Examples of Algorithm GV Topics

Dual Frequency Precipitation Radar

Detection:

- Light rain, snow
- Rain type (convective/stratiform)

Algorithm Physics:

- PIA Algorithm: Errors/Accuracy
  - Assessing and/or accounting for impacts of CLW, water vapor, DSD and assumed DSD models
- DSD retrieval:
  - DFR algorithm and DSD model for 3-D retrieval of rain and snow as f(regimes, temporal / spatial variability, precipitation rate)
- Z-R at light rain rates
- Sub-pixel variability
- Impact of external a priori regime ID
- Melting level ID, variability, extinction
- Hydrometeor ID and profile

Passive Microwave Radiometer

Detection:

- Snowfall detection thresholds
  Surface/atmospheric emission characteristics
- Rain no rain (especially light rain)
- Rain type (convective/stratiform)

Algorithm Physics:

- Single/bulk ice scattering vs. precipitation rates, types
- Melting layer extinction
- Water vapor, cloud water, and mixed phase impacts/models
- Impacts of a priori “regime” ID

Models:

- “Synthetic nature” of Cloud profile databases; empirical vs. numerical
- Coupled CRM/LSM physical inputs and associated parameterizations

cf. International participation summary table for countries planning physical validation efforts

Underlying issues of measurement standards and common methodologies noted (similar cross-cutting issue for all GV approaches)

Much to do! Poses questions of priorities and approach

Relative to Algorithm validation "needs": Methodical/Deliberate Approaches

- Define validation problem to be tackled by talking with algorithm developers* – decide what measurements are worthwhile
  *This is key since the GV paradigm incorporates algorithm developers into the GV process

- Define assumptions used in observation/retrievals [Algorithm teams also need to know this]

- Make many independent measurements since the algorithm problem is usually under-constrained.

- Avoid model "tuning": Isolate problem (s) in the algorithm that is (are) being addressed by observations (e.g., D0)

- Another approach (Japan): Use GV measurements to create synthetic nature and then use this as a reference point with forward models for testing algorithm retrievals.

- Related practical question: What algorithm physics should GV focus on? Can we resolve global discrepancies in the satellite algorithms with the results of local measurements?

- Response: Without additional information about the environment, consensus was that the GV measurements at different regional sites couldn't improve the algorithms. PMM science team addressing this by examining precipitation regimes*.
  * Variability as a function of regime was a common thread in several presentations.

Interaction with Algorithm Developers/PMM Science Team:

International partner proposals to address physical validation should iterate with science team members to define the problem prior to submitting proposals*

*This has become part of the process

Request algorithm developers to **select priority parameters/physics** for GV to observe (for example, from the “laundry list” presented earlier.

From a given list GV sites can be designed/selected/organized to address the most important algorithm physics issues (i.e. what is the most important GV measurement to make at a particular site?).

The issue is also important for establishing field campaign priorities.

Open question: What framework is needed to get feedback to GV from algorithm developers on questions of priorities: PMM meetings, working groups or something else?

Tentative response: Science Team can address the framework question.

Document “successes” as we move along. How to do this? Enables a rapid feedback process and a means to ensure that we improve the algorithms.