OMEGA

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OMEGA

Water ? Water !

(but not quite as envisioned before)

- OMEGA shows no evidence for permanent oceans or lakes along the past 3 billion years. No extended areas with carbonates, that would constitute the trap of the early CO_2 dense atmosphere. Mars likely suffered a very efficient and early atmospheric loss, with no long-term green-house effect. This is a major departure from the Earth evolutionary pathway.

- Water is today predominantly present as ice, with the two polar caps constituting massive reservoirs, and within hydrated minerals.

- In the early times, large water episodes led to the formation of clays, identified by OMEGA in the ancient cratered terrains.

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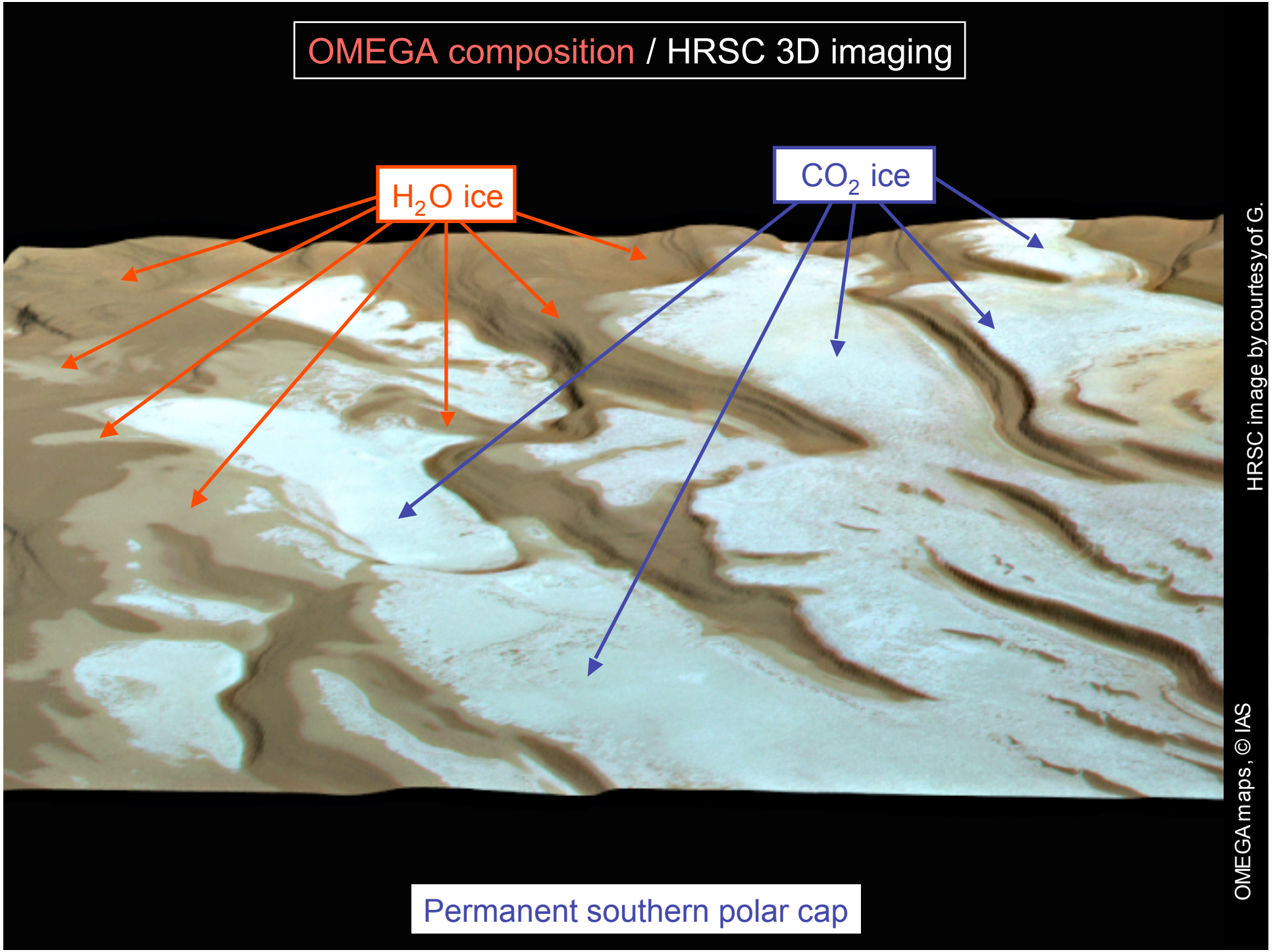
- More importantly, OMEGA has identified and mapped a variety of deposits, constituted of hydrated sulfates, which trace back water-driven processes, in three major locations:

