Noveltis

Processing of IASI heterogenous scenes

P. Prunet (1), S. Bijac, B. Tournier, J. Donnadille (1), J. Chimot, D. Coppens,
C. Camy-Peyret(2) T. Phulpin(4), C. Clerbaux(5),
Lydie Lavanant (3)

(1) NOVELTIS - (2) LPMAA – (3) Météo-France - (4) CNES- (5) LATMOS

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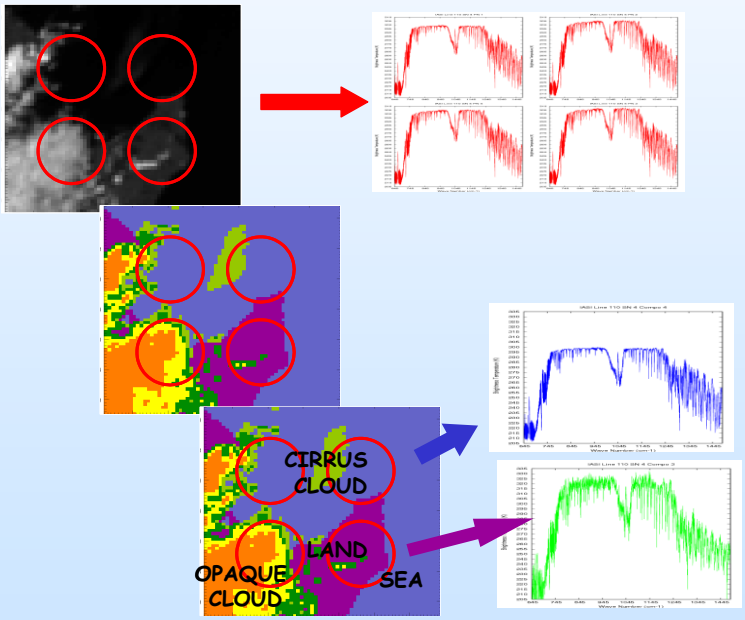
Context and objectives

- Observing the Earth from IASI, the probability within a coarse resolution pixel (12 km) of viewing targets exhibiting the same physical and spectral properties is very low. A target will be said homogeneous if its radiative temperature variability at any spectral wavenumber is smaller than typically 0.5/1 degree K. The size of the targets which are important to be resolved is typically of a few kilometers.

- The IASI/MetOp mission offers for the first time the ability to provide high quality data to appropriately cope with heterogenety of the scene within the IASI pixels.This is based on the availability together with IASI of high spatial resolution coregistered imagery (AVHRR, 1.1 km resolution).

Context and objectives

The AVHRR data are processed and the resulting products are included in the IASI level 1 products. A dedicated processing is presented to exploit and analyse this information. This processing allows:



1. The mapping and analysis of cloud coverage and surface heterogeneities at the IASI Pixel scale

2. the provision of 'decontamined' spectra, corresponding to different homogenous part of the pixel, for an optimal exploitation of the IASI measurements.

3. the spectral post-calibration of the IASI measurements in the case of heterogeneous scenes. Indeed, the off-axis interferometer introduces a residual spectral calibration error for heterogeneous pixels.

Mapping and analysis of cloud coverage and scene heterogeneity (1 day, 15 January 2007)

