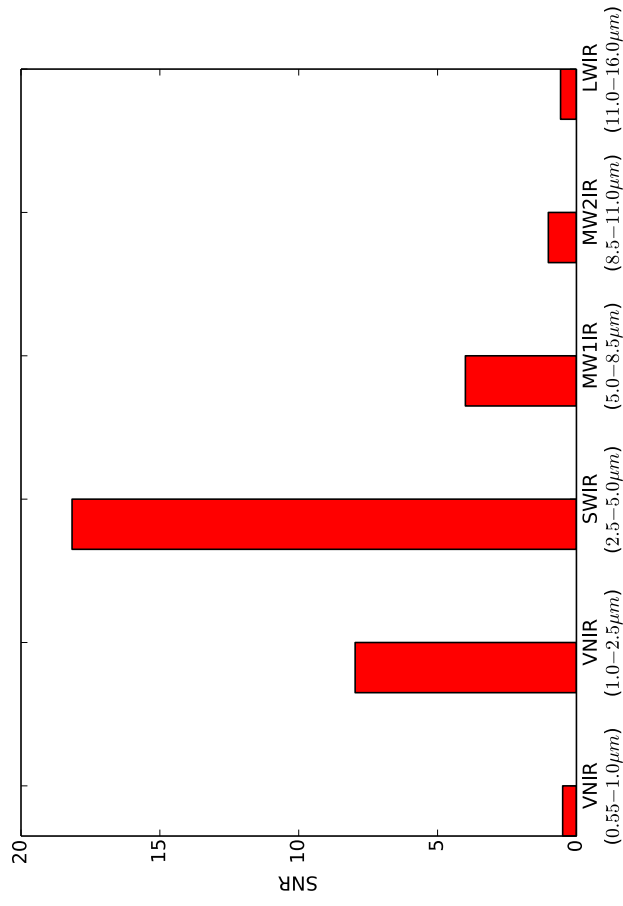
SNR of WASP-62 b (Secondary) Per Channel (1 eclipse = 11.47h)



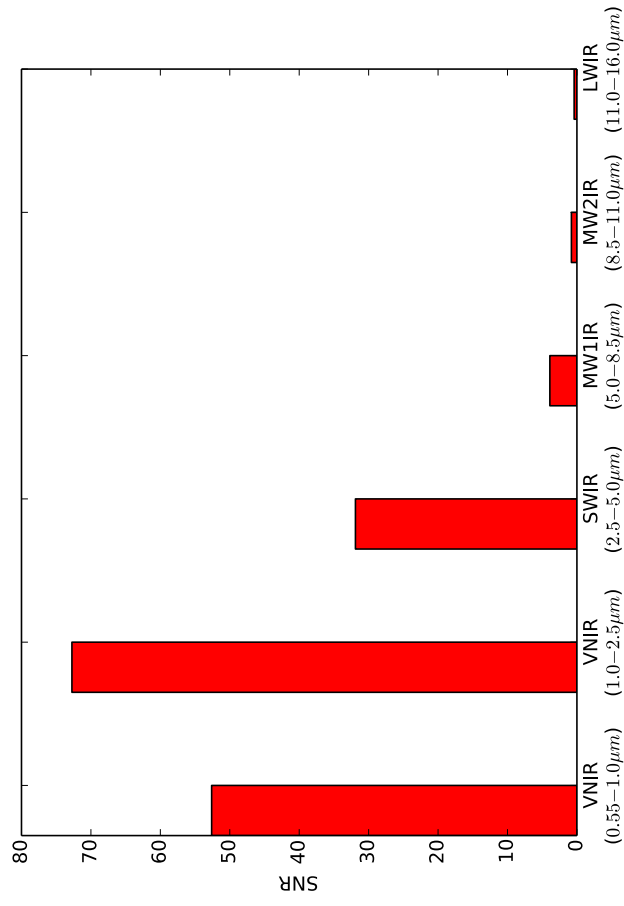
SNR of WASP-62 b (Primary) Per Channel (1 transit = 11.47h)



SNR of WASP-63 b (Secondary) Per Channel (1 eclipse = 16.16h)

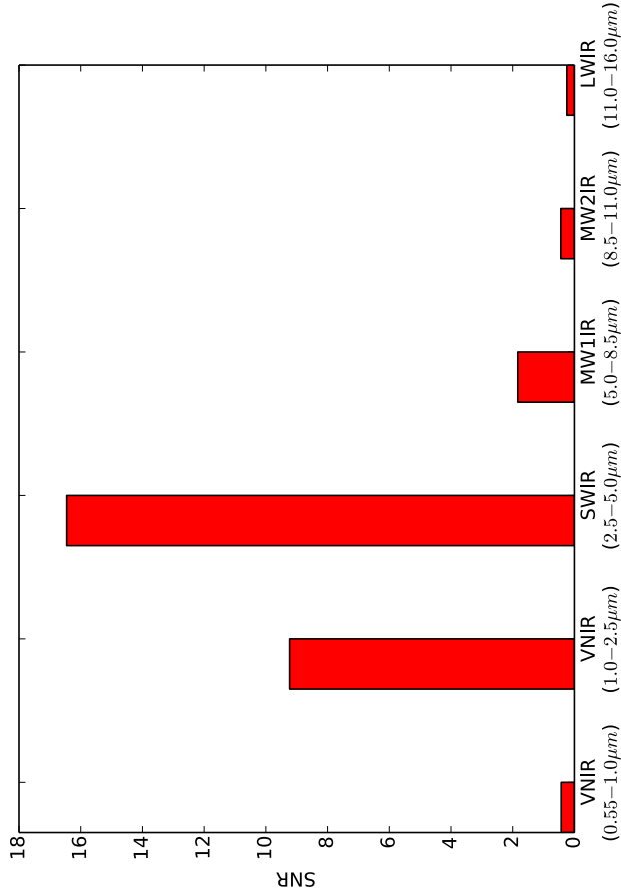


SNR of WASP-63 b (Primary) Per Channel (1 transit = 16.16h)

