

INTERNATIONAL PRECIPITATION WORKING GROUP

(Submitted by WMO)

Summary and purpose of document

To inform CGMS Members on the status of activity related to the formation of the International Precipitation Working Group (IPWG).

ACTION PROPOSED

CGMS Members to note the latest status of activity related to the formation of the International Precipitation Working Group (IPWG) and approve the draft Terms of Reference and structure for IPWG as contained in the Appendix.

Appendix: Draft Terms of Reference for the International Precipitation Working Group (IPWG)

DISCUSSION

BACKGROUND

1. CGMS-XXVIII noted that WMO had analysed the benefits from and agreed upon the need to foster further development of focused science groups. The success of both the International TOVS Working Group (ITWG) and the CGMS International Wind Workshop (IWW) in focusing the scientific community on a specific application area's issues and problems, strongly suggested similar benefits could be gained by development of science teams and workshops that could deal with application areas of satellite meteorology such as quantitative precipitation estimates, NWP and ocean and land surface properties. The current existence of many scientific groups operating in these areas could facilitate this task. For example, in the area of quantitative precipitation estimation, groups of scientists are currently involved in the Global Precipitation Climatology Project (GPCP) of the World Climate Research Programme (WCRP) and have already exchanged information on data requirements, algorithm development, data set production, validation and data distribution.

2. CGMS-XXVIII also noted that the fifty-second session of the WMO Executive Council had recommended involving relevant science groups in a systematic manner and the positive indication from the GPCP for WCRP's GEWEX to serve as a nucleus for such a working group. Thus, WMO strongly encouraged the formation of an International Precipitation Working Group with active participation by WMO and GPCP within the framework of CGMS. As a result, CGMS-XXVIII agreed to the following action item:

ACTION 28.13 The CGMS Secretariat to initiate the establishment of a Working Group on Precipitation, with co-sponsorship of WMO and CGMS, and to report to CGMS XXIX on progress.

1. FIRST SESSION OF THE INTERNATIONAL PRECIPITATION WORKING GROUP (IPWG)

The first session of the Coordination Group for Meteorological Satellites (CGMS) International Precipitation Working Group was held at the CSU Tamasag Conference Facility, Fort Collins, Colorado, USA, 20-22 June 2001.

1.1 Current status of precipitation estimation

The first session reviewed the current status of precipitation estimation from satellite-based observing systems and the plans and capabilities of proposed future satellite systems. Detailed descriptions of the current status can be found in the CD ROM version of the first session of the IPWG as distributed by the CGMS Secretariat. Additionally, the first session discussed the importance of the WMO Virtual Laboratory for Education and Training in Satellite Meteorology and the relevance of the IPWG towards helping it achieve its goals.

In conducting the review, the first session noted several issues that should be considered in the formation of the IPWG:

- validation and independent verification of precipitation estimates in the context of the scale of observation and the type of precipitation phenomena being characterized;
- the importance of the full implementation of the GCOS Surface Network (GSN) to help in the validation effort;
- the importance of water vapour and cloud micro-physics for the development of the next generation of satellite rainfall estimation techniques;

- the relevance of planned field experiments within the World Weather Research Programme especially for warm season precipitation events and the assimilation of precipitation observations in forecast models;
- the relevance of missions including the Global Precipitation Measurement (GPM) mission that would tie together active and passive instruments on polar-orbiting satellites with the high temporal observing capabilities afforded by geostationary satellites;
- the importance of international cooperation in the areas of missions, validation, algorithms, new techniques, and education and training;
- the importance of the IPWG covering the needs of various communities including hydrometeorology, weather and climate.

1.2 Terms of Reference for IPWG

The first session reviewed the draft terms of reference for an International Precipitation Working Group. The session was guided by the terms of reference for the ITWG and CGMS Winds Working Group and the issues identified in its review of the current status of precipitation estimation from satellite-based observing systems.

The first session developed terms of reference as shown in the Appendix for consideration and approval by CGMS-XXIX.

The first session agreed that the IPWG will be served by two Co-Chairmen and a Rapporteur to CGMS. The Co-Chairmen for IPWG are Dr Arnold Gruber (USA) and Dr Vincenzo Levizzani (Italy). It suggested that Dr Purdom serve as the Rapporteur.

The first session recommended that CGMS review and give favourable consideration to the structure and terms of reference for the IPWG as contained in the Appendix.

The first session also suggested that the Co-Chairs take into consideration the terms of reference contained in the Appendix and the following points in developing the second session:

- Identify producers of routine (or operational) rainfall products and engage them in quarterly reporting of remote sensing product comparisons with other rainfall estimates in a standard format;
- Address compatible and interchangeable algorithms, as appropriate, early-on with a group of specialists from both the research and operations communities. This will facilitate the early transition from research to operations
- Consider validation, with a group of specialists involving standard and specialized measuring systems,
- Consider new techniques for estimating precipitation that include water vapour, cloud microphysics and the utilization of new multi-spectral data;
- Consider frequency allocation and protection activities for current and future instruments;
- Consider the role of IPWG in direct assimilation of precipitation and related observations in NWP models at all scales. WWRP/THORPEX is important to the IPWG in this context.

The first session requested that the Co-Chairs make an initial indication of the time and venue for the second session of the IPWG and to inform CGMS-XXIX. The first session requested

that the Chair of the OPAG IOS inform CGMS-XXIX of the proposal for the formation of the International Precipitation Working Group as contained in the Appendix.

