Workshop proposal to ISSI

Quantifying the Martian Geochemical reservoirs

Overall theme and aim

Interdisciplinary forum of Martian geochemistry

a) constraining and quantifying the composition of the various (solid) reservoirs at the surface and within the interior of Mars

b) constraining and quantifying the physical and chemical processes which have led to the present day distribution of matter on and within Mars

Overall theme and aim

Interdisciplinary forum of Martian geochemistry

Orbital and in-situ study

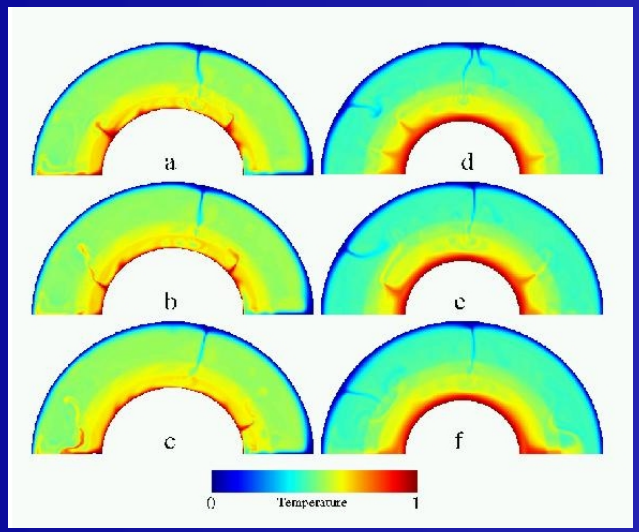
Overall theme and aim

Interdisciplinary forum of Martian geochemistry

Study of Martian meteorites

Overall theme and aim

Interdisciplinary forum of Martian geochemistry



Numerical and experimental simulation

Scientific Relevance

- Essential step for reconstructing the geological history of the planet (e.g. variations of temperature and distribution of matter as a function of space and time).
- In turn, will shed light on and constrain other issues such as the formation of ore deposits, or habitability as a function of time.
- A better understanding of the composition of Mars will also constrain the distribution of matter at the scale of the solar system, providing insight into accretionary processes during planet building

Scientific communities involved

- Planetary scientists directly involved in space-based exploration of the Martian surface, using orbital and/or in-situ instruments.
- Earth scientists studying samples generally accepted as coming from Mars (SNC meteorites).
- Planetary and/or Earth scientists who are simulating, either numerically or in the laboratory (experimentally) the physical and chemical processes occurring on or within Mars

Timeliness and relevance to space science

- The last five years have seen an explosion in the amount and quality of data produced by space-based exploration of the planet Mars (e.g. Mars Exploration Rovers of NASA, or Mars Express of ESA), with other missions in various stages of preparation (e.g. Mars Reconnaissance Orbiter currently getting into its final orbit).

- The last few years have also seen a significant increase in the number of recognised SNC meteorites, thanks to intensive searches of hot and cold deserts (Sahara, Antarctica...).

Timeliness and relevance to space science

- The extended mission of Mars Express will end in late 2007. An ISSI workshop in early 2008 would represent an ideal opportunity to summarize the findings of that mission.
- This time frame would also be favourable in the context of other missions which will be at critical stages of planning (e.g. Mars Science Laboratory and ExoMars).
- Reasonable time lapse since last ISSI workshop dedicated to Mars (2000) and since Workshop on “Geology and Habitability of Terrestrial Planets” (2005)

Topics

The workshop would be organised in such a way that people from different scientific communities could interact as much as possible. Workshop sessions would be centred on scientific questions rather than a given approach. Some suggestions of possible session titles are:

–Alteration of the Martian surface: (constraints from space-based observations; constraints from study of SNC's; constraints from experimental studies).
The relative importance of different volatile species (S, Cl, CO_2....) will be a central issue here.

–Magmatism on Mars: (constraints from space-based observations, from study of SNC's, from experimental studies).
These are central issues for constraining the composition and temperature of the Martian interior

Topics (con't)

Water on Mars: How can available data be used to constrain how water is distributed within the different geochemical reservoirs of Mars?

Internal structure: Is it possible to propose realistic models for internal structure and chemical variability, consistent with all the available observations and theoretical/experimental data?

Note also the possible interaction/implication of ISSI International science teams focussed on the question of water on Mars (#85 and #75).

WS Date & Structure

- Preferred date: early 2008.
- Preferred format: plenary sessions only (no parallel sessions, splinters, working groups etc.), in order for scientists from different communities to interact as much as possible.
- 4.5 days, 4 talks/half day

Proposed Conveners

- Michael Toplis (Obs. Midi-Pyrénées)

ISSI contact K. Fischbaugh (to be confirmed)

Joint MER/OMEGA meeting 12-14 June 2007 ideal place to approach potential international conveners