



## **Retrieval of Saharan desert dust optical depth from thermal infrared measurements by IASI**

S. Vandebussche, S. Kochenova, A.-C. Vandaele, N. Kumps, and M. De Mazière  
Belgian Institute for Space Aeronomy, Brussels, Belgium

Aerosols are a major actor in the climate system. They are responsible for climate forcing by both direct (by emission, absorption and scattering) and indirect effects (for example, by altering cloud microphysics). A better knowledge of aerosol optical properties, of the atmospheric aerosol load and of aerosol sources and sinks may therefore significantly improve the modeling of climate changes.

Aerosol optical depth and other properties are retrieved on an operational basis from daytime measurements in the visible and near infrared spectral range by a number of instruments, like the satellite instruments MODIS, CALIOP, POLDER, MISR and ground-based sunphotometers.

Aerosol retrievals from day and night measurements at thermal infrared (TIR) wavelengths (for example, from SEVIRI, AIRS and IASI satellite instruments) are less common, but they receive growing interest in more recent years. Among those TIR measuring instruments, IASI on METOP has one major advantage for aerosol retrievals: its large continuous spectral coverage, allowing to better capture the broadband signature of aerosols. Furthermore, IASI has a high spectral resolution (0.5cm<sup>-1</sup> after apodization) which allows retrieving a large number of trace gases at the same time, it will nominally be in orbit for 15 years and offers a quasi global Earth coverage twice a day.

Here we will show recently obtained results of desert aerosol properties (concentration, altitude, optical depth) retrieved from IASI TIR measurements, using the ASIMUT software (BIRA-IASB, Belgium) linked to (V)LIDORT (R. Spurr, RTsolutions Inc, US) and to SPHER (M. Mishchenko, NASA GISS, USA). In particular, we will address the case of Saharan desert dust storms, which are a major source of desert dust particles in the atmosphere. Those storms frequently transport sand to Europe, Western Asia or even South America. We will show some test-case comparisons between our retrievals and measurements from other instruments like those listed above. We will also highlight the challenges that go along with such retrievals.