

Executive summary



The 1st MTGV Workshop on **Rainfall Products Validation and Hydrological Applications in the Tropics**, organized by the Megha-Tropiques Science team was held in Toulouse in september 2013. 5 keynote talks and 6 sessions covered various aspect of rainfall uncertainties : sources of uncertainties in instant retrievals, scale issues, error models for satellite and ground 'truth' estimates, hydrological applications and cross-validations. Participants from 15 countries (Brasil, Burkina Faso, Cameroun, China, Colombia, France, Germany, India, Italy, Ivory Coast, Niger, Peru, U.S.A., U.K., Venezuela) representing the rainfall experts and users community contributed to the discussions.

The conclusions of the wrap up discussions are summed up in the executive summary below :

Workshop wrap up through 3 grand questions and 1 preliminary recommandation :

- The effort from the satellite, radar and rain gauge data communities to provide their own intrinsic uncertainty needs to be sustained – any comparison that does not account for uncertainties - in the ground 'truth ' in particular- should be banned
- The community need to pursue the error modeling/characterization effort... and also work on elaborating common semantics .

Q1: Instantaneous space based rainrates : what is needed from the GV exercices to characterize better the retrieval uncertainies and their sources.

Q1a: Stratify the radar vs satellite and the gauges vs satellite results as a function of the retrieval ambiguity – Prior to that an effort is needed from retrieval providers (BRAIN Bayesian approach or other) to better characterize/quantify the ambiguity with an index .

Q1b: Stratify the comparison as a function of complementary information on the rainfall systems characteristics and environment : convectif vs stratiform rainfall , stage of the convective systems in their life cycle, surface conditions such as soil wetness...

Q1b2: A feedback is needed from the physical performances assessment into the ambiguity index to help narrowing down its spread

Q1c: Clarify the bias (systematic) and the random part of the differences between satellite and radar or gauges

Q1d: Need to define common practices amongst the ground validation sites and campaigns in order to make sensible inter-comparison of results from different locations.

Q1e: Special attention is needed for the definition of the *no rain* threshold and apprehend the limits of detection of the various sensors before comparisons.

Q2: Accumulated rainfall amount: uncertainty and usage conditions

Q2a: down to which scales (space and time) can the satellite rainfall accumulations products be physically based and when should the stochastic / downscaling tools take over ?

Q2a2 How to reduce the uncertainty and biases in the accumulated products ? should we work on improved and down scaled error models that can be adjusted regionally/locally or by regime ? or should the products be proposed at smaller scales ?

Q2b: more documentation is needed for the potential users of these gridded products (in particular whether the product are accumulation over regular period of time or whether they are instantaneous estimates at regular time steps is not always obvious to the user and leads to miss uses).

Q2b2: users may be more widely made aware of the IPWG resources (intercomparison exercises etc.)

Q3: Hydrology results: how to upscale from local, model dependant to global perspectives

Q3a: Should some idealized/conceptual modeling exercises be organized in order to analyze in a comprehensive and coherent manner the problems of rainfall uncertainty propagation in hydrological models ; the dependences on scales ; the dependencies on the hydrological regimes / basin type ; how the uncertainty due to rainfall compares to other sources (in forcing and in validation data and in model parameters).

Q3a2 : understanding better the model dependancies of the apparent sensitivity to rainfall errors . corollary question : are some models over reacting ?

Q3b : lack of systematic consistent summary of the validation studies while this would be interesting for other users and as a feedback to developers.

Q3c: update the models studies to be more global (using ancillary data) thanks to new data coming in (satellite information SWOT/SMOS to close the water budgets in basins)