"**Mars and Venus atmospheres at the terminator**"

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The atmosphere of a terrestrial planet at the day-night terminator is a region of great interest characterized by gradients of density and temperature, driven by differences in the solar illumination, and by sharp transitions in the chemical regime. Atmospheric waves – induced by the sudden variation of the temperature structure – are also observed and could themselves modify the structure of this region. Solar occultation is a powerful technique to measure the vertical distribution of trace gases in planetary atmospheres at the terminator. The major advantages of this technique are the high vertical resolution and its self-calibration mode.

The Solar Occultation in the InfraRed (SOIR) instrument was the first high-resolution NIR spectrometer on board a spacecraft investigating the Venusian atmosphere at the terminator. SOIR offered the possibility to monitor routinely the density of various key Venus species and temperature vertical profiles and helped identify the complex dynamic and chemical processes that take place in this region. Rapid variations in species concentration at the terminator have the potential to cause asymmetries in the species distributions along the line of sight (LOS) of a solar occultation experiment. Nowadays, most of the retrieval algorithms for solar occultations rely on the assumption of a spherically symmetrical atmosphere. However, photochemically induced variations near sunrise/sunset conditions need to be taken into account in the retrieval process in order to prevent inaccuracies.

Ozone, in particular, displays rapid changes due to photolysis across the terminator on both Mars and Earth. Solar occultation observations of ozone at the Martian terminator were acquired by SPICAM/Mars Express and – since April 2018 – by the NOMAD instrument on the ExoMars 2016 Trace Gas Orbiter. These observations are used as a test case to investigate the impact of gradients along the LOS in the retrieval of ozone under sunrise/sunset conditions.