



First detection of meso-thermospheric Nitric Oxide (NO) by ground-based FTIR solar absorption spectroscopy

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We report the first detection of mesospheric-lower thermospheric (MLT, 50–130 km) NO from ground-based FTIR solar absorption spectra using Lorentz- and Doppler-broadened solar absorption lines in the stratosphere and in the MLT, respectively. We present the first characterization of vertical sensitivity in the FTIR NO retrieval and show that MLT NO partial columns can be retrieved with ~ 1 independent piece of information using a climatological NO profile extending up to 130 km. The information content analysis also improves the characterization of stratospheric partial column retrievals and is relevant to NO results obtained at other Network for the Detection of Stratospheric Change (NDSC) FTIR sites. We apply our approach to spectra recorded at Complementary NDSC site Toronto (43.66°N, 79.40°W) during the solar storms of Oct–Nov 2003 and at Primary NDSC site Eureka (80.05°N, 86.42°W) during Feb–Mar 2004. MLT NO enhancements are found at Eureka, while possible enhancements at Toronto cannot be attributed to a particular altitude.