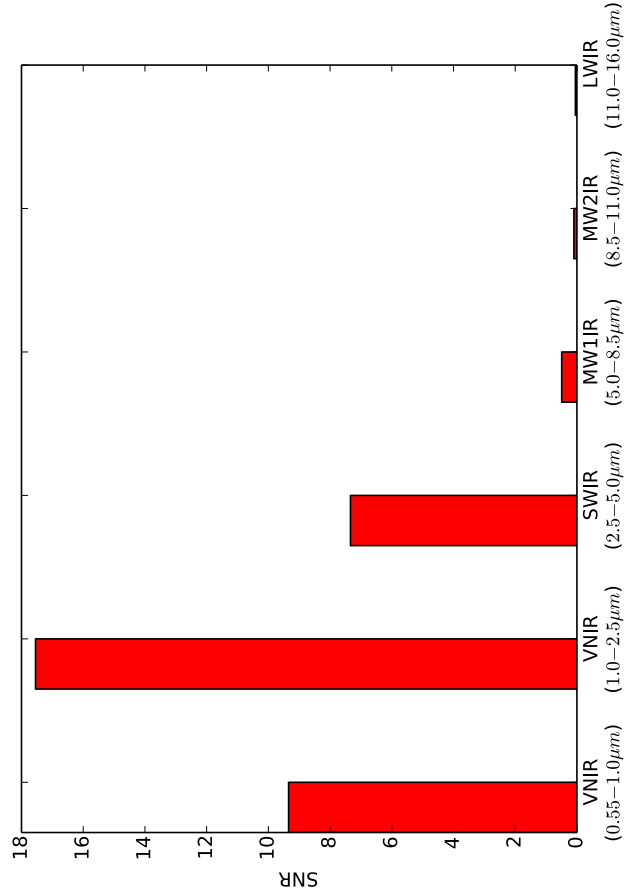




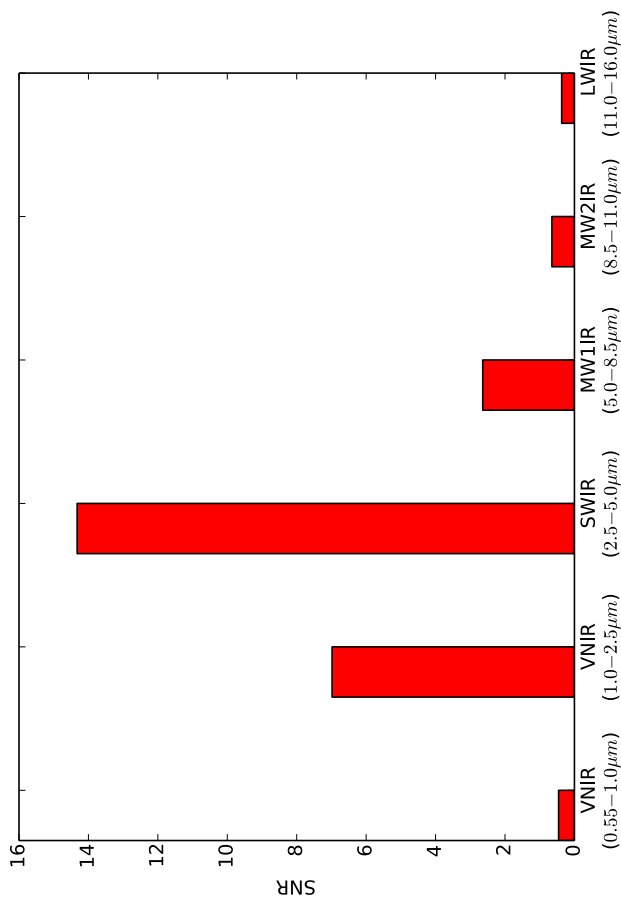
SNR of WASP-64 b (Secondary) Per Channel (1 eclipse = 7.10h)



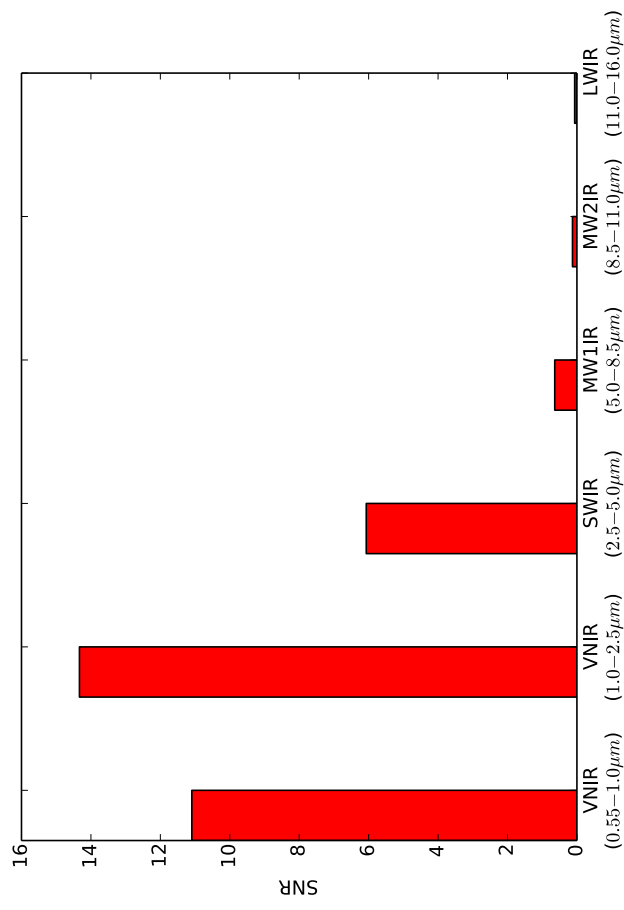
SNR of WASP-64 b (Primary) Per Channel (1 transit = 7.10h)



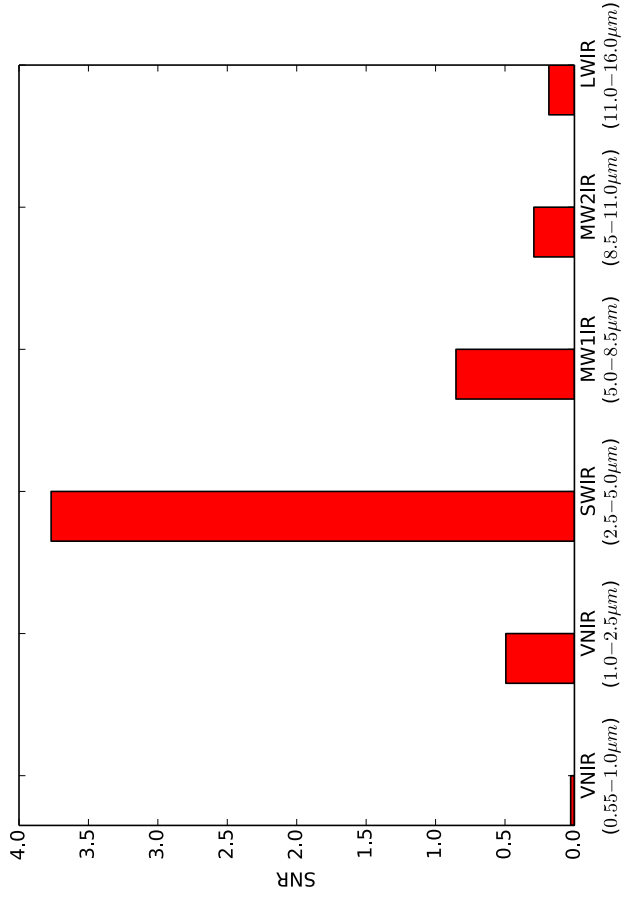
SNR of WASP-66 b (Secondary) Per Channel (1 eclipse = 13.67h)



