



Assessment of the impact of the systematic errors on the retrieval of geophysical parameters from FORUM measurements: methods and results

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The Far-infrared Outgoing Radiation Understanding and Monitoring (FORUM) mission has been proposed within the framework of the 9th Earth Explorer program. It was selected for phase A studies by the European Space Agency (ESA) as suitable mission to be launched in close formation with IASI-NG. The instrument will measure the top of the atmosphere (TOA) outgoing radiance at nadir in a wide spectral range covering FIR (Far-Infrared) and TIR (Thermal Infrared) regions from 100 cm^{-1} to 1600 cm^{-1} . The main target of the instrument, beside the measurement of the full spectrum of the Outgoing Longwave Radiation (OLR), is the estimate of water vapour in the upper troposphere-lower stratosphere (UTLS) region and clouds properties. However, FORUM is capable of measuring other variables such as ozone, temperature and surface emissivity. These targets are considered to become formal products and are examined in the retrieval tests performed in the phase A studies.

In order to investigate the capability of FORUM to measure these variables, the error sources affecting the retrieval, both random and systematic, have to be quantified. While the random retrieval error, defined as in Rodgers et al. (2000), is directly linked to the instrumental noise, the systematic errors are due to both instrumental issues and to the approximations present in the retrieval procedure (i.e. quantities that are not fitted). Therefore the systematic error sources are a wide set of variables, like the Volume Mixing Ratios of interfering gaseous species, the water vapour continuum model, error in the spectroscopic data and instrumental characteristics. To estimate the impact of the systematic errors on the retrieval, we adopted the error spectra strategy already used by Dudhia et al. (2002) to assess the systematic errors for MIPAS/ENVISAT level 2 products. In this work, we will report both the used methodology and the results for the more relevant systematic errors affecting the retrieval of FORUM targets.