APPLICATIONS WORKING GROUP

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1. Global IR data sets

The 4-km Global Merged IR dataset is a global merger of the thermal IR images recorded by the 5 primary geosynchronous satellites, with important adjustments applied for zenith-angle and parallax errors in the original pixels. It provides essentially full resolution on a uniform 4-km-equivalent latitude/longitude grid covering 60°N-S every half hour. This dataset was developed and is being hosted by NOAA/NWS/CPC, with a record that has been extended back to early 2000.

IPWG recommendation to CGMS:

The IPWG requests that CGMS strongly support the continued production, with necessary operational development, of the 4-km Global Merged IR dataset. This dataset is a critical part of most of the current generation of global precipitation estimates that involve IR data.

2. Permanent archives and reprocessing

IPWG recommendation to CGMS:

The IPWG requests that CGMS strongly supports the establishment of permanent active archives for all sensors and operational algorithms that produce precipitation estimates. It is critical that the archives contain complete records of data for both a) the original satellite data (level 1b), and b) precipitation estimates (level 2 and level 3), and that periodic reprocessing be carried out on the entire record as the state of the art in calibration and precipitation retrievals advances.

3. Initiative for mainstreaming satellite precipitation products in operations

IPWG recommendation to CGMS:

The IPWG recommends that CGMS endorse developing a comprehensive initiative to enable users to better exploit the satellite-derived precipitation observations in operational hydrological and meteorological forecasting and water resources management. This recommendation is consistent with initiatives and programmes like the IFAS International Flood Alert System, the ECMWF assimilation of cloudy radiance data, the development of long-term reanalysis products, and the EUMETSAT's H-SAF, and should be seen in the context of the *R&D to Operations Transition Strategy* by WMO. IPWG will take up the task to further develop the concept and necessary actions in collaboration with WMO and other partners, including CGMS.

Recommendations to IPWG:

Recognizing the generally inadequate use of available satellite precipitation estimation products by National Meteorological and Hydrological Services (NMHSs), IPWG will work with relevant partners to:

- I. Explore options to increase institutional service delivery capacity for the long-term provision of data and product services related to satellite precipitation estimates for operational purposes;
- II. Facilitate capacity building to better enable users, and in particular NMHSs, to make use of satellite precipitation products;
- III. Promote development of standards and mechanisms to ensure the inter-operability of products and services;
- IV. Facilitate the building of a "Community of Practice" which will:
 - i. define and regularly update user requirements,
 - ii. exchange experiences in the use of satellite precipitation products,
 - iii. promote and support calibration and validation exercises world-wide and
 - iv. promote the use of available data and products for forecasting, assessment and management purposes in particular in developing countries.

Action (IPWG Co-Chairs): Define specific actions and recruit interested members to carry out this framework.

4. <u>Precipitation product contents standard</u>

For the users of satellite precipitation products the large variety of provided contents in satellite product files is often a problem. Therefore a proposal for a contents standard definition was made at the 2^{nd} IPWG and renewed at the 3^{rd} IPWG. The response to the proposal was unfortunately almost non-existent. The Applications WG still considers this issue to be of high importance but decided not to give a new recommendation separate from the Mainstreaming initiative.

5. <u>Web-page update</u>

IPWG recommends that the contents of the IPWG web-pages are updated regularly, but at least revisited yearly. The web-master is responsible to trigger the update process.

Action (Vincenzo Levizziani): Contact contents providers of all parts of the IPWG web-page regularly (at least yearly) to check and update their contributions to the web-pages.

6. <u>Web page visibility</u>

On the IPWG web-page a feedback section is provided for the users of satellite precipitation products with the intention to facilitate the reporting of feedback or anomalies to the product developers. This mechanism is hardly ever used. The poor visibility of the IPWG web-page to the wider community was identified as one probable reason.

Action (IPWG members): The information about the IPWG web-page should be added to the README-files which are provided with the precipitation data created by the various IPWG members. As well, IPWG members are requested to provide appropriate external Web locations that might link to the IPWG pages.

7. Export algorithms

On the IPWG Web-pages a section is dedicated to algorithms which can be downloaded and used by everybody. Only two algorithms are provided currently, one each for IR (Tapiador) and passive microwave (Ferraro). It was doubted that many additional of those *export algorithms* will be posted, because there is usually no funding and no support for it. In addition it is becoming more and more difficult to make more sophisticated algorithms available as export algorithm packages (including documentation). For new users getting the necessary input data may be more difficult than bringing up the export algorithm. Accordingly, each export algorithm's package should include information on data availability, an introductory tutorial, and a consistent set of test input and output data, together with the algorithm software. The working group agreed that the Web page should continue to be open for the addition of new algorithms. At the same time, state-of-the-art algorithms should be promoted by providing their developers' contact information.

Action (Vincenzo Levizziani): Contact providers of current algorithms to make the data sets complete (add test input/output and tutorial).

8. Training

The best way to provide training to potential users of satellite precipitation products was discussed. Some work has been done by providing relevant information on the IPWG web-page. According to the experience of the working group participants, one effective way of training on satellite products is to provide roving seminars. In this context, the precipitation training should be coordinated with existing training activities (e.g. satellite agencies).

Action (IPWG members): If IPWG members identify a specific need for training, they may contact WMO for organisational or monetary help.

Action (Wolfgang Grabs): Evaluate the opportunities to receive funding from the satellite program of WMO for specific training on the application of precipitation data from satellites.

Action (IPWG Co-Chairs): Contact organisations which already provide training on the use of satellite products, and foster the promotion of satellite precipitation data in their courses.

9. <u>Diverse product goals</u>

Discussion revealed that the various requirements of the user community cannot be satisfied by a single product. In some cases joint observational products delivering the best possible instantaneous result are needed, while for others (e.g. climate applications) it is more important for the products to be consistent over time. In the same sense, the combination of numerical predictions and observational data will provide better information for some application but not for others. Therefore, as a matter of policy it is necessary to provide multiple products.

10. <u>Minimum scales available from satellite</u> observations

Status: Available and near-future satellite technology provide high-quality (i.e., microwave-based) precipitation estimates with a resolution of about 3 hours and 0.1<deg>. Lower-quality (generally IR) precipitation estimates are available from geosynchronous satellites with intervals of about a half hour and 4 km. User requirements for finer scales can only be accommodated by some form of interpolation, extrapolation, or disaggregation.

11. <u>H-SAF workshop</u>

Information: The EUMETSAT H-SAF 2nd workshop will take place in autumn 2009. The topic is related to hydrological applications of satellite products such as precipitation soil moisture and snow. Detailed information will be provided via IPWG web-page in due time.