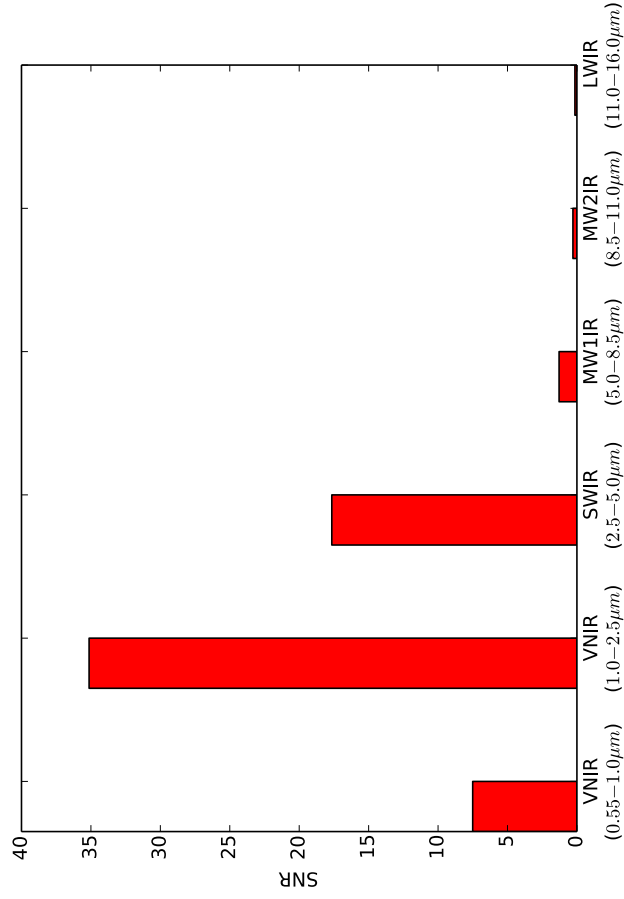
SNR of WASP-66 b (Primary) Per Channel (1 transit = 13.67h)



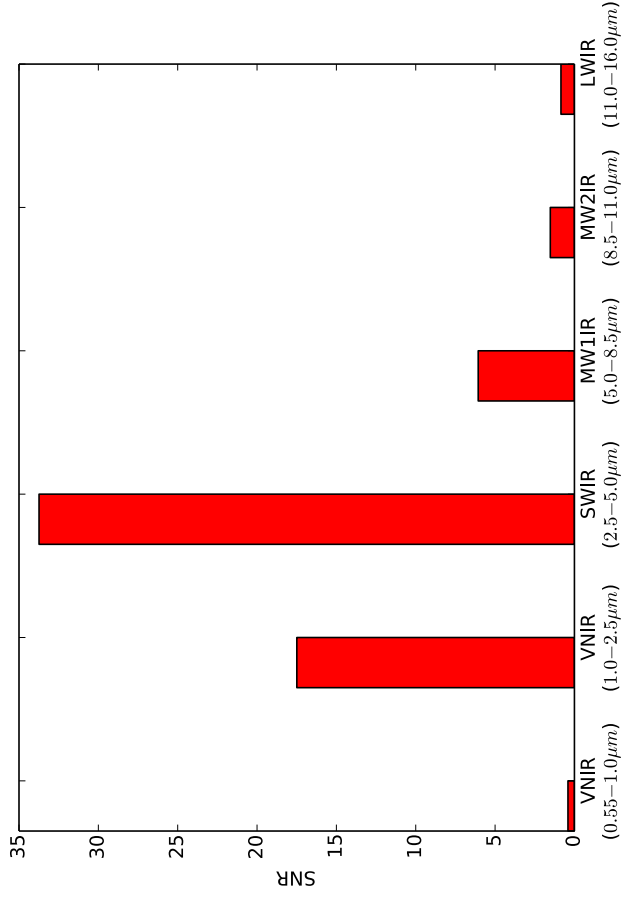
SNR of WASP-67 b (Secondary) Per Channel (1 eclipse = 5.79h)



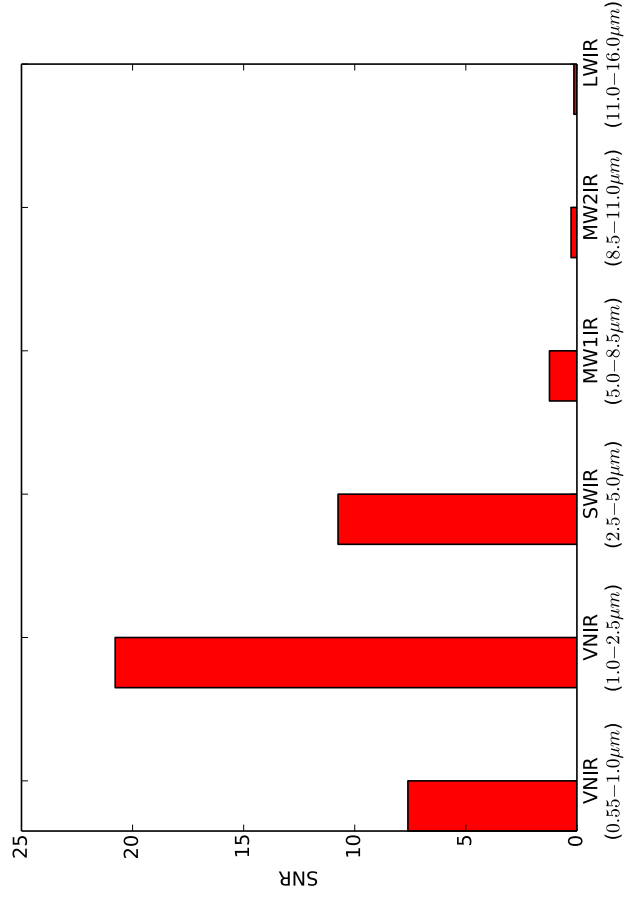
SNR of WASP-67 b (Primary) Per Channel (1 transit = 5.79h)



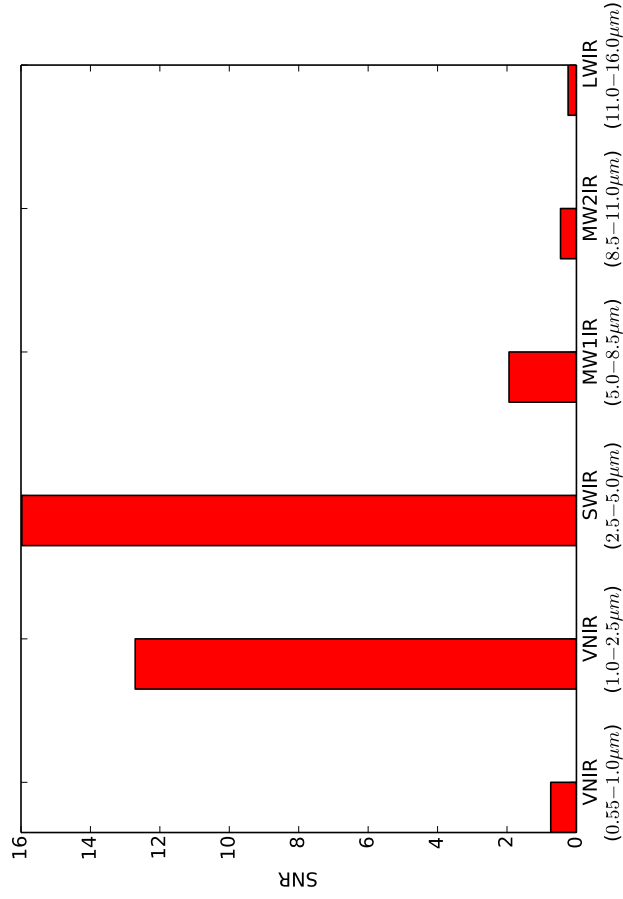
SNR of WASP-71 b (Secondary) Per Channel (1 eclipse = 6.81h)



