First results from the Metop-C IASI Level 2 cal/val
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References
[7] Feltz M. L. et al., “Assessment of NOAA NUCAPS upper air temperature profiles using COSMIC GPS radio occultation and ARMr temperature analysis of these comparisons have shown a very good agreement against in-situ measurements, other satellites products or model data. New validation projects are regularly added to the collection through new scientific collaborations. Some of these studies have led to the implementation of routine validation systems that allows us to monitor the performances of our IASI L2 products.

The IASI L2 Products Processing Facility

Preparation
Collocation
IASI + AMSU MHS AVHRR

Statistical retrieval
Cloud retrieval
Optimal estimation
OEM

Atmospheric composition
L2

Full-sky H2O daily maps at 800 hPa

Day
Night

Comparing Metop-C to Metop-B and -A IASI L2 products demonstrated the very good health of all the products and the remarkable inter-platform consistency of the IASI instruments.

Sanity and self-consistency checks

To hunt interpixel differences, we are comparing the distribution of the products in each of the 4 IASI pixels separately. No differences can be seen in any of the Metop-C IASI L2 products, confirming the very good quality of the IASI L1 calibration.

IASI L2 O3 total column vs ground Brewer

EuBrewNet coordinates Brewer spectrophotometer measurements of ozone within Europe, providing a consistent, spatially homogeneous European data resource [7].
We have compared our IASI L2 O3 total column product to the collocated EuBrewNet measurements. Over the selected 10 day period, we observe an overall good agreement in the range of 2 percent rel. error with the Brewers. We also see that IASI-C performances are very similar to the two other platforms.

IASI L2 T and H2O profiles vs airborne AMDAR

The aim of the WMO AMDAR program is to collect temperature, humidity and wind from commercial aircrafts [9]. In particular, take-offs and landings allow the acquisition of profiles and can be used to perform temperature and humidity profile validation.

Though not initially designed for operational scientific purposes, these data are proving very valuable in the context of satellite products validation and monitoring. We observe a very good agreement between the IASI L2 profiles and the AMDAR measurements for both the temperature and the relative humidity products. We can also see that Metop-C and Metop-B show very comparable performances.

Validation strategy

Since the launch of the first Metop in 2007, the IASI L2 products have accumulated a long history of validation [1]. For each of the IASI L2 products, many comparison studies have been performed against in-situ measurements, other satellites products or model data. New validation projects are regularly added to the collection through new scientific collaborations. Some of these studies have led to the implementation of routine validation systems that allows us to monitor the performances of our IASI L2 products.

The IASI L2 O3 total column vs ground Brewer

The IASI L2 products have been declared ready for operational use in October 2019.

The Integrated Global Radiosonde Archive (IGRA) provides radiosonde and pilot balloon observations at over 2,700 globally distributed stations available at standard and variable pressure levels [8]. Variables include pressure, temperature, geopotential height, relative humidity, dew point depression, wind direction and speed. In this study we used the version 2 of the IGRA dataset (IGRA v2).

The IASI L2 T and H2O profiles vs IGRA sondes

The IASI L2 L2 time series show a very stable behaviour since the deployment of the IASI-C L2 calibration parameters. Over the 1-month period used here, we can see that the Metop-C performances when compared to IGRA are very similar to the two other platforms. Furthermore, the timeseries show a very stable behaviour since the deployment of the IASI-C L2 calibration parameters.

Summary

• The IASI-C L2 commissioning took place between June and October 2019. All the products that make up the EUMETSAT IASI L2 suite have been calibrated and validated for the new Metop-C platform.

• The cal/val strategy was based on the long history of validation accumulated from the previous IASI instruments: (i) direct comparison to IASI-A and IASI-B, (ii) comparative performances assessments against models and (iii) parallel validation against in-situ measurements, were used to ensure that the quality of the IASI-C L2 products was similar to the two other instruments performances.

• Feedbacks from external partners provided during the trial dissemination phase have confirmed the overall quality of the IASI L2 product from the Metop-C platform.

• The 24th of October 2019, the IASI-C L2 products have been declared operational and are distributed to the users.

You have questions about the IASI L2 products or the way to access them? Contact ops@eumetsat.int