Measurements and modeling of IASI Tropospheric Ozone
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Introduction
The Infrared Atmospheric Sounding Interferometer (IASI) provides near real-time measurements of ozone with an excellent geographic coverage, opening new perspective for chemical forecasting with an unprecedented amount of data. In particular, significant improvements for ozone peaks forecasting are expected, through data assimilation of IASI ozone measurements into a three-dimensional chemistry-transport model.

We present preliminary analysis undertaken for the data assimilation of IASI observations into the CHIMERE continental atmospheric model [Vautard et al., 2001; Schmidt et al., 2001]. As IASI measurements will be assimilated, we first need to validate them. Retrievals of ozone total and partial columns have been performed and initial comparisons of ozone total column is showed. The detailed characterization of the ozone retrievals is presented, in particular the evaluation of the sensitivity of the measurement with respect to the different atmospheric layers. The first available IASI data will be discussed in the framework of data assimilation for chemical forecasts.

IASI trace gases retrieval

2 complementary tools

Operational mode : SA-NN
[Turquety et al., 2004]
Neural network based techniques

Research mode : Atmosphit
[Coheur et al., 2005]
Optimal estimation theory

- 1 total column (O₃, CO, CH₄)
- 3 partial columns (O₃)
  0-6 km, 0-12 km & 0-16 km

Errors
- Vertical profiles
- Averaging kernels
- Residual

ASI OZONE Tropospheric column – global scale

3 Days

The results show interesting 0–6 km column retrievals : this study is in progress (comparisons with model are being performed)

IASI OZONE 0–6 km column : local scale

3 Days

Initial comparisons with GOME-2

GOME-2 L2 data : Courtesy from DLR

Further work

- Complete evaluation of IASI performances for ozone Total, Tropospheric and 0–6 km column
  - Comparisons IASI – SONDES
  - Comparisons IASI – GOME-2, TES, ...

- Characterization of ozone profiles
  - Analysis of averaging kernels at different latitudes and for different seasons
  - Analysis of error budgets