

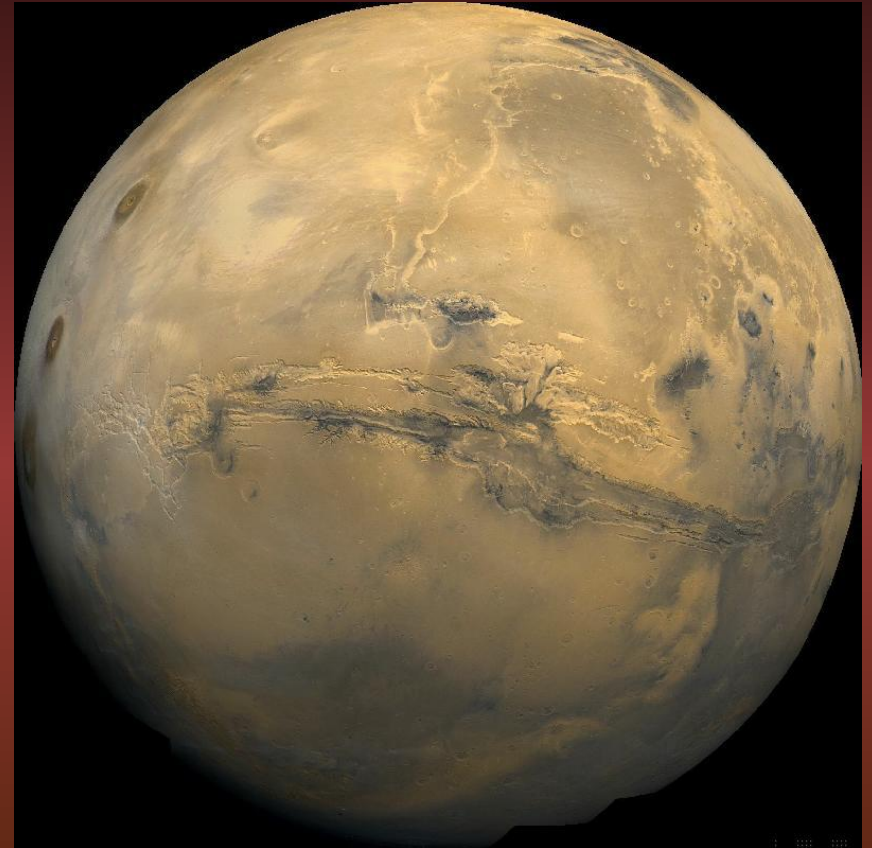
# **Mars Express**

# **Mars Reconnaissance Orbiter**

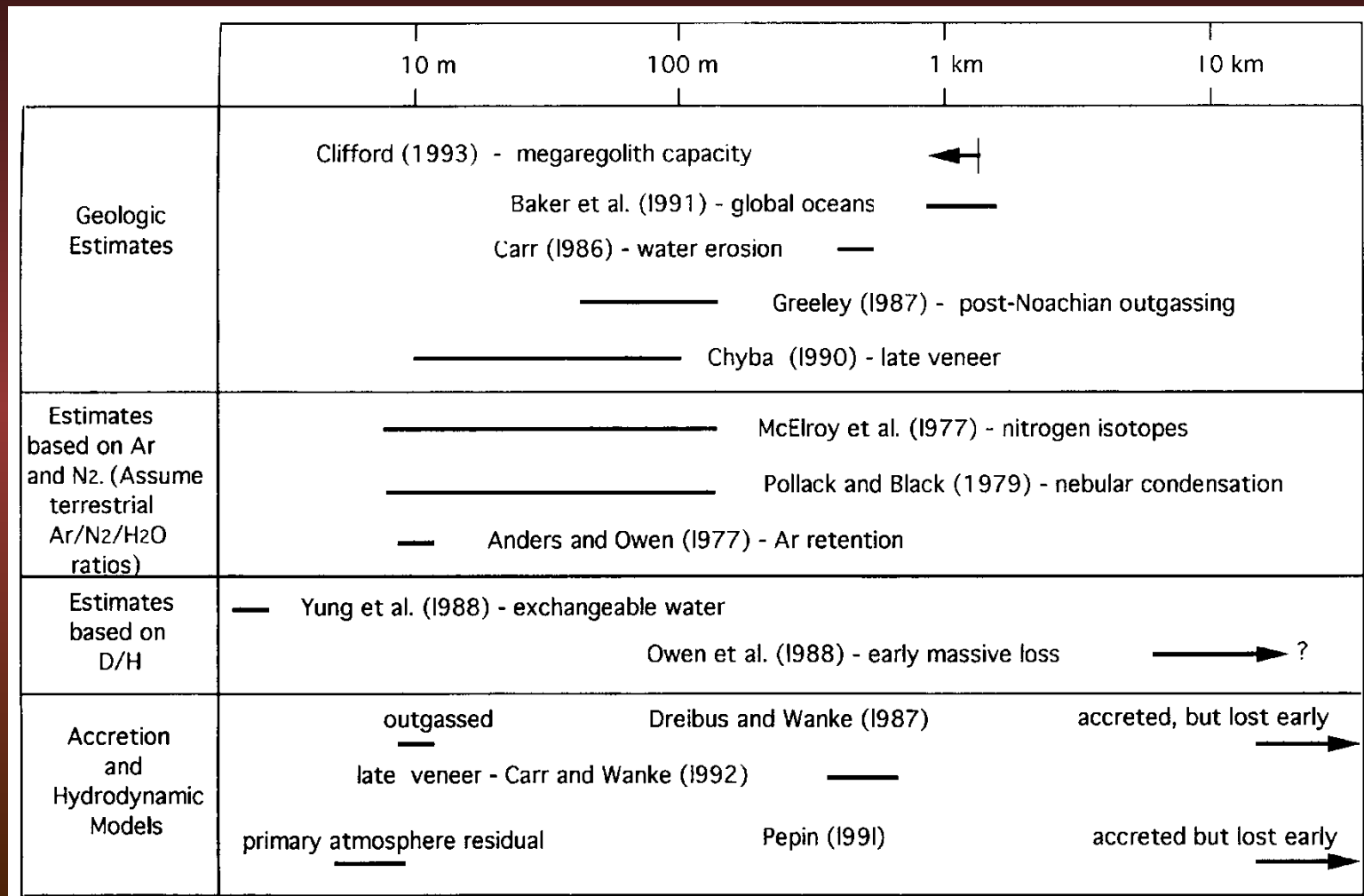
R. Orosei  
INAF/IAPS

# Mars

- Wrapped in a thin atmosphere of carbon dioxide, it shows signs of a past in which the water flowed on the surface (denser atmosphere, warmer climate)
- This suggests that the evolution of life could have taken place on Mars
- Mars is the most explored planet in the solar system, also through international collaborations
- The discovery of life on another planet would have an impact comparable to the Copernican revolution