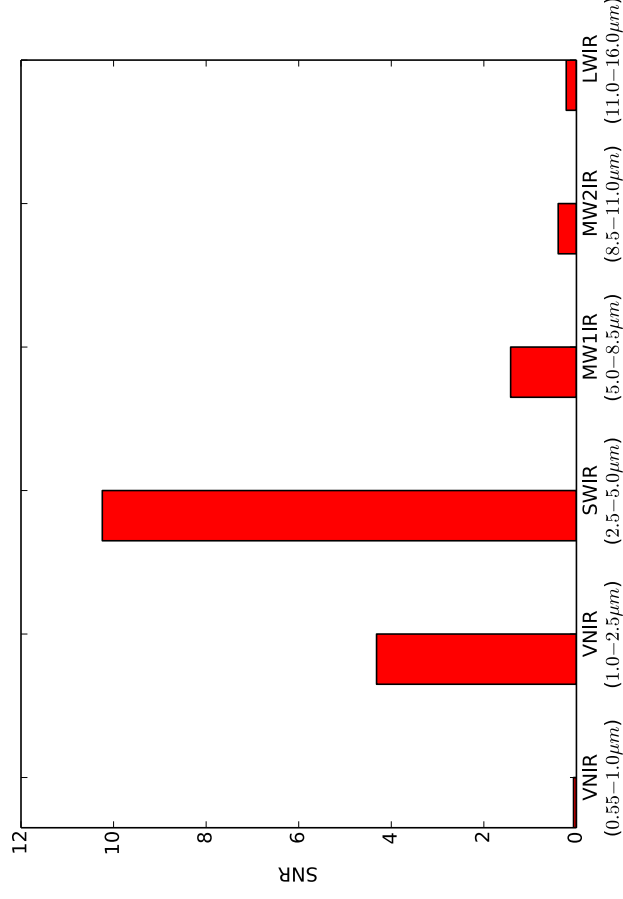
SNR of WASP-71 b (Primary) Per Channel (1 transit = 6.81h)



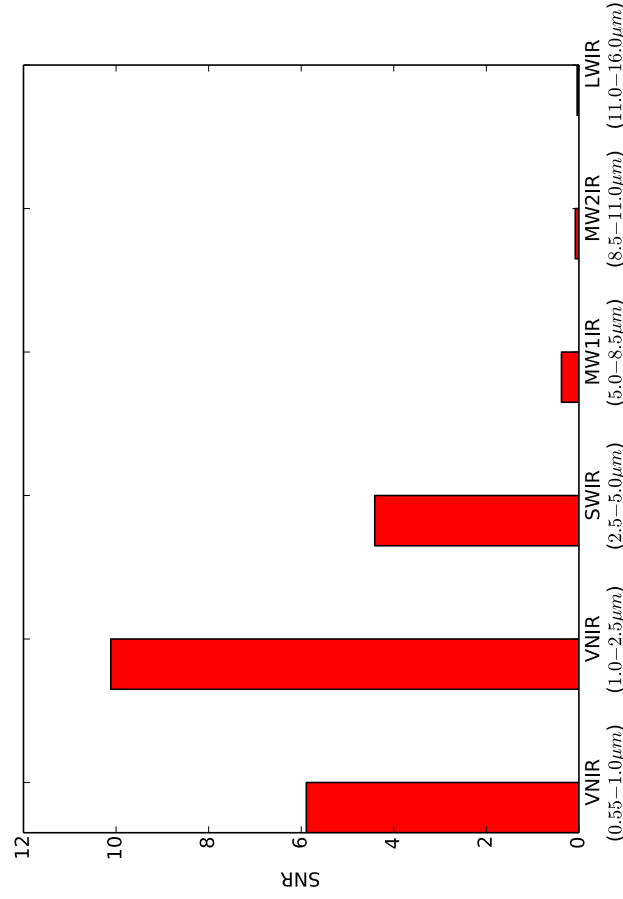
SNR of WASP-72 b (Secondary) Per Channel (1 eclipse = 9.19h)



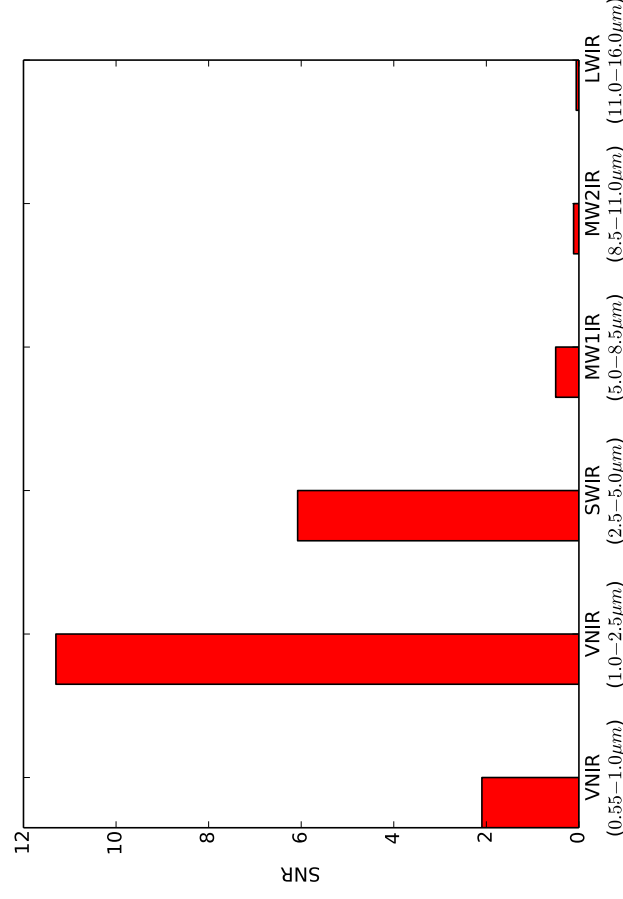
SNR of WASP-75 b (Secondary) Per Channel (1 eclipse = 5.91h)



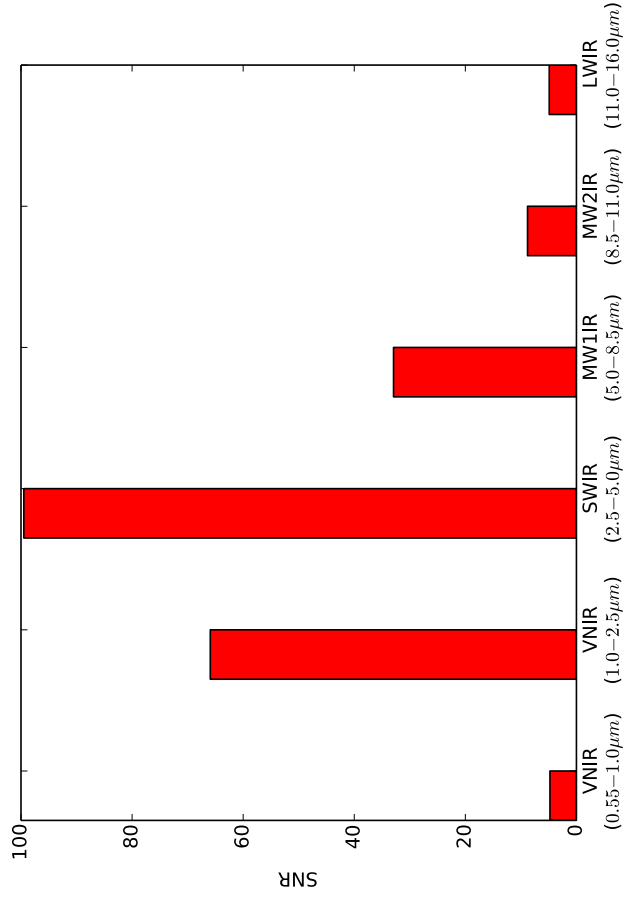
SNR of WASP-72 b (Primary) Per Channel (1 transit = 9.19h)



