

Line lists for the 16 μm , 11 μm , and 8 μm bands of nitrous acid (HONO)

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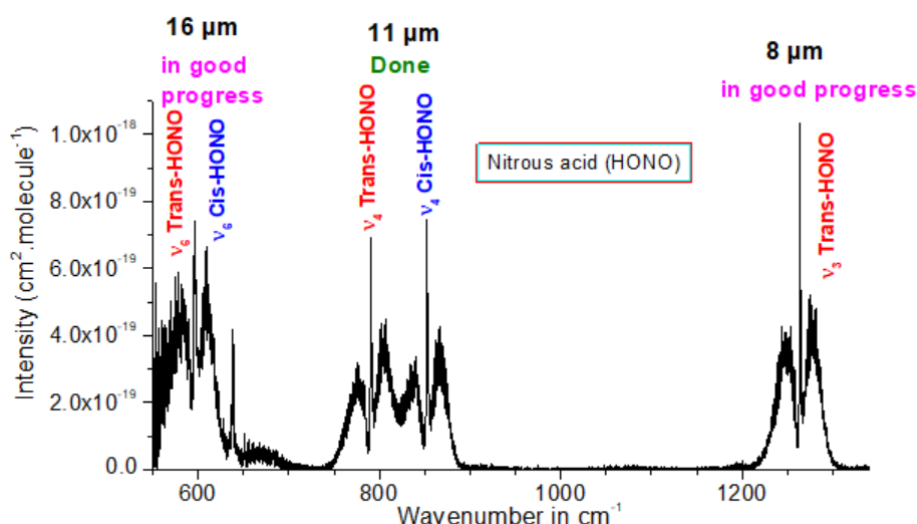
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ABSTRACT

The Nitrous acid (HONO) is a major source of OH radicals in the Earth atmosphere. Satellite missions, like IASI or FORUM, can potentially provide a global view of this species in the atmosphere. HONO was first detected at 11 μm by IASI during high events of fires¹⁻³. The recent study of Franco et al.⁴ has demonstrated that using different absorption bands can help for HONO detection. The goal of the present study is to generate individual line lists for the 16 μm , 11 μm , and 8 μm absorption bands of Trans-HONO and Cis-HONO. These line lists could help for the future synergy between the IASI-NG and FORUM instruments. Indeed, the HONO retrievals should be more accurate when a line by line list^{2,3}, instead of cross-sections^{1,4} are used for the analysis of the atmospheric spectra. Indeed, line lists enable to account explicitly for the temperature dependence of its infrared signature^{2,3}, while this is not the case for cross sections^{1,4}. Our HONO linelists were generated during several new experimental developments, like Fourier transform spectra recorded simultaneously in the THz, Far-infrared, 16 μm , 11 μm , and 8 μm spectral regions on the AILES Beamline at the SOLEIL synchrotron and in LISA laboratory, followed by theoretical studies.



¹ Clarisse et al. Geophys Res Lett 2011;38:L10802. ² Dufour et al. Atmosphere 2022;13:1485 ; ³ Armante et al. Mol. Phys. 120 (2021) 0.1080/00268976.2021.1951860 ; ⁴ Franco et al. Atmos. Chem. Phys., 24, 4973, (2024)