# Estimates of the initial quantity of water on Mars



## **“Follow the Water”**

*Common  
Thread*

*W*

Determine if Life ever Arose on Mars

*A*

*T*

Characterize the Climate of Mars

*E*

*R*

Characterize the Geology of Mars

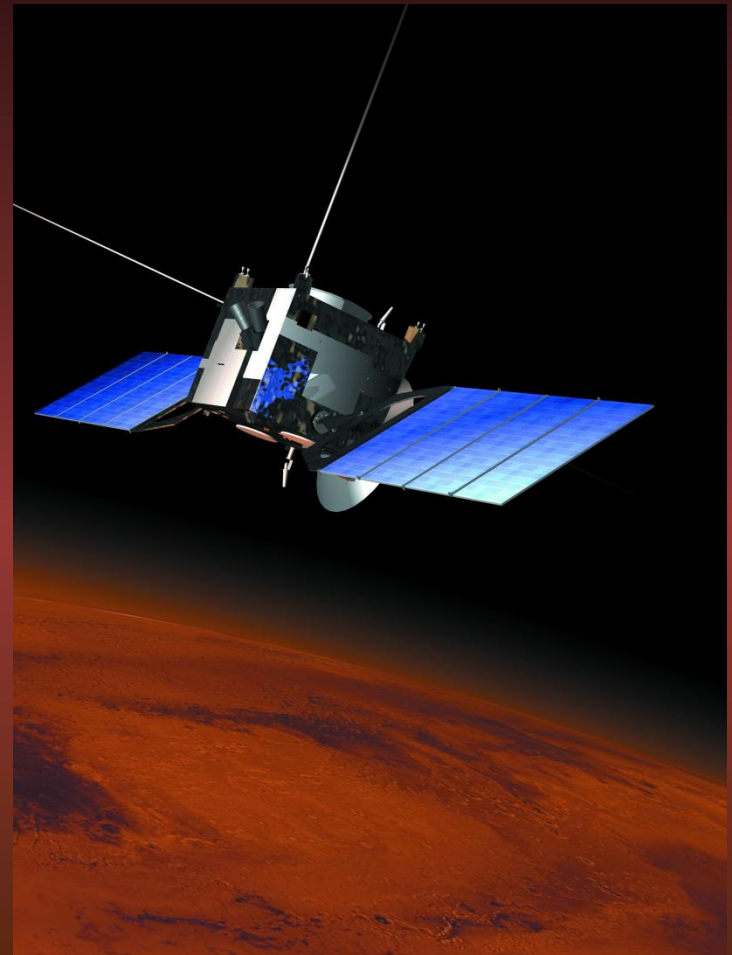
When  
Where  
Form  
Amount

Prepare for Human Exploration