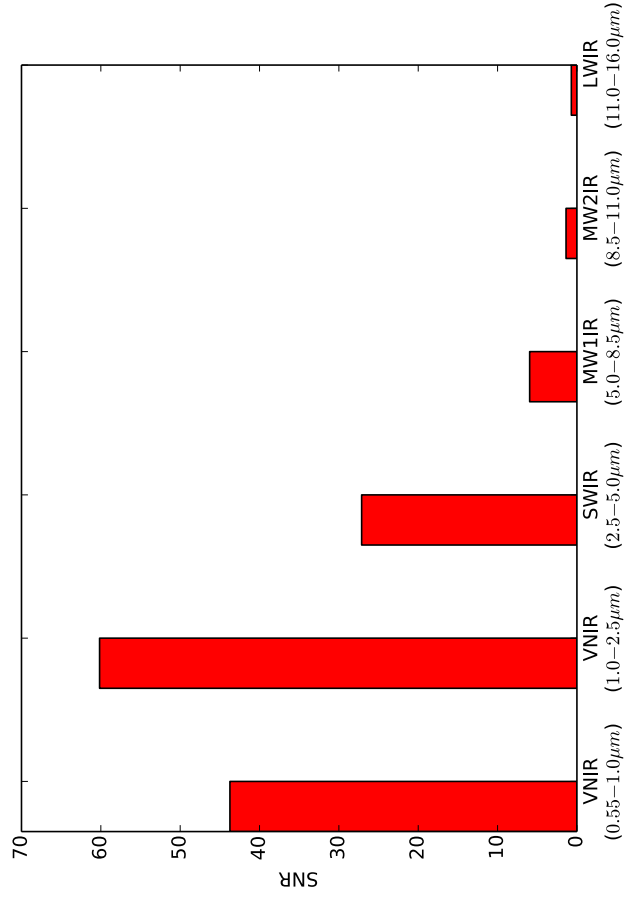
SNR of WASP-75 b (Primary) Per Channel (1 transit = 5.91h)



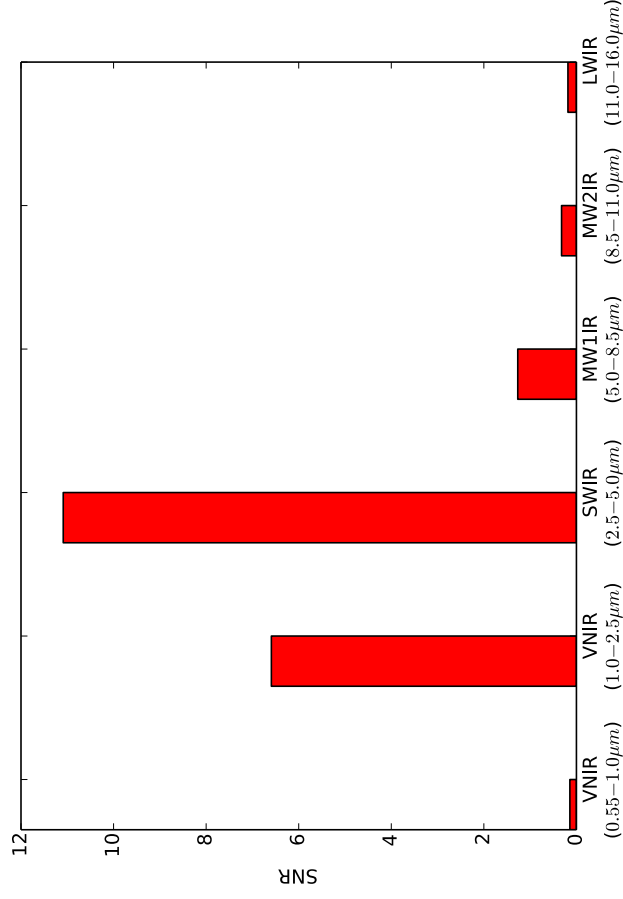
SNR of WASP-77 A b (Secondary) Per Channel (1 eclipse = 7.60h)



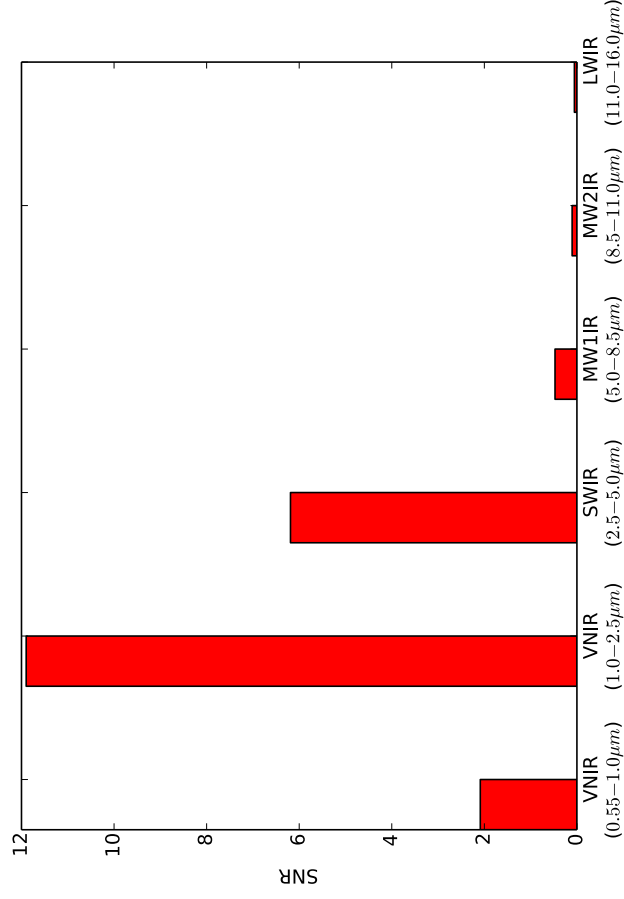
SNR of WASP-77 A b (Primary) Per Channel (1 transit = 7.60h)



