**Abstract:** The Infrared Atmospheric Sounding Interferometer (IASI) was launched in October 2006 onboard the first MetOp satellite. This instrument primarily dedicated to measure meteorological parameters, also enables to characterize the atmospheric content of chemical species such as ozone ($O_3$) and carbon monoxide (CO). At Laboratoire d’Aérologie we developed the Software for Fast Retrievals of IASI Data (SOFRID) to retrieve $O_3$ and CO atmospheric contents. This software is based on the latest release of the 1D-Var module from the Met-Office (v3.3) coupled to the RTTOV (v9.3) fast radiative transfer code developed within the EUMETSAT NWP SAF. We present this software based on the following steps: 1) selection of the pixels according to the user spatio-temporal wish, 2) selection of the co-located meteorological parameters from the ECMWF analyses and the IASI EUMETSAT L2 data. 3) building of an $O_3$ profile database and a priori ensemble from WOUDC and MOZAIC data coupled with Aura/MLS assimilated fields, 4) retrieval and characterization of $O_3$ profiles from the selected pixels. Maps of IASI-SOFRID $O_3$ partial columns over Europe and Africa are presented for NH summer and winter.

**Design of the IASI retrieval software developed at Toulouse**

**SOFRID**

- **INPUTS DATA OF SOFRID**
  - L1c IASI data
  - L2 IASI data
  - EUMETSAT L2 data
  - ECMWF data
  - A priori data
  - Met-Office (v3.3) coupled to the RTTOV (v9.3)

- **ALGORITHM OF PRE-TREATMENT**
  - The user chooses
    - A period
    - A geographic area
  - Every ECMWF timestep +/- 3 hours
  - The corresponding L1c data
  - The corresponding L2 IASI data
  - We create the inputs by interpolating the vertical profiles on the retrieval grid
  - Input of RTTOV/1D-Var

**O$_3$ profiles database**

Objective: Database of $O_3$ profiles from the surface to the mesosphere to build a priori data and validate IASI retrieval

Data used:
- WOUDC/SHADOZ sondes (up to 25-35 km) and MOZAIC troposphere
- Aura/MLS data (UT to mesosphere) assimilated with MOCAGE/PALM

- Retrieval characterization
  - Method: optimal estimation (1D-Var) with exclusions for H$_2$O absorptions
  - a priori data: WOUDC/SHADOZ/NOZAI/ML-Asim
  - Radiometric noise: 0.35 mW/(m$^2$ ster)
  - ~2.5 independent levels of information

**Validation**

- Tropics (MOZAIC)
  - Acra, Ivory Coast, 5°N, 0°E
  - 70 soundings
  - DFS=2.6 (0.6-UTLS, 0.8-Tropo.)

- UTLS/Tropo.: high $O_3$ columns
  - UTLS/Tropo.: high $O_3$ columns over Tropical Atlantic
  - DFS=3.2-3.9
  - DFS=1.8-1.8

**IASI-SOFRID $O_3$ data over Europe and Africa**

- UTLS / tropospheric $O_3$ over Europe
  - Strato.: North-South gradient well reproduced
  - UTLS: Maxima south of 20°S / north of 30°N
  - Power tropopause / Jets
  - High $O_3$ in Strato./Tropo.: high $O_3$ columns over Tropical Atlantic
  - Biomass Burning/LiNOx + export
  - Desert dust?
  - Few pixels/low tropo. $O_3$ over deserts...
  - Surface emissivity...

- UTLS: Maxima over North-Western Europe/UK
- Troposphere: Maxima over Eastern Mediterranean

- Tropospheric and UTLS information uncorrelated

**Conclusions**

- Implementation of the RTTOV emissivity module
- Use of the RTTOV aerosol module to take mineral dust into account
- Retrievals of CO
- Formatting of L2 products

**Perspectives**

- Implementation of the RTTOV emissivity module
- Use of the RTTOV aerosol module to take mineral dust into account
- Retrievals of CO
- Formatting of L2 products