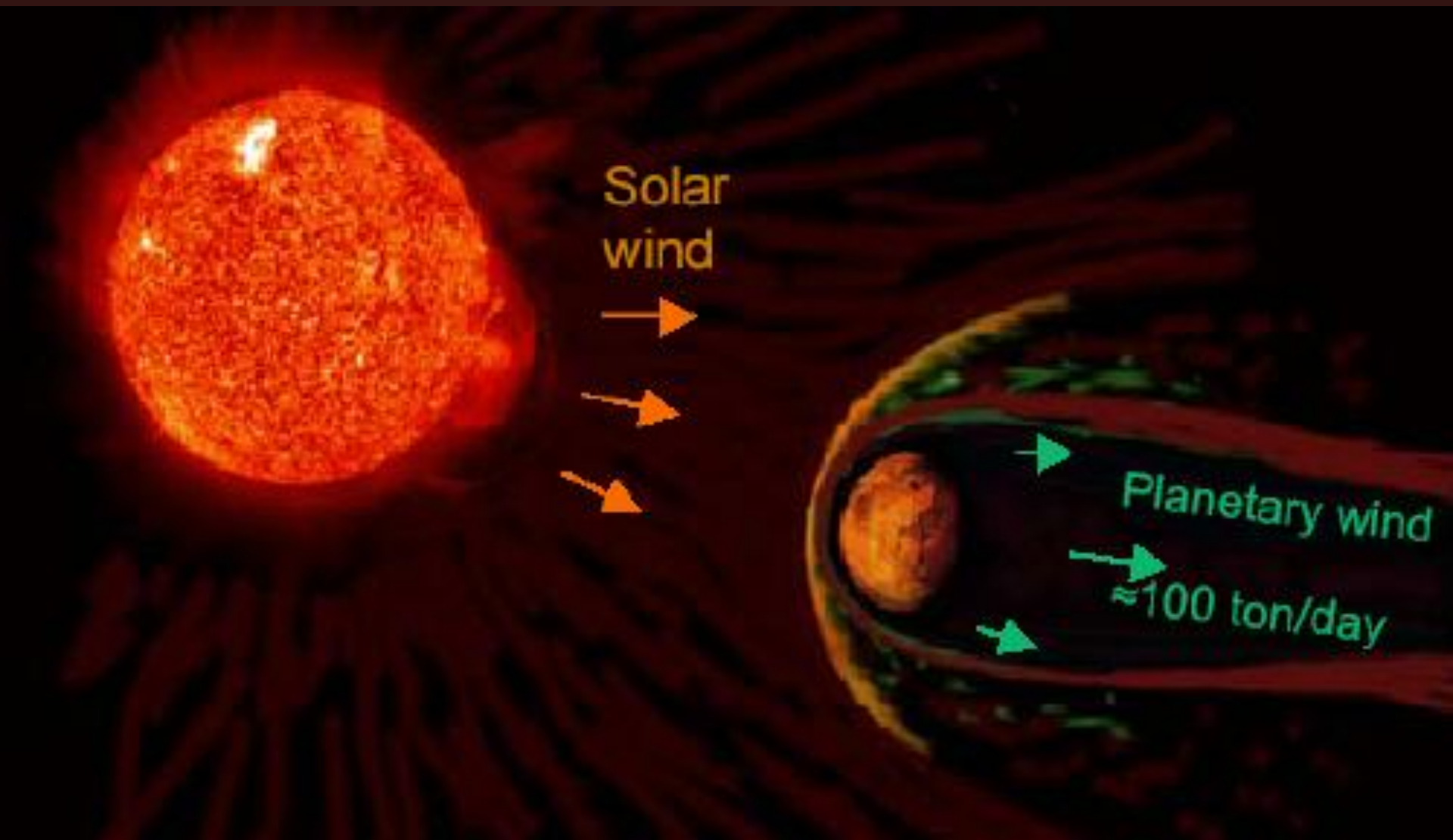
# Mars Express

- Launched on June 2, 2003.
- ESA's first planetary mission.
- Carries seven experiments, several of which have Italian contributions or leadership.
- Will remain operational at least until 2014.

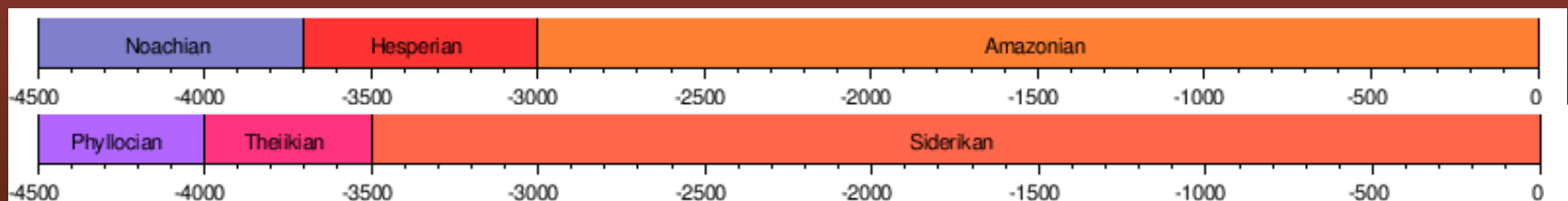
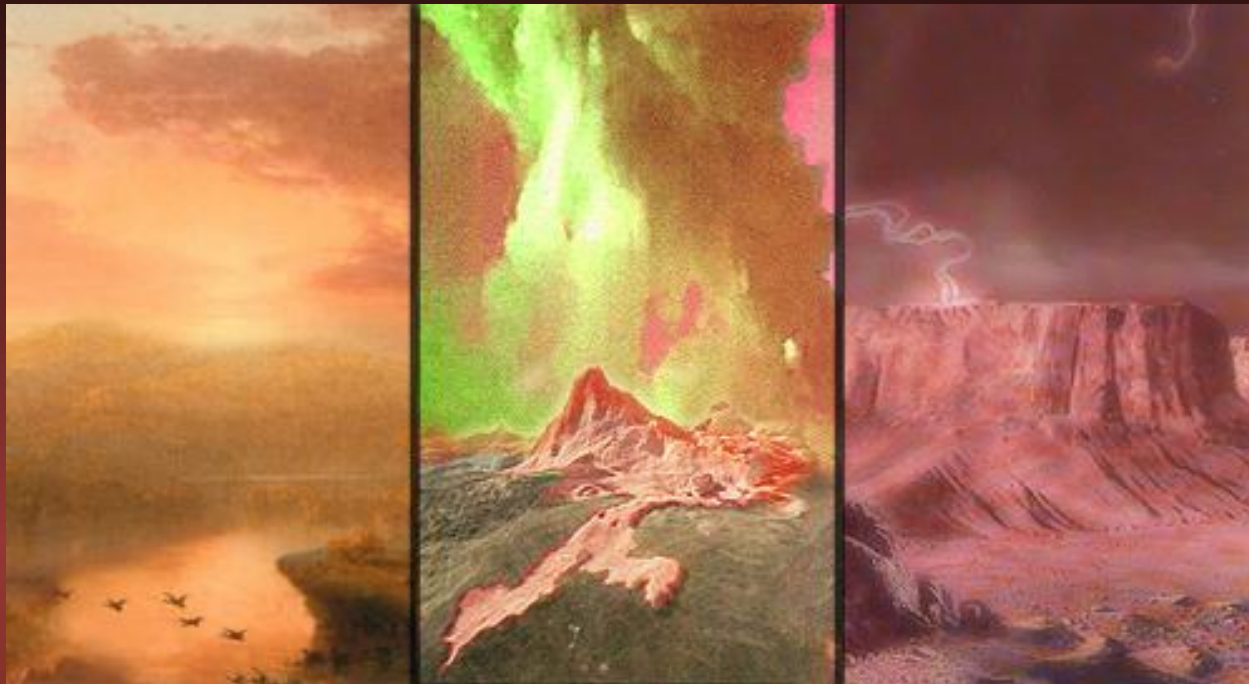




