

# Research Working Group Recommendations and Action Items

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**Chair: Ali Behrangi**  
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## ***Participants 2016:***

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J. Turk, S. Upadhyaya, Nai-Yu Wang

# Action Items to IPWG

## Topic: Converging to real precipitation estimate in High latitude

**Problem:** Quantifying precipitation in cold region is still a major challenge

- Develop methods and strategy to improve high lat. (cold region) precipitation (quantity, phase, PSD ...)
  - Improve retrievals
  - Explore what exist in Decadal survey
  - Explore what is needed in future (e.g., combination of multi-frequency radars? What frequencies, what platform ? CubeSat ?)
- Explore other alternatives for quantifying cold region precipitation (e.g., using GRACE/GRACE-FO, CloudSat/EarthCARE built on some recent analysis)

**POC:** Gail Skofronick-Jackson, Chris Kummerow, Ali Behrangi, Takuji Kubota, and Huan Meng

# Action Items to IPWG

## Topic: Oceanic precipitation observation

**Problem:** Many datasets exist (Ship, Buoys , etc). and needs to become available

- Develop common observation data table (and links to them under IPWG web). This dataset is extremely useful for retrieval and validation.
- Quality control is an important research item that needs to be considered.

POC. C. Klepp, Bob kuligowski, Y. Serra

Bob just added:

<http://www.isac.cnr.it/~ipwg/calval-links.html>

- <http://ipwg.isac.cnr.it/calval-links.html>

# Action Items to IPWG

## Topic : Shallow/orographic precipitation

**Problem:** Radars and PMW continue to have problems with capturing **shallow** precipitation (**orographic, lake effect, etc.**).

- Continue exploring physical mechanism for understanding shallow (orographic/lake effect) precipitation.
- Improve retrieval methods
- Collect observation data sets in support of this research. (e.g., collecting data from field campaigns such as NAME, etc.). Potentially IPWG web can offer links to the data sets.

**POC:** Shoichi Shige , Chris Kummerow, Huan Meng, Ali Behrangi, Mark Kulie

# Action Items to IPWG/CGMS

Topic: Enhancing spatial and temporal observations to refine our understanding of microphysical parameterization.

- Three frequency radar (e.g., Ka, Ku, W? ) have shown useful skill to determine particle size distribution and habit.
- Data assimilation has started to assimilate frozen hydrometeors
- Recommendation to CGMS** : to talk to WMO (or other agencies) to foster this line of research. Foster integration of new finding (e.g., 3 frequency radars) to improve microphysical parameterization.

**POC:** Chris Kummerow, Dong-Bin shin, Yeji Choi , Gail Skofronick-Jackson

# Action Items to IPWG

**Topic: Land surface and precipitation retrieval.**

**Problem:** Uncertain emissivity and surface backscatter over heterogeneous surfaces remains a problem for over land precipitation retrieval

- Foster new techniques to incorporate land surface properties in precipitation retrievals and data assimilation observation operators

**POC:** Joe Turk, Nai-Yu Wang

# Action Items to IPWG

**Topic: High spatiotemporal sampling of multispectral VIS/IR from new generation of Geostationary satellites**

**Problem:** This combination has not been used in full capacity

- Foster Integration efforts between MW and IR community to advance more physically based precipitation retrievals and understanding of storm dynamics

**POC:** Bob Kuligowski, Chris Kummerow, Ali Behrangi , Joe Turk, Chris Funk, Nai-Yu Wang

# Recommendations to CGMS

**IPWG strongly recommends to CGMS members to continue the constellation of PMW sensors to ensure quality satellite precipitation products for weather, climate, and hydrological applications**

- Confirmation for currently planned satellites
- Develop plans for subsequent launches of microwave sensors to ensure continuity of long-term observations that meet the documented needs of the user community
- Coordinate crossing times of precipitation relevant satellites in an effort to improve the temporal sampling of diurnal cycle, convective systems lifecycles, and severe storms.

POC. George Huffman , Chris Kidd , Huan Meng, ....



# Recommendations to CGMS

- IPWG recommends that CGMS members should provide free access of geostationary (IR window and WV channels) satellite data with complete global coverage (including Indian Ocean) to developers of the precipitation products in a timely fashion with a latency of one hour or less to better support short-term applications (e.g., flash flooding, nowcasting, etc.).
- Accessibility of new generation of fast refresh geostationary data (higher sampling freq.+ better latency)