1.3 EUMETSAT's Nowcasting SAF

In November 1992 EUMETSAT adopted the concept of a distributed Application Ground Segment, including the Central Facilities in Darmstadt, Germany, and a network of elements known as Satellite Application Facilities (SAF), as specialised development and processing centres. Utilizing the specific expertise available in EUMETSAT's Member States, the SAF will complement the production of meteorological products derived from satellite data at EUMETSAT's Central Facilities and will also distribute user software packages.

Among the seven SAFs under development, one is dedicated to Nowcasting and Very Short-Range Forecasting. This SAF develops software packages for the extraction of geophysical products in the areas of clouds, precipitation, air mass parameters, winds, rapidly developing thunderstorms and automatic recognition of conceptual models. The SAF Consortium comprises the Spanish National Meteorological Service (NMS), which is acting as Host Institute, and the NMSs from Austria, France and Sweden. The development phase of this SAF started in February 1997, and it will enter its Initial Operations Phase (IOP) in 2002. However, due to the delay of the launch of MSG-1, validated/tuned software packages will not become available before 2003.

Two precipitation products are being developed in the Nowcasting SAF: the first, the Precipitating Clouds (PC) product (developed by the Swedish NMS) will provide probabilities of precipitation intensities in pre-defined intensity intervals. The objective of the PC product is to support detailed precipitation analysis for nowcasting purposes. The focus will be on the delineation of non-precipitating and precipitating clouds for light and heavy precipitation, rather than quantifying the precipitation rate. Particular attention will be given to the identification of areas of light rain caused by stratiform clouds. From the probabilities, categories of precipitation intensity may be derived. Two different versions of the product generation software will be derived: i) one based on MSG SEVIRI VIS/IR input data, and ii) one based on AVHRR/AMSU input data. In addition, two sub-versions are being developed, one with a dependency on NWP data and one based entirely on satellite imagery. Prototype PC products are available at <http://www.smhi.se/saf>.

The second precipitation product will be the Convective Rainfall Rate (CRR) developed by the Spanish NMS. This will be complementary to the Precipitating Cloud product, since it will concentrate on the detection of areas of heavy convective rainfall. The CRR product will be an image-like product providing information on the rainfall intensity in mm/hour for pre-defined intensity classes for clouds identified as convective cells. There will be 5-6 intensity classes. The main use of this product is the monitoring of convective systems, i.e., of their rain intensity, however the CRR product could also be useful for hydrological applications. The CRR method is based on the "Rainsat" algorithm (Bellon *et al.*, 1980) and on the NOAA Auto-Estimator technique (Scofield, 1987, Vicente *et al.*, 1998).

DRAFT TERMS OF REFERENCE FOR THE INTERNATIONAL PRECIPITATION WORKING GROUP (IPWG)

BACKGROUND

It was proposed at the first session of the IPWG (20-22 June 2001) to establish the International Precipitation Working Group (IPWG) as a permanent Working Group of the Coordination Group for Meteorological Satellites (CGMS). The IPWG will focus the scientific community on operational and research satellite based quantitative precipitation measurement issues and challenges. It will provide a forum for operational and research users of satellite precipitation measurements to exchange information on methods for measuring precipitation and the impact of space borne precipitation measurements in numerical weather and hydrometeorological prediction and climate studies.

PURPOSE

In the area of quantitative precipitation estimation, the IPWG intends to build upon the expertise of scientists who are currently involved in precipitation measurements from satellites with emphasis on derivation of products. The IPWG is established to foster the:

- Development of better measurements, and improvement of their utilization;
- Improvement of scientific understanding;
- Development of international partnerships.

OBJECTIVES

The objectives of the IPWG are:

- (a) to promote standard operational procedures and common software for deriving precipitation measurements from satellites;
- (b) to establish standards for validation and independent verification of precipitation measurements derived from satellite data; including:
 - reference standards for the validation of precipitation for weather, hydrometeorological and climate applications;
 - standard analysis techniques that quantify the uncertainty of ground-based measurements over relevant time and space scales needed by satellite products;
- (c) to devise and implement regular procedures for the exchange of data on inter-comparisons of operational precipitation measurements from satellites;
- (d) to stimulate increased international scientific research and development in this field and to establish routine means of exchanging scientific results and verification results;
- (e) to make recommendations to national and international agencies regarding the utilization of current and future satellite instruments on both polar and geostationary platforms; and
- (f) to encourage regular education and training activities with the goal of improving global utilization of remote sensing data for precipitation measurements.

MEMBERSHIP

The Working Group shall be comprised of representatives nominated by the satellite operators of the CGMS, other members of CGMS and relevant research satellite operators. The CGMS or the IPWG may invite other experts from the community to participate in the activities of the group.

WORKING ARRANGEMENTS

The Working Group will be chaired by two Co-Chairmen appointed by the plenary of the CGMS. The Co-Chairmen shall compile a report on relevant activities for the scheduled plenary meetings of the CGMS. The interactive connection with satellite operators will be performed through the use of a Rapporteur who will attend and report to the CGMS meetings.

Under the lead of the two Co-Chairmen, the IPWG will organize Workshops, co-sponsored by CGMS and WMO, approximately every two years. The Workshops will promote the exchange of scientific and operational information between the producers of precipitation measurements, the research community, and the user community.