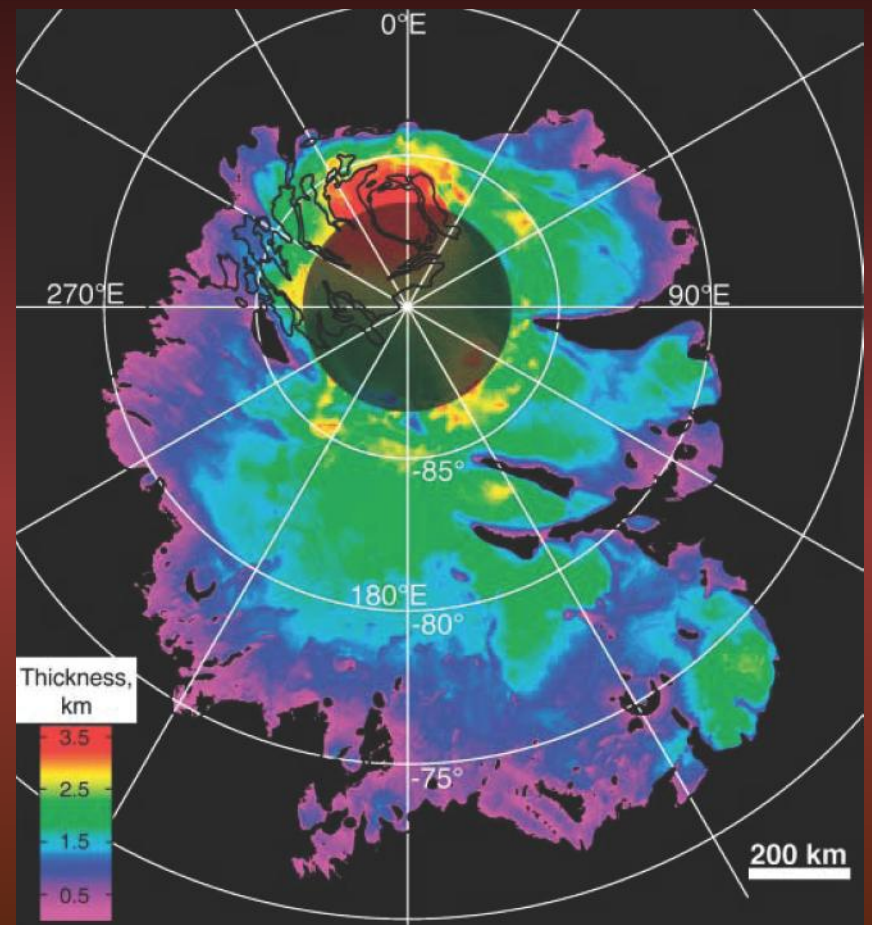
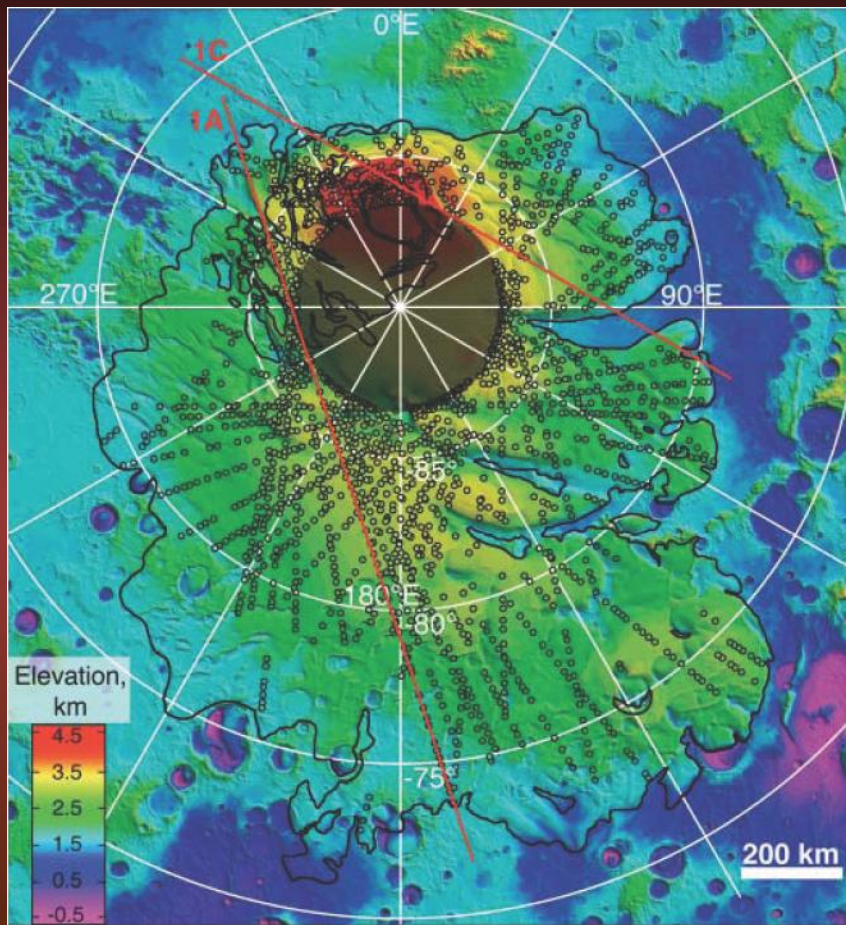
# ASPERA: Erosion of the atmosphere



