Towards a consolidated MTG-IRS L2 processor

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Primary Mission Objective:

To provide high spatial and temporal resolution observations of atmospheric state, in particular moisture.

Further Mission Objective:

Eyjafjallajökull lässt grüssen
Cathy Clerbaux, Lieven Clarisse, P. Coheur, D. Hurtmans
Meteosat Third Generation Infrared Sounder (MTG-IRS)

Instrument Characteristics:
FTS, large detector array, integration time of 10 sec.
Large data volume: approx. 2500 spectra / sec.
(cf. IASI: 15 spectra / sec)
Development of L2 Concept

Why?
Issues being considered

General Processing Issues:
  Use of compact representation of radiances (PCA)
  Apodisation
  Channel Selection
Data Acceptance
Specific Scene Analysis
Pre-Processing
  Surface Properties retrieval
  Specific Statistical retrieval method to generate First Guess
Iterative Retrieval
  Background state and covariance for iterative retrieval
  Forward model errors
  How to handle CO and O3
Specific Quality Indicators
Examples

Data Acceptance
Four 15 min scan zones.
Zone 4 observed in 15 min every other 15 min

At Day-1: L2 Processor will only consider Zone 4 data.
Development of L2 Concept

How?
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S. Klonecki – P. Prunet (Noveltis)
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How(2): Processing Framework

Processing Module
(F90, C, C++, Matlab, ...)

Dynamic Input Data (hdf 5)

Static Data (?)

Dynamic Output Data (hdf 5)
Two different Scene analysis modules applied to same IASI data
Green: cloud free, white: cloudy
Illustrates the need for a reference dataset.
Maximum likelihood method requires specification of:
- background state and covariance matrix
- forward model error covariance matrix.

How to establish forward model error covariance matrix?
Radiance difference IASI - Calculations
Histogram Noise Normalised Differences

Chans. wn > 1500 & < 1570 or wn > 1615 & < 1800 cm\(^{-1}\). All days

In situ bias correction
Rigel et al. bias correction
Gaussian with sigma=1.0

Relative frequency

IASI instrument noise normalized radiance residuals
Summary

Through the concerted effort by MTG-IRS Science Team, we hope to converge towards a consolidated MTG-IRS L2 processor capable of generating products which satisfies the needs of the user community.