



Air quality monitoring with current (IASI) and future (IASI-NG/MetOp-SG, IRS/MTG) space-borne thermal infrared sounders

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Current nadir-looking thermal infrared (TIR) sounders, such as the Infrared Atmospheric Sounding Interferometer (IASI) launched onboard the MetOp polar-orbiting platforms, are now playing an important role for probing pollutants in the troposphere and in the boundary layer (e.g., carbon monoxide – CO, ozone – O₃, ammonia, sulfur dioxide). Vertical profiles can be obtained for the main absorbers, with varying vertical resolution and accuracy, depending on geophysical parameters and instrumental specifications.

Two future missions using TIR instruments (IRS on Sentinel 4/MTG geostationary-orbiting platform and IASI-NG on Sentinel 5/MetOp-SG polar-orbiting platform) are planned to be launched by EUMETSAT within 5 years. Both instruments are nadir looking Fourier transform spectrometers like IASI but with different radiometric and spectral characteristics.

In this study, we illustrate the ability of IASI to monitor CO and O₃ in the lowermost troposphere. We assess more specifically the performances of the different satellite instrument concepts in terms of vertical resolution and sensitivity at the surface for CO and O₃, using representative cases at local, continental and global scales.