# OMEGA: the three ages of Mars



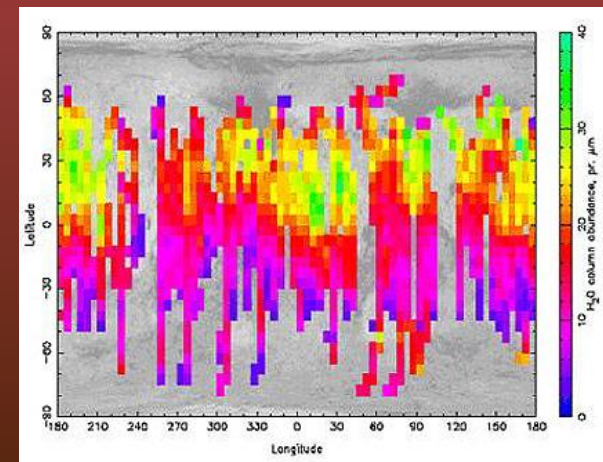
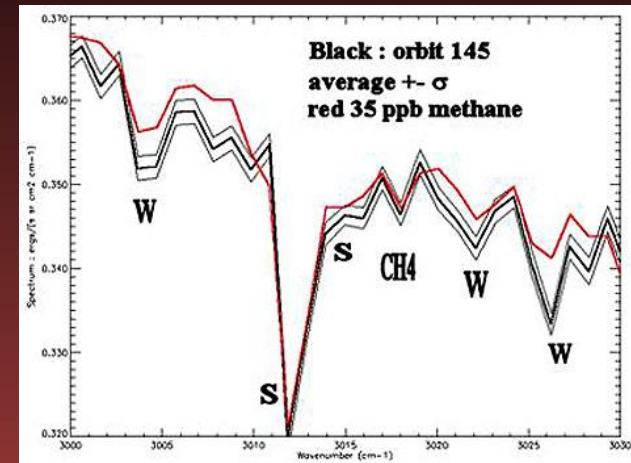
# MARSIS: the ice inventory of Mars





