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Ice clouds detection with NOMAD-LNO onboard ExoMars Trace Gas Orbiter

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This work takes advantage of the NOMAD spectrometer observations, on board the 2016 ExoMars Trace Gas Orbiter. ExoMars is an ESA-Roscosmos joint mission consisting of a rover and an orbiter (Trace Gas Orbiter - TGO). The Nadir and Occultation for Mars Discovery (NOMAD) is one of the four instruments on board TGO. The instrument is a suite of three spectrometers designed to observe the atmosphere and the surface of Mars in the UV, visible and IR. For this study, the Limb, Nadir and Occultation (LNO) channel, operating in the IR, is selected [1][2]. We focus on specific signatures in the [2.3 - 3.8 μm] range of NOMAD-LNO in order to study the possible detection of clouds at these wavelengths in the infrared.

For this study, we have selected the order 169 ([2611.8 nm - 2632.7 nm]) located in the vicinity of 2.7 μm CO₂/H₂O ices absorption band. We search for the presence of ice clouds in MY 34 ($L_5 = 150^\circ - 360^\circ$) and MY 35 for observations with a solar zenith angle below 80 degrees. The detection method is adapted from Bellucci et al., 2019 [3] and L. Ruiz Lozano et al., 2020 [4]. The initial results indicate a number of detections in the Tharsis region consistent with the known 'W' clouds [6][7]. Finally, these results will be compared with the NOMAD-UVIS observations ([230 nm - 310 nm]) obtained at the same TGO orbits.

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