Determination and modeling of the vertical rate of atmospheric cooling and radiative flux in the infrared with the IASI instrument onboard the Metop platforms

Yoann Tellier, Cyril Crevoisier, Raymond Armante, and Virginie Capelle
Laboratoire de Météorologie Dynamique/IPSL, CNRS, Ecole polytechnique, 91128 Palaiseau Cedex, France
(yoann.tellier@lmd.polytechnique.fr)

In the context of rising concerns about climate changes, the monitoring of essential climate variables from space is of great interest. One of the fundamental drivers of our climate system is the balance between the net incoming solar radiation and the outgoing radiation from the Earth and its atmosphere. For the past decades, several spaceborne missions aimed at measuring the outgoing radiation of the Earth system. Since the years 2000s, hyperspectral sounders allowed the retrieval of vertically resolved atmospheric parameters. The objective of the poster is to present the first results of the exploitation of a hyperspectral sounder to retrieve the outgoing longwave radiation and the vertical longwave cooling rate.

The hyperspectral sounder IASI, first launched on the platform MetOp-A in October 2006, then on MetOp-B in September 2012 and recently on MetOp-C in Novembers 2018 offers 20 years of measurement of the Earth's outgoing longwave radiation, its spectral range covers a large portion of the longwave spectrum. IASI provides essential data to retrieve the vertical atmospheric parameters such as temperature profiles or concentration of main constituents and to study their variability on climatic timescales. Using the radiative transfer code 4A and the spectroscopic database GEISA, the OLR and the vertical sources and sinks of radiative energy can be retrieved from IASI data. In the context of the Radiative Forcing Model Intercomparison Project, the first OLR and vertical longwave cooling retrieval are presented in comparison with other datasets.