# PFS: Methane!

- The most important discovery on Mars Express is that of methane in the atmosphere.
- The discovery was made by an Italian instrument, the spectrometer PFS.
- The amounts are tiny, but they require an active source.

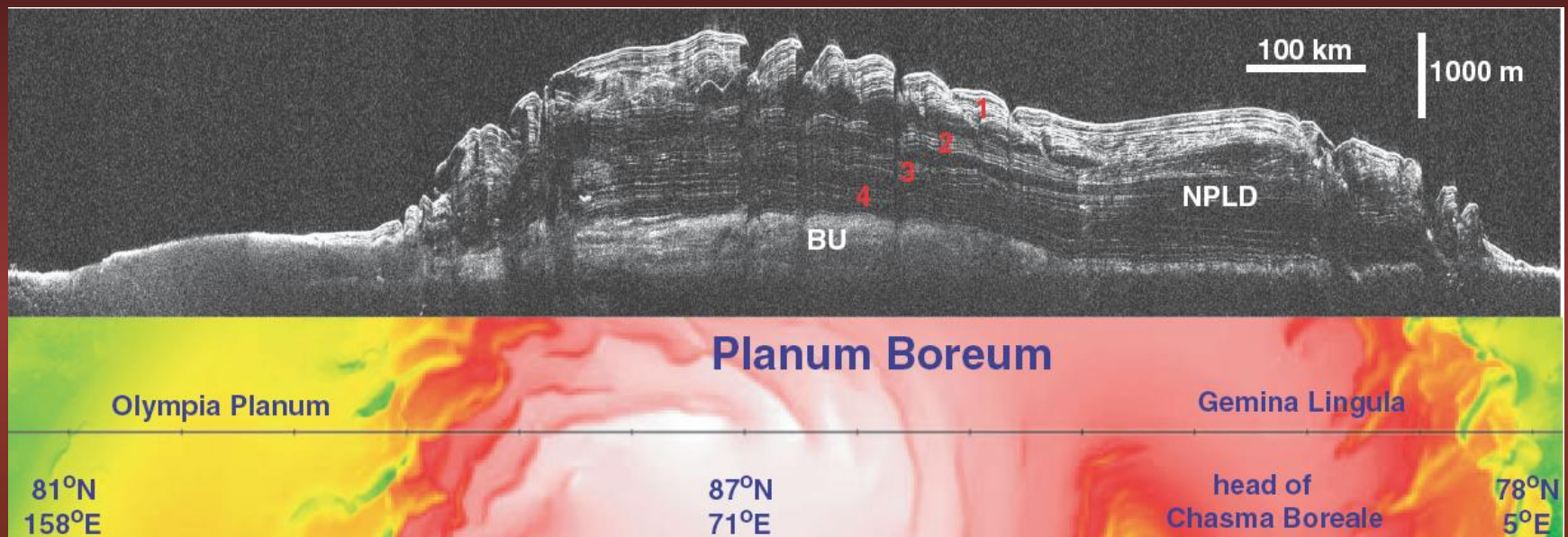


# Mars Reconnaissance Orbiter

- Launched on August 12, 2005.
- NASA mission with high resolution sensors, to search for traces of water on the surface of the planet.
- Carries the Italian radar SHARAD.
- It has now been extended at least until 2013.



# Mars North Polar Deposits: Stratigraphy, Age, and Geodynamical Response





# Subsurface structure of Planum Boreum from Mars Reconnaissance Orbiter Shallow Radar soundings

