(May 2010)

Intercomparisons and Validation of IASI L1 Reprocessed Data of MetOp-A

Mayte Vasquez(1,2), Dorothée Coppens(1), Marie Doutriaux-Boucher (1)

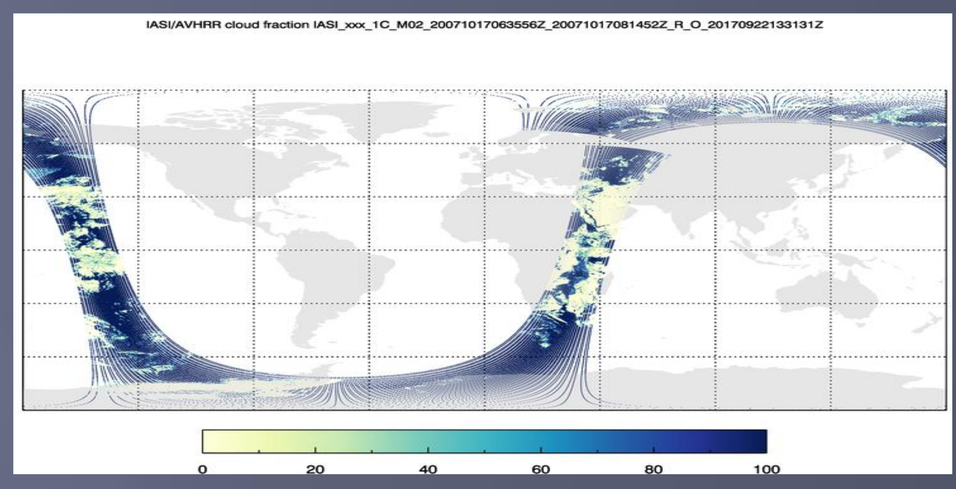
EUMETSAT, Eumetsat-Allee 1, 64295 Darmstadt, Germany

Reprocessing of the L1C products from the Infrared Atmospheric Sounding Interferometer (IASI) instrument currently flying on the MetOp-A platform has been performed at EUMETSAT for a period of four years, from July 2007 to April 2011. This work presents the validation activities on the generation of the data in order to ensure that the requirements have been satisfied.

The reprocessing is conducted in order to account for Day-2 algorithms with a format evolution and the latest configuration parameters' improvements. The final reprocessing period will range from July, 2007 up to now. The reprocessed products will specially allow the evaluation of the content and the improvement of the data in terms of spectral calibration. Furthermore, the MetOp-B Cal/Val has allowed the revision of configuration parameters and the reprocessing also aims at aligning as much as possible the IASI data measured before 2013 with those parameters.

New Information in the Products

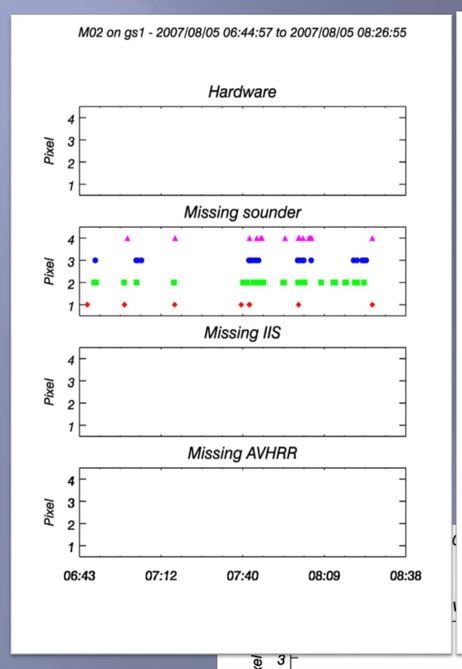
Cloud and land mask information from AVHRR has also been included in the IASI products which did not exist in the IASI L1 products before September 2009. The following figure shows the cloud fraction in a reprocessed product from the 10th of October 2007 where cloud features in the atmosphere can be observed:

