



Infrared remote sensing of the Martian atmosphere from ground and space (David Bates Medal Lecture)

Therese Encrenaz

Paris Observatory, LESIA, Meudon, France (therese.encrenaz@obspm.fr, +33 1 4507-2806)

The atmosphere of Mars, as compared with the terrestrial one, shows clear similarities (rotation period, obliquity, presence of polar caps) and differences (tenuous atmosphere, strong meridional transport, absence of magnetic field). It is characterized by a fast response to changes in solar irradiation which induces strong seasonal cycles of the pressure the water vapor and the dust. There are many pending questions regarding the present atmosphere (circulation, surface-atmosphere interactions, trace constituents...), the past climate (effects of obliquity changes), and the history of the atmosphere since its origin.

In addition to the Viking measurements, the composition and structure of the Martian atmosphere have been studied through remote sensing spectroscopy from Martian orbiters, observatories in Earth orbits, and ground-based telescopes. The infrared range, both in the reflected solar component and in the thermal regime, have allowed us to monitor the thermal structure of Mars, to monitor the CO₂, H₂O and dust cycles, and to study the minor species and their seasonal évolution.

This paper will review our present knowledge of the Martian atmospheric composition, with special emphasis on recent results obtained using Mars Express and ground-based telescopes on minor atmospheric constituents (H₂O, CO, H₂O₂). The need for high-resolution imaging spectrometers using large telescopes, in support to space missions, will be emphasized and future plans will be discussed.