

# **ECMWF / EUMETSAT NWP-SAF Workshop**

## **The Assimilation of Hyper-spectral Geostationary Satellite Observations**

**22-25 May 2017**

### **Executive Summary**

The workshop was hosted at ECMWF Headquarters in Reading and attracted over 40 expert scientists representing 10 different countries as well as international organisations such as EUMETSAT and ECMWF. There were two days of presentations and the slides from these can be viewed on the workshop website:

<https://www.ecmwf.int/en/learning/workshops/workshop-assimilation-hyper-spectral-geostationary-satellite-observations>

Following the presentations the workshop was divided in to two working groups and tasked with discussing issues related to instrument calibration and validation, data processing and user applications. A detailed description of the working group discussions can be found on the workshop webpage, but some of the more important statements and recommendations are summarized here.

It was agreed that the process followed by EUMETSAT and CNES for the calibration and validation of METOP IASI was excellent and the group recommended that this be used as a model for the future CAL/VAL of MTG-IRS. In particular the early involvement of the NWP community (providing feedback on the data quality with detailed monitoring statistics) was important and accelerated progress towards an early operational use of the data.

For radiance observations from the MTG-IRS the user community has a strong requirement for a spectral response that is uniform across the detector array and stable in time. If this will be achieved by additional processing of the level-1 data, then details of exactly how this will be done should be published by EUMETSAT and shared with users as soon as possible in the appropriate documentation (ATBD).

There was no requirement expressed for unapodised data from MTG-IRS and the group supported the light apodisation approach currently proposed by EUMETSAT. However, this can produce negative radiances and a number of users plan to apply locally an additional apodisation (e.g. Gaussian, using the planned NWP-SAF processing software) to avoid having to develop a radiative transfer facility capable of handling negative radiances. To this end the lightly apodised data should be handled and communicated in a way that allows this local conversion to be done.

If data compression is necessary for MTG-IRS dissemination to users then the proposed approach using Principal Component Scores was thought to be a good option. However, the group felt strongly that the statistical training of these should be global (i.e. not dwell based). Spectra which fail to compress accurately should be flagged and if possible still transmitted to users (e.g. via compressed residuals) as they are likely to correspond to interesting atmospheric phenomena. The majority of users currently plan to use NWP-SAF software to convert the scores to reconstructed radiances before assimilation.

The group felt that the baseline MTG-IRS measurement schedule presented at the workshop was not optimal and did not provide sufficiently frequent coverage of the wider disk (e.g. in the Southern Hemisphere and Tropics). It is understood that there is scope to adjust the schedule when the satellite becomes operational. This should be planned and executed in close consultation with NWP users.

Users expressed a requirement for the IRS disseminated products to additionally contain essential metadata needed for successful NWP assimilation. One example is a quantitative measure of scene homogeneity for the detection of clouds - others are parameters that could assist the correction of residual (time varying) biases in the data. It is important that users review current plans for metadata provision as early as possible (content as specified in Product Format Specification document) so that omissions can be addressed in a timely manner before launch.

While the GIIRS on FY-4A is an instrument of a type similar to MTG-IRS, it differs in important respects. Nevertheless, the group strongly supported EUMETSAT in its effort to gain access to the data and distribute to users as part of its third party activities. Experience with real observations from GIIRS will accelerate progress in many areas and help ensure an early operational exploitation of MTG-IRS.

The group strongly supported the NWP SAF development of an IRS Pre-processing Package (IRSPP). A user consultation process is underway to establish the requirements of this software. It is also important that details of EUMETSAT plans for level-1 processing (including data / metadata / format / content) be published as soon as possible to assist the development of the various tools.

The group noted activities at EUMETSAT and other centres concerning the extraction of wind information from MTG-IRS data. It supported the continuation of these studies, with a goal of developing them to operational readiness.