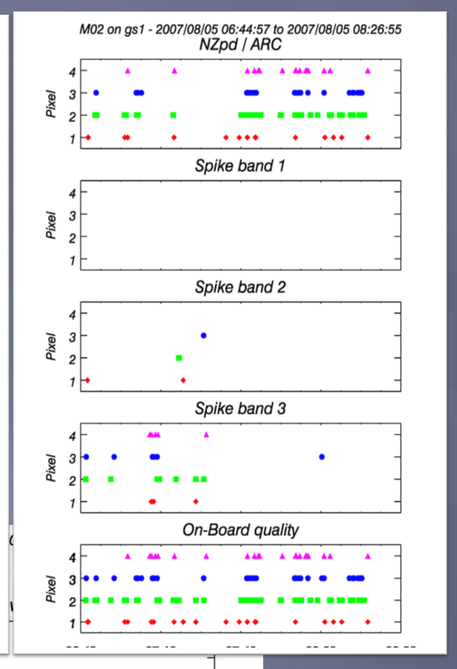


Introduction of Quality Flags and Intercomparions

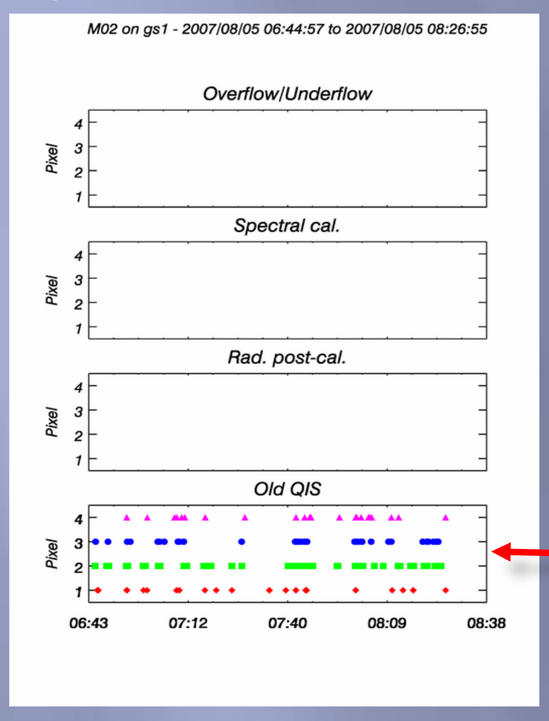
Before day-2 evolution (May 2010), the products only contained a flag summarizing for all bands. In the reprocessed products, it can be observed that 14 different on-board and on-ground processing quality flags are introduced. The check on the old quality flag also confirms that the reprocessing activities has not produced any impact on it as it was expected.

Reprocessed Data

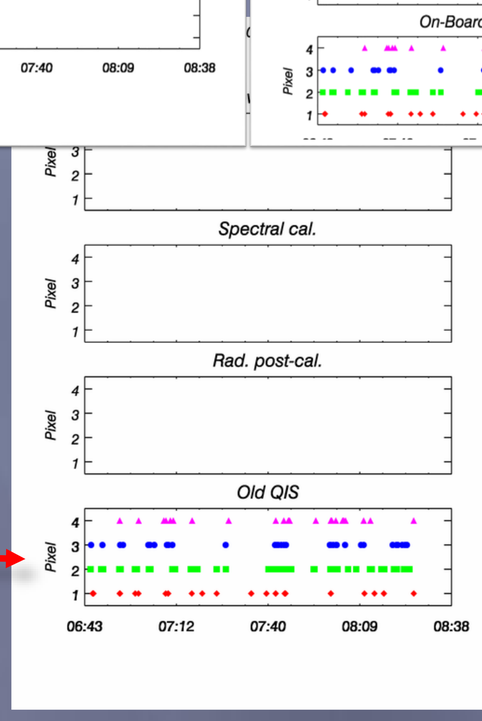




Reference Data



Similar old quality flag



Reduction of Pixel Anomalies and Filling Gaps

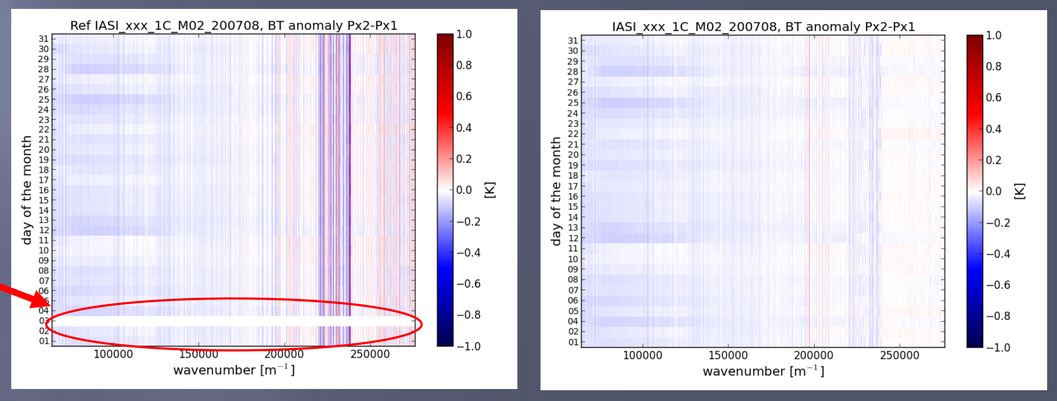
The pixel anomaly is defined as the difference between the averaged radiances over all pixels 2 (also scan positions) and the averaged radiances over each of the pixels 1, 3 and 4 (and scan positions). The radiance anomalies are shown for over a month in brightness temperature (K).

