



UV airglow - remote sensing of the Martian upper atmosphere

Guillaume Gronoff (1), Cyril Simon Wedlund (2), Christopher Mertens (1), Jean Lilensten (3), Stephen Bougher (4), and Mathieu Barthelemy (3)

(1) NASA-LaRC, Science Directorate, Chemistry and Dynamics Branch, Hampton, United States (guillaume.p.gronoff@nasa.gov), (2) BIRA - IASB, Bruxelles, Be, (3) IPAG, Grenoble, Fr, (4) Univ Michigan, Ann Arbor, MI, USA

The SPICAM spectrometer onboard Mars Express was able to detect several aspects of the Martian UV airglow. Some of the observed emissions need modelling efforts, while for others the discrepancy between the model and the observation comes only from the thermospheric parameters. Since the Martian upper atmosphere undergoes large seasonal neutral density variations, it is then useful to study these variations through the airglow instead of depending on the less practical occultation techniques.

In this work, we present our techniques to retrieve the upper atmosphere density thanks to the $O(^1S)$, the $CO(a^3\Pi)$ (Cameron bands) and the $CO_2^+(B)$ emissions. The use of the forward model, Aeroplanets, along with the database for the cross sections AtMoCiad, allows to estimate the uncertainties. The CO_2 densities retrieved independently from each emission are in good agreement, and can be compared to densities deduced from occultation where the two techniques overlap.

We show the need for a NASA/TIMED-like mission to Mars (Thermosphere-Ionosphere-Mesosphere Energetics and Dynamics) to understand the mesosphere-upper atmosphere of Mars, for which we give recommendations on the observing channels and retrieval techniques.