Assessment of Global Precipitation Products

Validation at weather scales in regions without ground measurements

Initial input and thoughts from - Ralph Ferraro, Bob Kuligowski, NOAA/NESDIS/STAR

We are seeking more help on this topic from the IPWG community!
Validation of short-term, high spatial resolution satellite precipitation estimates is largely restricted to well populated regions over land.

Specialized ground data likely exist in remote land regions, but are not readily available (e.g., agricultural, hydrological, cooperative/volunteer networks, military data sets, etc.)

Alternative sources of data may be of use (e.g., river flow gauges, precipitation “analyses”, model reanalysis, media reports, TRMM and GPM radars, microwave links, etc.)

Looking for common surface and climatological features with regions rich in GV data may help determine algorithm performance in regions without GV.

Consistency among various satellite products may provide information on the uncertainty in such regions.

Hypotheses:

1. Validation of short-term, high spatial resolution satellite precipitation estimates is largely restricted to well populated regions over land.
2. Specialized ground data likely exist in remote land regions, but are not readily available (e.g., agricultural, hydrological, cooperative/volunteer networks, military data sets, etc.)
3. Alternative sources of data may be of use (e.g., river flow gauges, precipitation “analyses”, model reanalysis, media reports, TRMM and GPM radars, microwave links, etc.)
4. Looking for common surface and climatological features with regions rich in GV data may help determine algorithm performance in regions without GV.
5. Consistency among various satellite products may provide information on the uncertainty in such regions.
Supporting Materials – A starting point

Supporting References

Hypotheses:

1. Validation of short-term, high spatial resolution satellite precipitation estimates is largely restricted to well populated regions over land

Comparison of Near-Real-Time Precipitation Estimates from Satellite Observations and Numerical Models

2. Specialized ground data likely exist in remote land regions, but are not readily available (e.g., agricultural, hydrological, cooperative/volunteer networks, etc.)

Validation of Satellite-Based Precipitation Products over Sparserly Gauged African River Basins

Evaluation of TRMM 3B42 precipitation estimates of tropical cyclone rainfall using PAGRAIN data

Validation of satellite rainfall products over East Africa’s complex topography

Validation of high-resolution satellite rainfall products over complex terrain

Evaluation of high-resolution satellite precipitation products using rain gauge observations over the Tibetan Plateau

CoCoRaHS: The Evolution and Accomplishments of a Volunteer Rain Gauge Network

3. Alternative sources of data may be of use (e.g., river flow gauges, precipitation “analyses”, model reanalysis, media reports, TRMM and GPM radars, etc.)

Comparison of Near-Real-Time Precipitation Estimates from Satellite Observations and Numerical Models

Hydrologic evaluation of satellite precipitation products over a mid-size basin

Evaluation of satellite rainfall products through hydrologic simulation in a fully distributed hydrologic model

Evaluation of Spatial Errors of Precipitation Rates and Types from TRMM Spaceborne Radar over the Southern CONUS

Tracing hydrologic model simulation error as a function of satellite rainfall estimation bias components and land use and land cover conditions

Assessing the skill of satellite-based precipitation estimates in hydrologic applications

Statistical and hydrological evaluation of TRMM-based Multi-satellite Precipitation Analysis over the Wenchu Basin of Bhutan: Are the latest satellite precipitation products 3B42V7 ready for use in ungauged basins?

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How well can we estimate error variance of satellite precipitation data around the world?

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Next Steps

1. Build the team with more SME’s from within IPWG – any volunteers?
2. Flesh out the Hypotheses and gather more supporting references, etc.
3. Summarize findings in the literature based on (2).
4. Determine best path forward for the upcoming 1-3 years:
   * Are further assessments warranted and if so, identify leads
   * Acquire needed data sets
   * Etc.