AMSR-E Validation Summary

http://eospso.gsfc.nasa.gov/validation/valplans.html
## Validation of Ocean Products

<table>
<thead>
<tr>
<th>Ocean Parameter</th>
<th>Calibration methods</th>
<th>Rms. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea-Surface Temperature ($T_s$)</td>
<td>Satellite, Buoy</td>
<td>0.5 C</td>
</tr>
<tr>
<td>Wind Speed (W)</td>
<td>Satellite, Buoy, GCM</td>
<td>0.9 m/s</td>
</tr>
<tr>
<td>Columnar Water Vapor (V)</td>
<td>Radiosonde</td>
<td>0.6 mm</td>
</tr>
<tr>
<td>Columnar Cloud Water (L)</td>
<td>Histogram</td>
<td>0.02 mm</td>
</tr>
</tbody>
</table>
Rainfall Validation

• Initial validation and data release
  – Intercomparisons with existing satellite rainfall products

• Comparison with ground based radar data
  – WSR-88 radar at Eureka, CA
  – TRMM assets in Kwajelein, Darwin, Australia, Melbourne, FL and Houston, TX.

• Flight campaigns: Winter 2002, Summer 2004
Sea Ice Validation

- Sea ice concentration: aircraft campaigns and time series of images
- Sea ice temperature: use empirical relationship together with aircraft and satellite (MODIS and AVHRR) thermal infrared data, buoys
- Snow depth on sea ice: in-situ measurements made by ships
Sea Ice Validation (cont.)

• Aircraft Campaigns:
  – Meltpond 2000 in the Summer Arctic (Successfully completed!)
  – Winter Antarctic August 2001
  – Winter Arctic Mar 2002
  – Spring Antarctic October 2002
  – Winter Arctic March 2004
Land Validation

- **Algorithm Calibration:** eliminate retrieval bias errors
  - Use geographically diverse and homogeneous (over the footprint scale) sites

- **Operational Networks:** validate the temporal soil moisture changes
  - DOE ARM, Oklahoma Mesonet, USDA SCAN, USDA ARS Micronet, Illinois State Water Survey, FSU, Mongolia and China

- **Field Experiments:** short-term intensive sampling over a few footprints
  - SGP97, SGP99, SMEX’02, SMEX’04
Land Validation (cont.)

- Modeling and Data Assimilation: used mainly for consistency checking of the spatial and temporal patterns
- Satellite Data Intercomparison: assess brightness temperature calibration levels over land, intercompare between AMSR-E AIRS and MODIS, and evaluate effects of heterogeneity within the footprint
Snow Water Equivalent Validation

- **Type 1: Grid Scale Validation**
  - Airborne gamma SWE detector and multi-frequency microwave radiometers flying over flat grid scale areas (25 km by 25 km)

- **Type 2: River Basin Scale Validation**
  - Satellite derived areal SWE compared with values derived from a snowmelt runoff model

- **Type 3: Regional Scale Validation**
  - Statistical method to provide SWE estimates from large areas where ground-based network measurements exist
Snow Water Equivalent Validation (cont.)

• Type 1 validation sites:
  – Airborne microwave radiometer experiments in Sodankyla and Kuusamo, Finland; joint effort with Technical University of Helsinki, University of Reading, USDA, USGS
  – Airborne gamma measurements in Roswell, NM, and Black River, WI; in cooperation with NOHRSC, USDA and USGS, in 2001, 2002 and 2003
  – AMSR-E joint campaign with the sea ice group in Alaska 2002 and 2004; EOS CRYSYS IDS team plans a field campaign in 2002 in the Canadian prairies
Snow Water Equivalent Validation (cont.)

- **Type 2 validation sites:**
  - Rhine and Rhone, Switzerland
  - Rio Grande, Colorado
  - Kings River, California
  - Beas Thalot, India
  - Chatkal, Uzbekistan

- **Type 3 validation sites:**
  - Northern Great Plains
  - Ob River Basin, Russia and Canadian prairie (Possibly)
Snow Water Equivalent Validation (cont.)

- Field Experiments: obtain grain size profiles and their change with time
  - Sites in New York, Wisconsin, Wyoming, Colorado
- Operational Surface Networks: comparison studies
  - Former Soviet Union Hydrological Surveys (-1990), USDA SnoTel (Western US)
- Satellite Data: use MODIS data for snow extent to verify AMSR-E retrievals