Cloud Free (0%) : **21.5 %**

Cloud fraction < 5% : 25.36 %

< 10% : 26.93 %

< 20% : 29.18 %

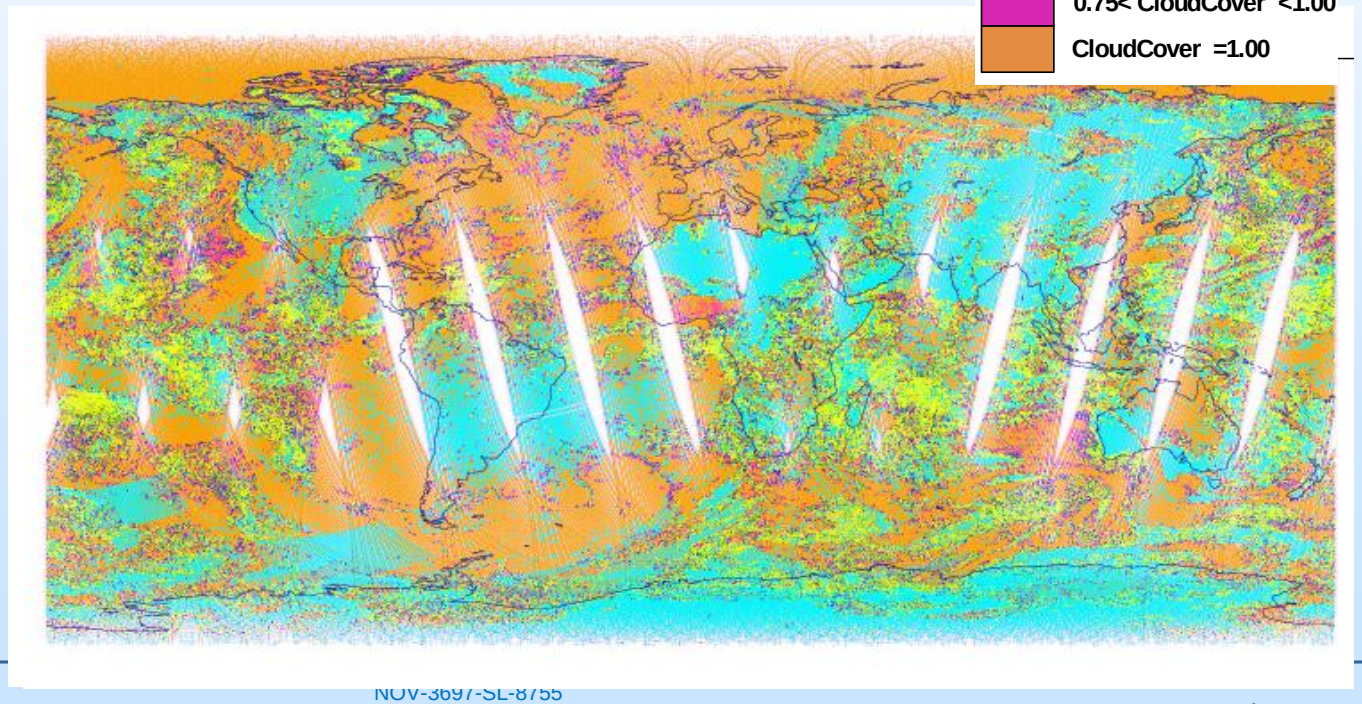
< 50% : 34.36 %

< 75% : 38.72 %

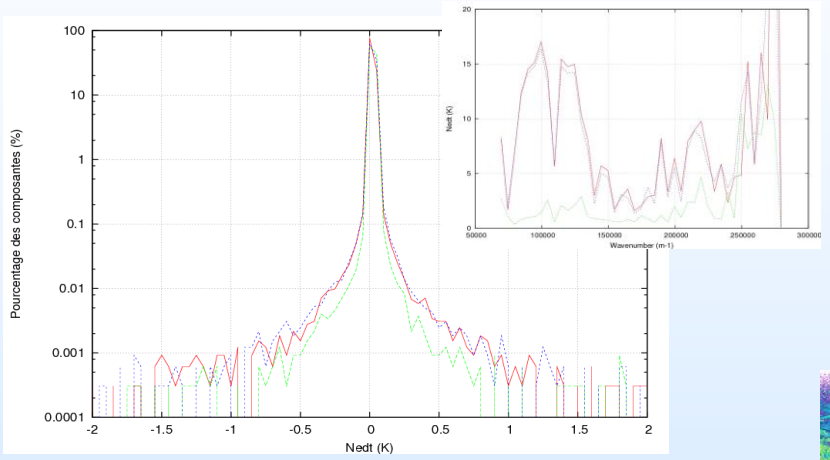
Fully cloudy (100%) : 52.95 %

Only 7 % of cloud free AND homogeneous measurements

- 2,6 % of homogeneous sea
- 4,2 % of homogeneous land



the spectral post-calibration of the IASI measurements in the case of heterogeneous scenes



the off-axis interferometer introduces a residual spectral calibration error for heterogeneous pixels.

An estimation and a correction of this calibration error can be performed using information about the proportion and repartition of various surface types inside IASI pixel.

The effect is statistically small (lower than 1 % of the data significantly affected) but can reach several Kelvins.

Depends on Pixel configuration :

Components contrast,

Components fraction,

Components position