Atmospheric Chemistry using IASI / MetOp: Overview of initial results

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MetOp, the first European meteorological platform on a polar orbit was launched on October 19, 2006. The platform carries a series of instruments, including IASI, the Infrared Atmospheric Sounding Interferometer designed and built by the French spatial agency CNES. IASI consists of a Fourier transform spectrometer, which measures radiance spectra of the Earth-atmosphere system between 645 and 2760 cm⁻¹ in the thermal infrared, at a spectral resolution of 0.5 cm⁻¹ (apodised). The nadir-looking geometry of IASI, combined with an across-track scanning mode reaching 48° on both sides, allows global coverage to be achieved in twelve hours. The first IASI spectra were delivered from mid July 2007. This work exhibits the first results acquired by analyses of IASI spectra, using retrieval tools dedicated both to operational and scientific processing, analysis of peculiar spectra in calibration mode, or images. We show that the extended spectral coverage of IASI provides unique information on the concentration distribution of numerous tropospheric species, impacting on climate (H₂O, CO₂, N₂O, CH₄, CFCs) or on chemistry (O₃, CO, HNO₃). For most of these gases we demonstrate that vertical profiling is possible. IASI is showed to be very useful to monitor volcanic SO₂. The emphasis of this work is put on preliminary analyses of O₃, CO, CH₄ distributions on local to global scales, acquired during the first months of IASI operation, and also on CFCs and SO₂.