The following figures present the anomalies for August 2007, which correspond to the first period of the reprocessed data. In general, it can be observed that the reprocessed products present lower differences, especially around band 3 at 2300 cm-1. The data corresponding to the 3rd of August is missing in the reference file due to an anomaly when disseminating the products to the archive. However, in the reprocessed products, the data for this date was recovered, which is also one of the main purposes of these activities.

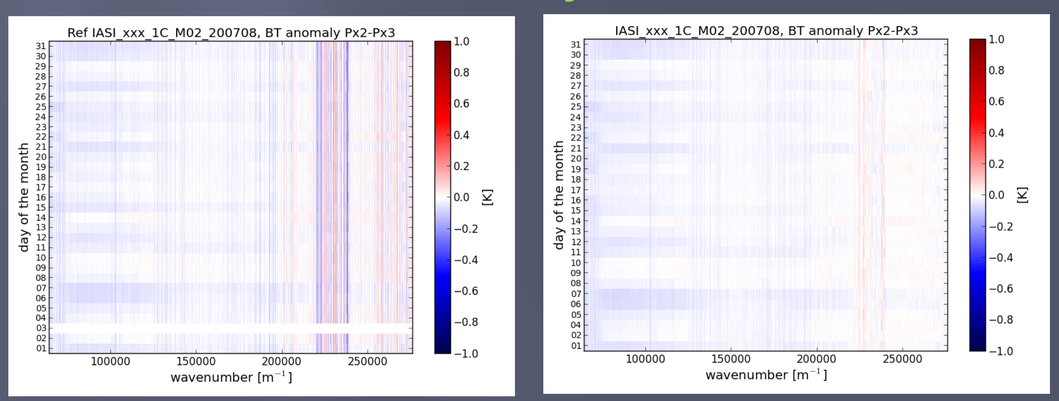
Gaps filling

Reference Data — Reprocessed Data

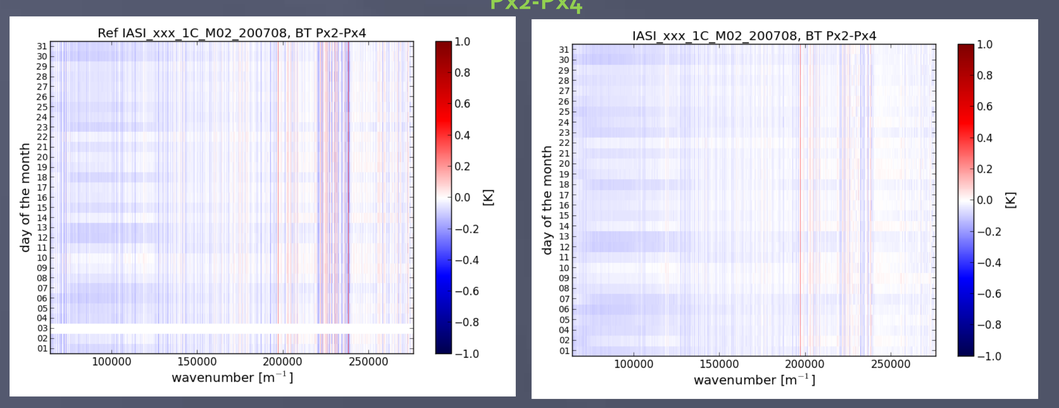
Px2-Px1



Px2-Px3



Px2-Px4



Improving Spectral Harmonization

Since July 2007, inter-pixel radiance differences in the IASI level 1C products exceeding 0.1 K were observed in some regions of the spectra. After some investigations, it was found that the on-ground processing algorithm was not able to fully correct the spectral response function. The solution was to symmetrise the Self Apodisation Function used to harmonise the spectra in the on-ground processing. In order to simplify the correction, CNES implemented the symmetrisation through the Spectral Data Base, which has been used since 07.02.2011. This impacts all pixel and in particularly the pixel 2. From the figures below, it can be observed that the inter-pixel differences with the pixel 2 has been largely reduced.

Reference Data — Reprocessed Data

Summary and Outlook

- Quality flags in the reprocessed products were validated and checked to contain about 13 new different on-board and on-ground quality flags
- New information on the cloud and land fraction was confirmed to exits now in the reprocessed products
- Reprocessed files showed recovered data that was originally missing in the archive.
- Pixel anomalies from the reprocessed files showed a reduction of the differences, especially in band 3.
- The reprocessing activities are expected to be concluded by end of February 2018
- Reprocessed products will be available for the users on the EUMETSAT archive

1 EUMETSAT

2 HE SPACE it's all about people

Contact: EUMETSAT User Helpdesk: ➔ OPS@eumetsat.int