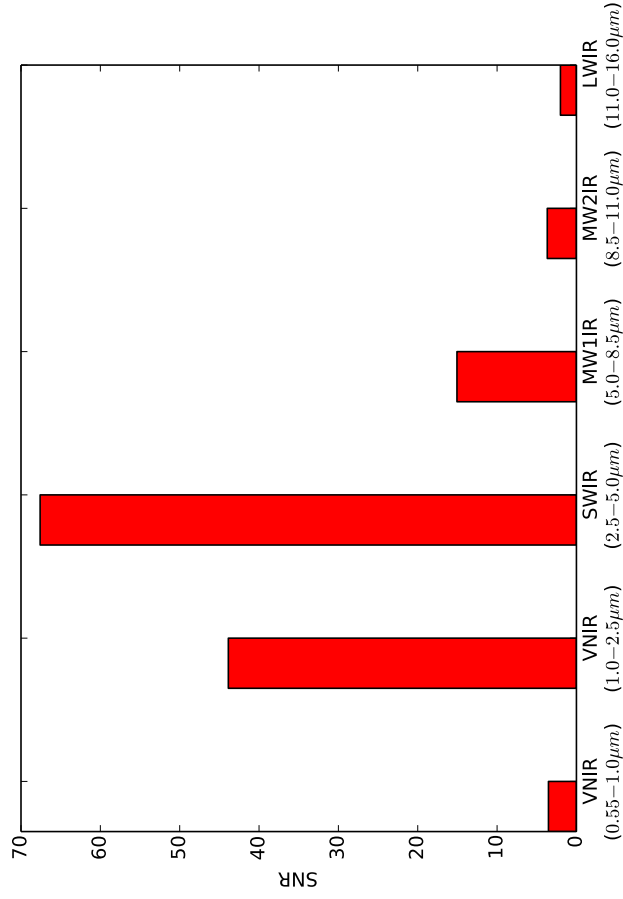
SNR of WASP-78 b (Secondary) Per Channel (1 eclipse = 14.12h)



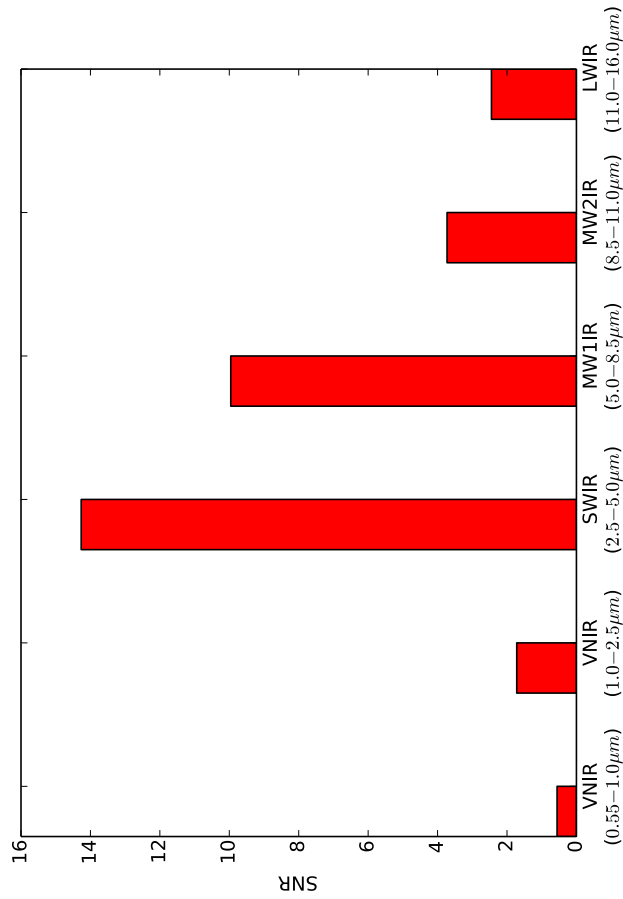
SNR of WASP-78 b (Primary) Per Channel (1 transit = 14.12h)



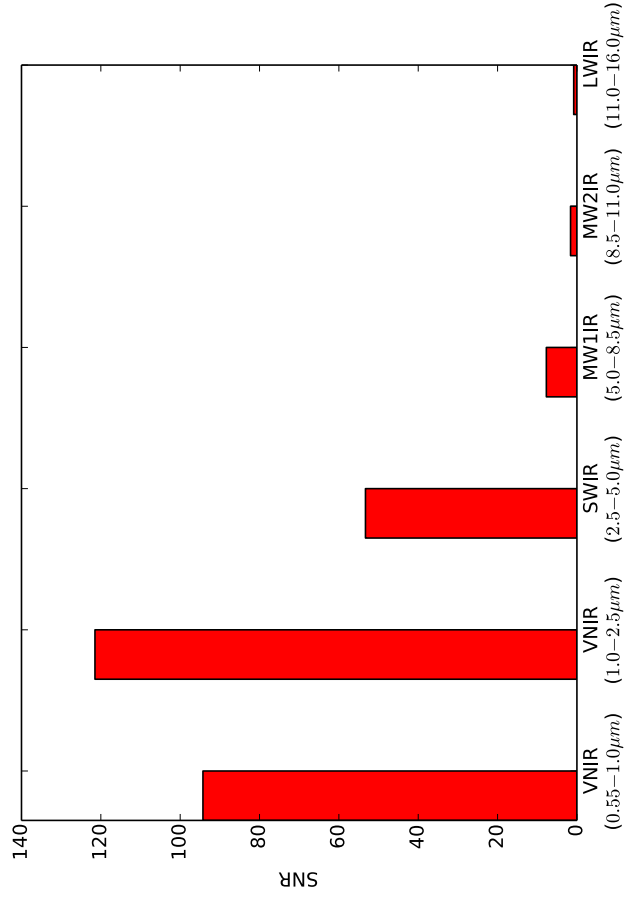
SNR of WASP-79 b (Secondary) Per Channel (1 eclipse = 18.64h)



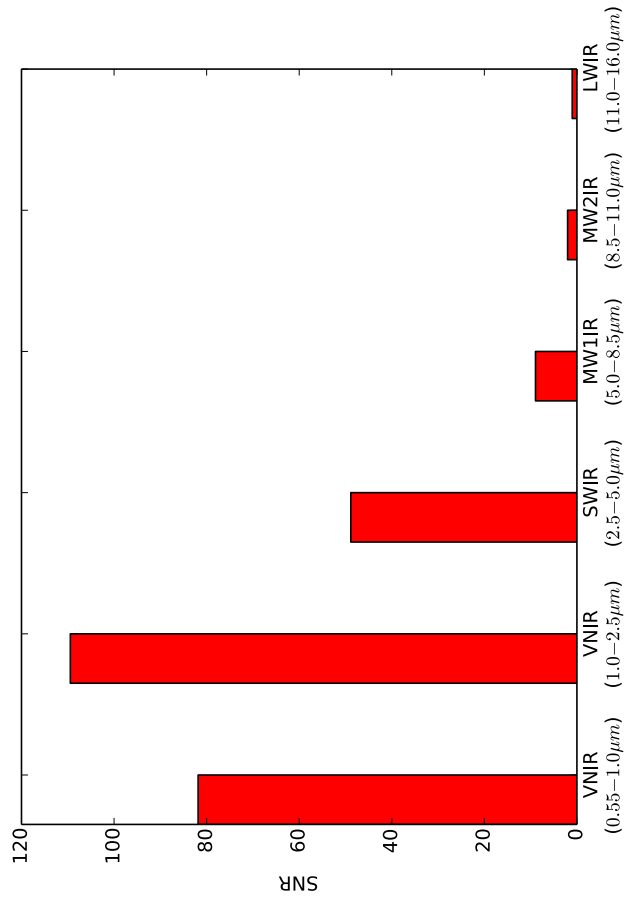
SNR of WASP-80 b (Secondary) Per Channel (1 eclipse = 6.34h)



