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Impact of the 2018 Mars global dust storm on water vapour as observed by NOMAD on ExoMars Trace Gas Orbiter

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The NOMAD ("Nadir and Occultation for MArs Discovery") spectrometer suite on board the ExoMars Trace Gas Orbiter has been designed to investigate the composition of Mars' atmosphere, with a particular focus on trace gases, clouds and dust. This will allow for a major leap in our knowledge and understanding of the Martian atmospheric composition and the related physical and chemical processes. NOMAD will conduct a spectroscopic survey of Mars' atmosphere in ultraviolet (UV), visible and infrared (IR) wavelengths covering large parts of the 0.2-4.3 μm spectral range [1,2]. NOMAD is composed of 3 spectrometers: a solar occultation dedicated spectrometer (SO – Solar Occultation) operating in the infrared (2.3-4.3 μm), a second infrared spectrometer (2.3-3.8 μm) capable of doing nadir, but also solar occultation and limb observations (LNO – Limb Nadir and solar Occultation) [3], and an ultraviolet/visible spectrometer (UVIS – UV visible, 200-650 nm) that can work in all three observation modes [4].

Science phase started in April 2018. Since then NOMAD performed solar occultation and nadir observations using different options to test the instrument under various conditions. Several atmospheric species have been targeted, delivering profiles from solar occultation from 200 km down to the surface and integrated abundances from nadir measurements. Observations optimized for the detection of dust and clouds have also been performed. We will present first results from nadir and solar occultation observations, with an emphasis on the detection of the dust storm observed in June 2018 and afterwards, and its impact on the composition of the atmosphere in particular on water and D/H ratio.

References

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