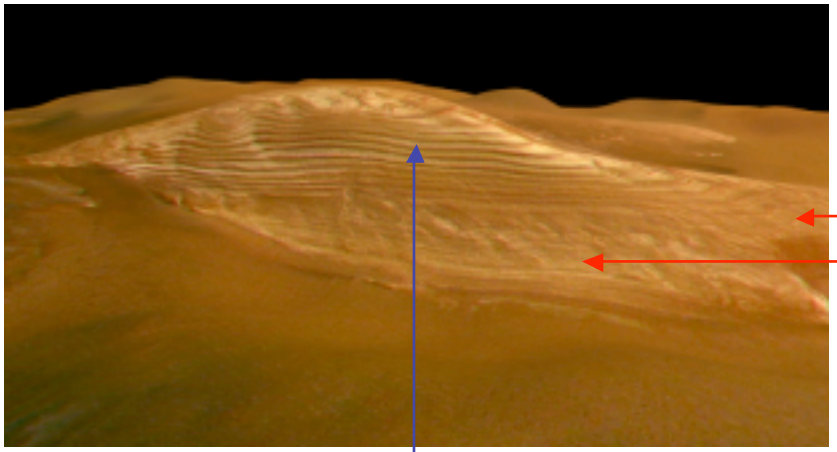
→ within Valles Marineris, in bright and stratified (layered) deposits

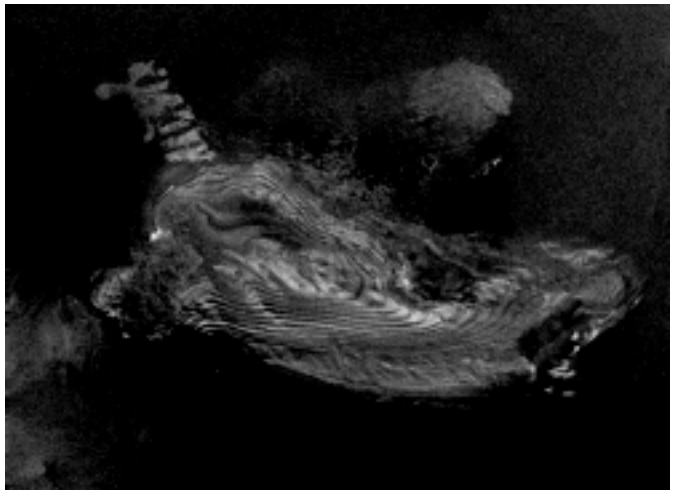
→ close to the Opportunity landing site

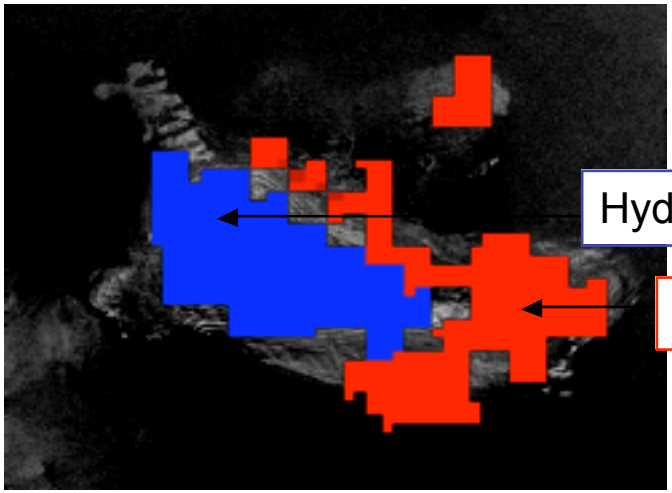
→ at the North pole, where the dark dunes are made of gypsum !