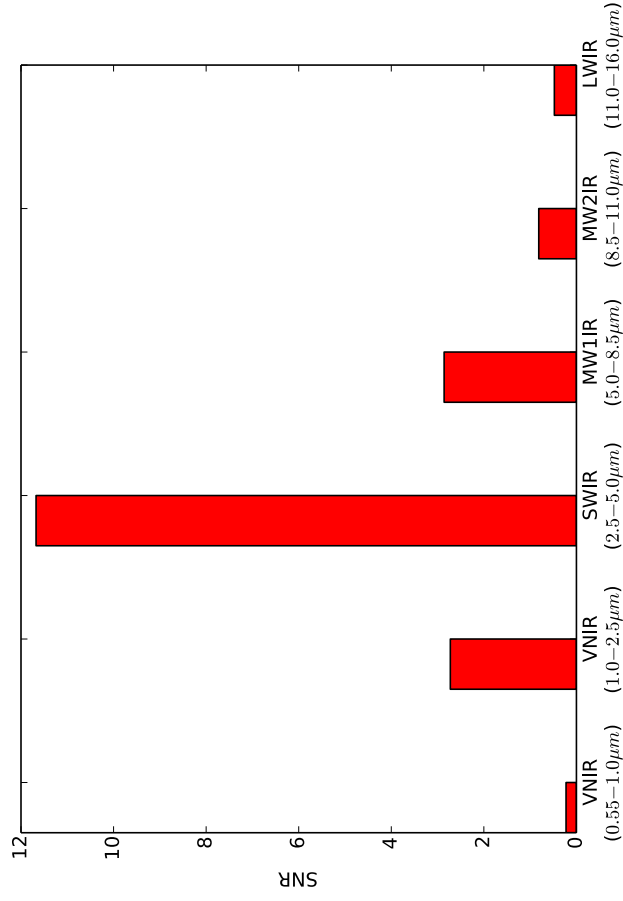
SNR of WASP-79 b (Primary) Per Channel (1 transit = 18.64h)



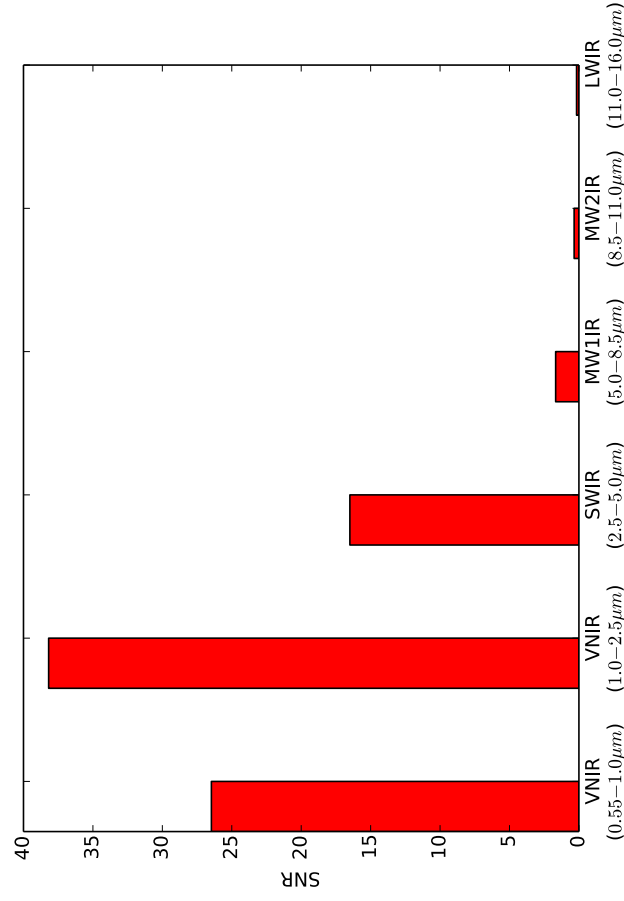
SNR of WASP-80 b (Primary) Per Channel (1 transit = 6.34h)



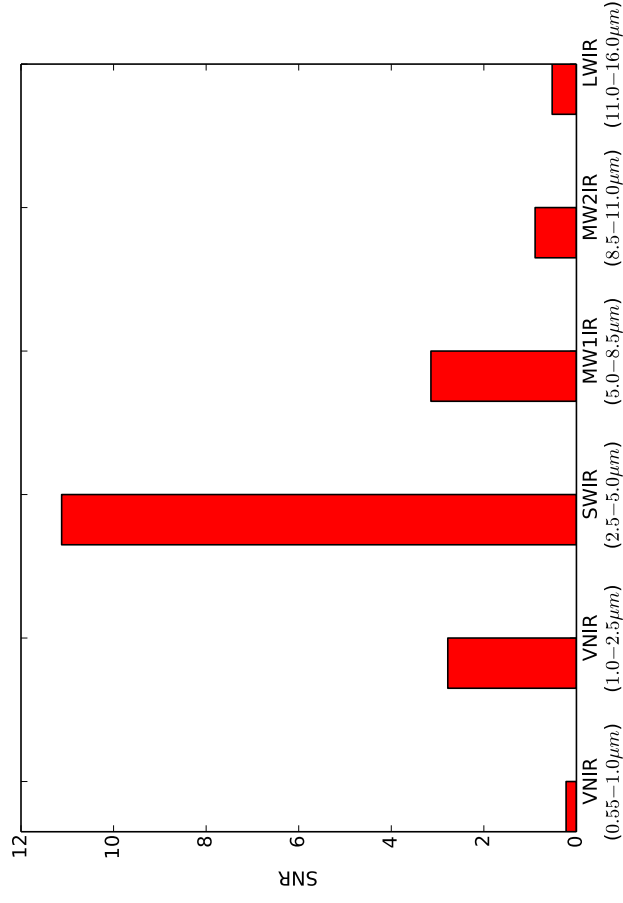
SNR of XO-1 b (Secondary) Per Channel (1 eclipse = 9.01h)



