THE INTERNATIONAL PRECIPITATION WORKING GROUP (IPWG)

A. Gruber¹ and V. Levizzani²

¹ Cooperative Institute for Climate Studies, Earth System Science Interdisciplinary Center University of Maryland, College Park, MD 20142, USA ² Institute of Atmospheric Sciences and Climate (ISAC-CNR) Via Gobetti 101, I-40129 Bologna, Italy

ABSTRACT

This article summarizes the formation and the workings of the International Precipitation Working Group (IPWG) following its inception. A summary of the first meeting from 2002 is presented, as well as notable accomplishments.

1. INTRODUCTION

The International precipitation working group was established in June 2001 at a Workshop at the Colorado State University, Tamasag Conference Facility, Fort Collins, Colorado, USA.

The Objectives established for the IPWG were:

- 1) to promote standard operational procedures and common software for deriving precipitation measurements from satellites;
- 2) 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;
- 3) to devise and implement regular procedures for the exchange of data on inter-comparisons of operational precipitation measurements from satellites;
- 4) to stimulate increased international scientific research and development in this field and to establish routine means of exchanging scientific results and verification results;
- 5) to make recommendations to national and international agencies regarding the utilization of current and future satellite instruments on both polar and geostationary platforms; and
- 6) to encourage regular education and training activities with the goal of improving global utilization of remote sensing data for precipitation measurements.

The first Workshop of the IPWG took place in Madrid Spain, September 23-27, 2002 in cooperation with EUMETSAT's Satellite Application Facility on Nowcasting and Very Short Range Forecasting at the Instituto Nacional de Meteorologia (INM). At that meeting three working groups were established; Operational Applications, Research and Validation. These groups established a total of 21 recommendations consisting of a mix of short and long term actions for the IPWG. It was a very ambitious set of recommendations, but does set the stage for future IPWG activities. The recommendations are documented in Gruber and Levizzani (2003). They are also are available on the IPWG web site - <u>http://www.isac.cnr.it/~ipwg/</u> and rather than repeat the full set of recommendations we will review the accomplishments of the IPWG over the past two years. However, the reader is encouraged to review them in order to gain a better understanding about the IPWG.

2. ACCOMPLISHMENTS

During the past two years the IPWG has accomplished many important goals based on the recommendations of the first Workshop. Among them are:

• Algorithm Inventory and downloadable algorithms

This consists of an inventory of routinely produced precipitation estimates either operational or experimental/research. There are twenty two algorithms in the inventory and consist of infrared based, microwave based, microwave and infrared blend, and multi-spectral (infrared, near infrared, visible). There is one algorithm available for downloading. It is the EURAINSAT/A 1.0 a fairly straight forward infrared based algorithm.

- A web page designed for the precipitation community. It contains the above mentioned algorithm inventory, IPWG reports, algorithms, datasets, validation information, training, meetings, etc. The URL is http://www.isac.cnr.it/~ipwg/
- The IPWG, under the leadership of B. Bizzarri has provided requirements for microwave and sub-mm frequencies protection.
- Under the leadership of P. A. Arkin a document outlining Climate Monitoring Principles.
- Sponsorship of a web based global validation effort of daily precipitation from a variety of algorithms: Infrared, microwave, combined microwave and infrared, multi-spectral and NWP forecasts of daily rainfall. The overall effort is being coordinated by E. E. Ebert and is being done at three locations around the world; Australia, United States and Europe. Results are prepared daily and displayed on the web.

E. E: Ebert - Australia http://www.bom.gov.au/bmrc/wefor/staff/eee/SatRainVal/sat_val_aus.html

J. Janowiak – USA http://www.cpc.ncep.noaa.gov/products/janowiak/us_web.shtml

C. Kidd – Europe http://kermit.bham.ac.uk/~kidd/ipwg_eu/ipwg_eu.html

An archive of the results is being maintained at the Cooperative Institute for Climate Studies, Earth System Science Interdisciplinary center, University of Maryland by X. Yin.

• The IPWG web page contains links to various validation efforts. They include:

- AMSRE Validation network W. F. Krajewski
- Forecast verification-issues, methods E. E. Ebert
- QPF validation NWP rain-tools E. E. Ebert
- Satellite validation rainfall E. E. Ebert
- SRDC M. M. Morrissey
- Links to Training
 - CGMS Virtual Lab for Education and training
 - CIRA
 - Web based resource site for modelers, algorithm developers and users of passive MW data G. Petty
- Co-sponsorship with the Global Precipitation Climatology Project (GPCP) of the assessment of global monthly mean precipitation for the Intergovernmental Panel on Climate Change (IPCC).

Assessment will include information on input data, e.g., satellite, in situ, uncertainties in rainfall estimates, techniques for merging various sources of data and uncertainty in final product and information on the spatial and temporal variability of precipitation including trends. At a workshop held 3-4 Aug 2004, it was decided to focus the assessment on the Monthly mean GPCP data set (1979-2003) with supporting data as needed. The supporting data include the GPCP pentad data set, the CMAP global precipitation data set SSM/I data sets, gauge data sets and TRMM data. The group also decided that the assessment should be based on published or soon to be published literature. An outline was developed and Chapter leads assigned and over 25 scientists from around the world have agreed to contribute. The assessment is being chaired by A. Gruber and V. Levizzani and the target date for completion of the assessment is August/ September 2005. The outline is given in the next section and Chapter leads are indicated.

3. PRECIPITATION ASSESSMENT OUTLINE

Executive Summary (A. Gruber and V. Levizzani)

- 1. Introduction (motivation, brief history A. Gruber and V. Levizzani)
- 2. Global Precipitation Data Sets 10-12 pp. (C. Kidd and K. Nakamura)
 - 2.1 Introduction (bare basics of how/why in situ and remote sensing estimates –) 1-2 pp.
 - 2.2 GPCP Monthly mean 3-5 pp.
 - 2.2.1 Input data and characteristics
 - 2.2.1.1 Gauges
 - 2.2.1.2 Satellite estimates SSM/I, GPI, OI, TOVS
 - 2.2.2 Analysis procedures
 - 2.2.3 Error characteristics
 - 2.3 Other precipitation data sets (similar to 2.2, but compressed) 3-5 pp.
 - 2.3.1 CMAP (P. Xie)
 - 2.3.2 Satellite based estimates; microwave, infrared, combined , etc (compare/contrast various algorithms)
 - 2.3.3 TRMM PR and TMI
 - 2.3.4 Gauge (GPCC, GHCN-CAMS, CRU, ... -)
 - 2.4 Chapter summary 1 page

- 3. Spatial and Temporal Variability of Precipitation (comparison, validity) 20 pp.+fig's (C. Ropelewski and P. A. Arkin)
 - 3.1 Introduction
 - 3.2 Mean distribution (single number, single map, zonal profile –)
 - 3.3 Annual cycle (perhaps sub-monthly comes in here?)
 - 3.4 Seasonal to inter-annual variations
 - 3.5 Inter-decadal variations / trends
 - 3.6 Summary
- 4. Future Directions (E. N. Anagnostou and A. Mugnai)
 - 4.1 New-generation satellites, short-interval precipitation data sets, radar observing systems, ...
 - 4.2 TBD
- 5. Conclusions and Recommendations (A. Gruber, V. Levizzani)

Appendix 1: Authors, Contributors, and Reviewers

4. REFERENCES

Gruber, A., and V. Levizzani (Ed.), 2003: Proceedings of the 1st Workshop of the International Precipitation Working Group, 23-27 September 2002, Madrid Spain. CNR-ISAC and Eumetsat, EUM P34.