OMEGA composition / HRSC 3D imaging
H_2O ice
CO_2 ice
Permanent southern polar cap
HRSC image by courtesy of G.
OMEGA maps, © IAS

OMEGA composition / HRSC imaging

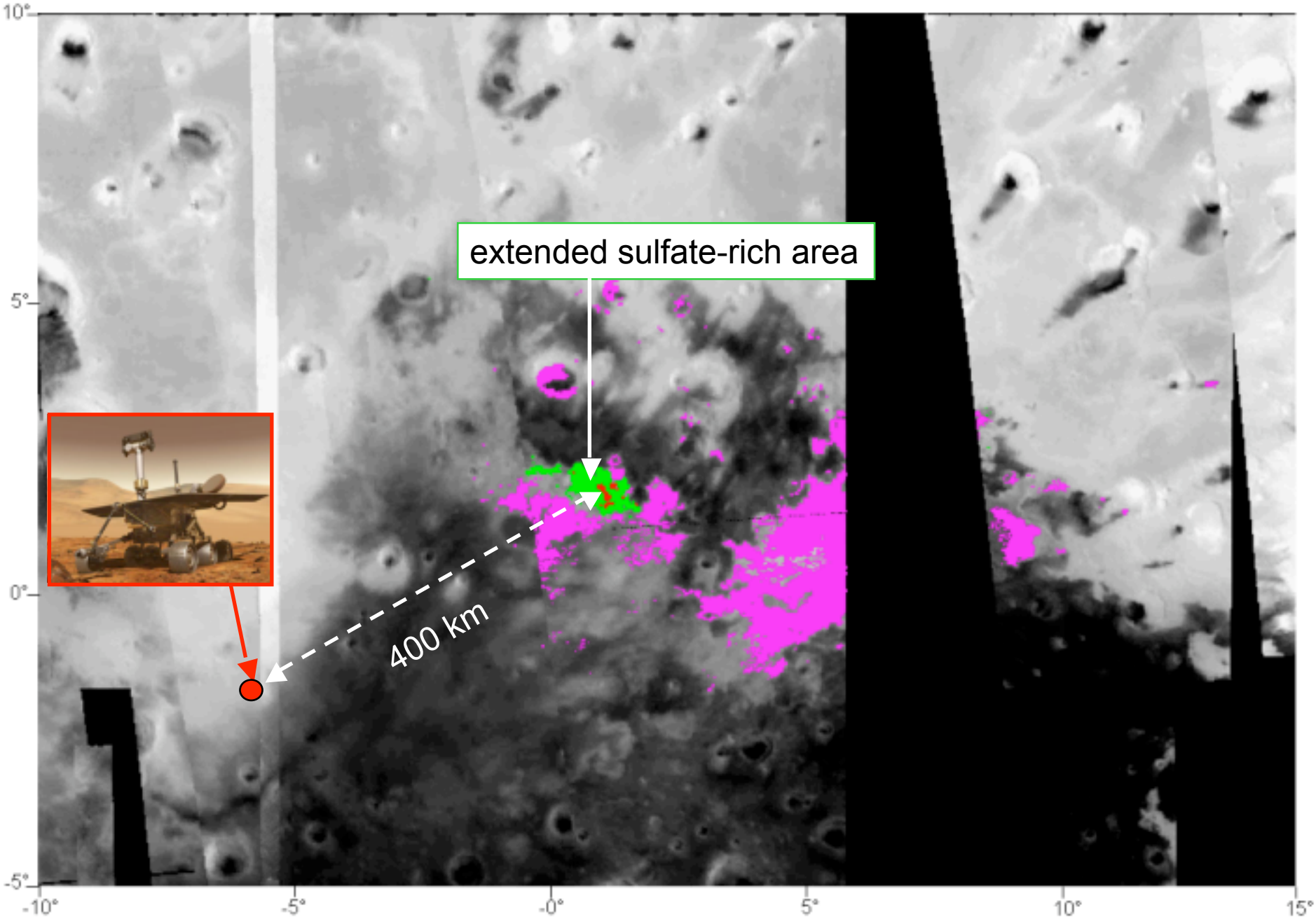






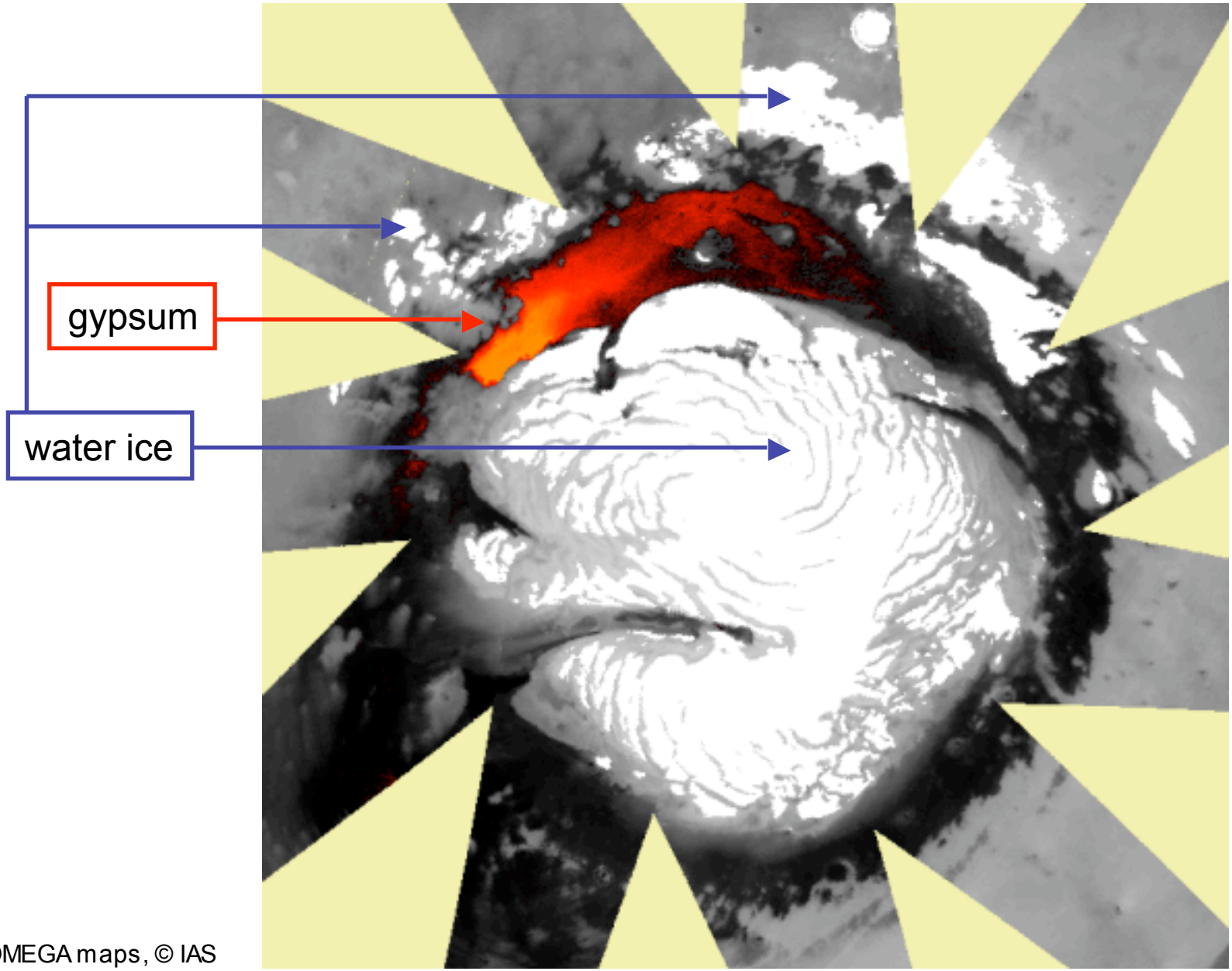
OMEGA maps, © IAS

HRSC images by courtesy of G. Neukum



OMEGA maps, © IAS

A wide polar area made of gypsum



OMEGA maps, © IAS

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The OMEGA observations tell that before Mars entered a dry and cold era some 3 billion years ago, Mars could have hosted warm and wet episodes in its early history.

This phase is traced back by the sulfate-rich areas mapped by OMEGA, that should constitute targets for future NASA and ESA in situ explorations.