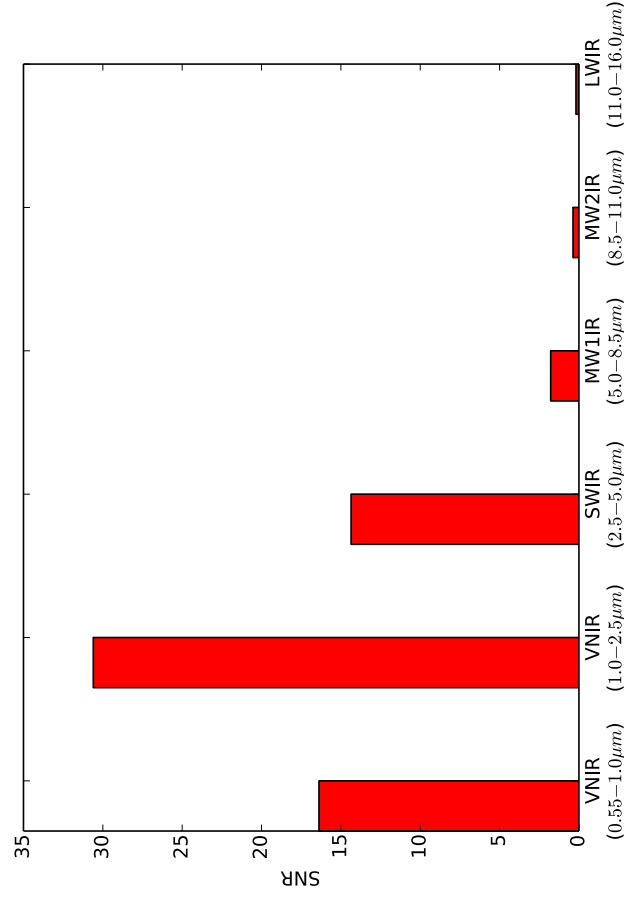
SNR of XO-1 b (Primary) Per Channel (1 transit = 9.01h)



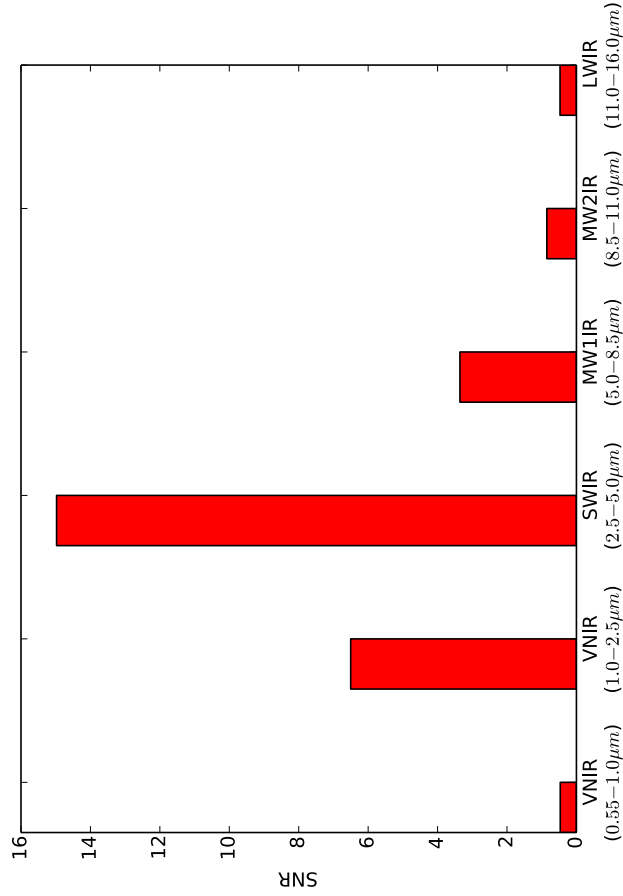
SNR of XO-2 b (Secondary) Per Channel (1 eclipse = 7.97h)



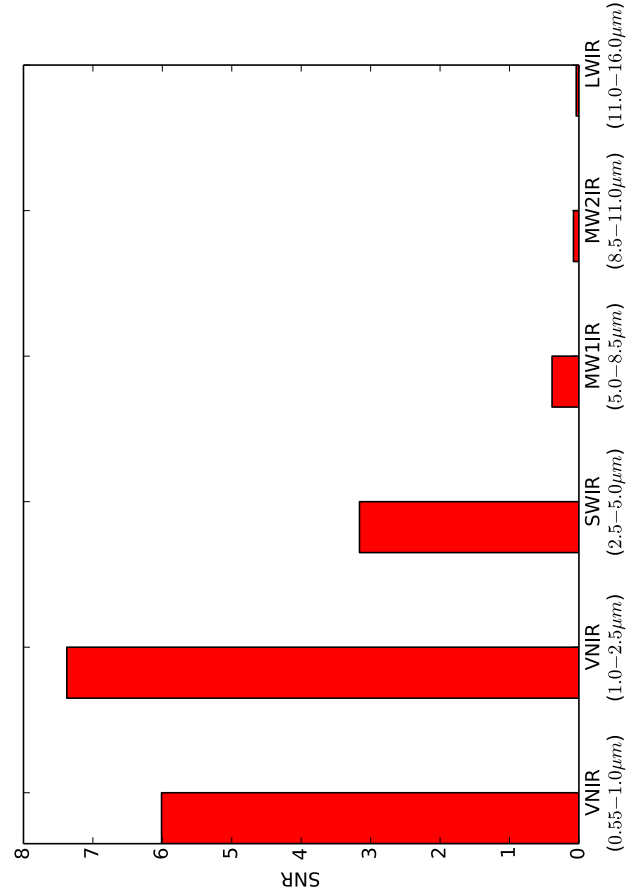
SNR of XO-2 b (Primary) Per Channel (1 transit = 7.97h)



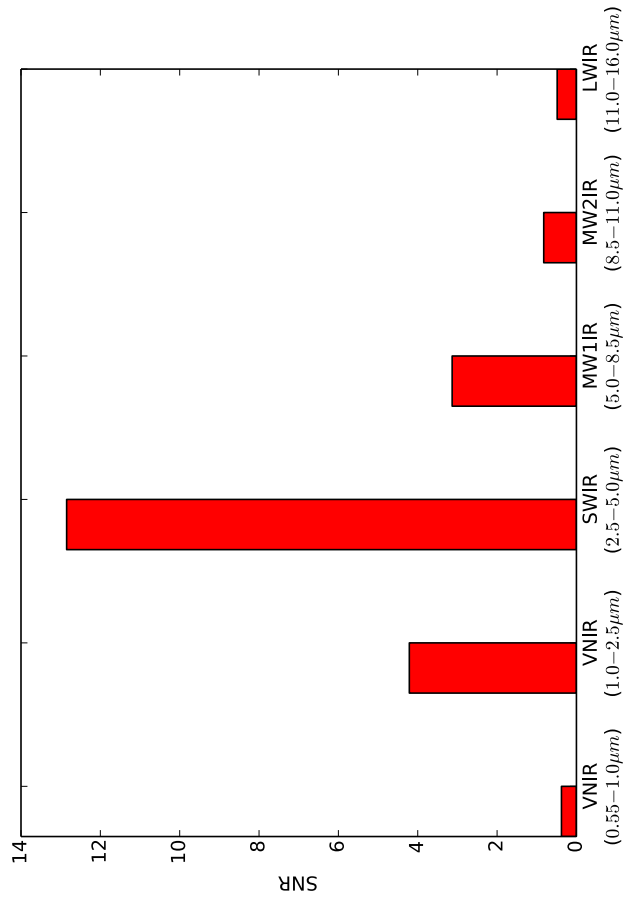
SNR of XO-3 b (Secondary) Per Channel (1 eclipse = 8.60h)



SNR of XO-3 b (Primary) Per Channel (1 transit = 8.60h)



SNR of XO-4 b (Secondary) Per Channel (1 eclipse = 13.29h)



SNR of XO-4 b (Primary) Per Channel (1 transit = 13.29h)

