Geophysical Research Abstracts
Vol. 15, EGU2013-13345, 2013
EGU General Assembly 2013

Status Update on the GPM Ground Validation Iowa Flood Studies (IFloodS) Field Experiment

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The overarching objective of integrated hydrologic ground validation activities supporting the Global Precipitation Measurement Mission (GPM) is to provide better understanding of the strengths and limitations of the satellite products, in the context of hydrologic applications. To this end, the GPM Ground Validation (GV) program is conducting the first of several hydrology-oriented field efforts: the Iowa Flood Studies (IFloodS) experiment.

IFloodS will be conducted in the central to northeastern part of Iowa in Midwestern United States during the months of April-June, 2013. Specific science objectives and related goals for the IFloodS experiment can be summarized as follows:

1. Quantify the physical characteristics and space/time variability of rain (rates, DSD, process/"regime") and map to satellite rainfall retrieval uncertainty.
2. Assess satellite rainfall retrieval uncertainties at instantaneous to daily time scales and evaluate propagation/impact of uncertainty in flood-prediction.
3. Assess hydrologic predictive skill as a function of space/time scales, basin morphology, and land use/cover.
4. Discern the relative roles of rainfall quantities such as rate and accumulation as compared to other factors (e.g. transport of water in the drainage network) in flood genesis.
5. Refine approaches to "integrated hydrologic GV" concept based on IFloodS experiences and apply to future GPM Integrated GV field efforts.

These objectives will be achieved via the deployment of the NASA NPOL S-band and D3R Ka/Ku-band dual-polarimetric radars, University of Iowa X-band dual-polarimetric radars, a large network of paired rain gauge platforms with attendant soil moisture and temperature probes, a large network of both 2D Video and Parsivel disdrometers, and USDA-ARS gauge and soil-moisture measurements (in collaboration with the NASA SMAP mission). The aforementioned measurements will be used to complement existing operational WSR-88D S-band polarimetric radar measurements, USGS streamflow, and Iowa Flood Center stream monitoring measurements. Coincident satellite datasets will be archived from current microwave imaging and sounding radiometers flying on NOAA, DMSP, NASA, and EU (METOP) low-earth orbiters, and rapid-scanned IR datasets collected from geostationary (GOES) platforms.

Collectively the observational assets will provide a means to create high quality (time and space sampling) ground "reference" rainfall and stream flow datasets. The ground reference radar and rainfall datasets will provide a means to assess uncertainties in both satellite algorithms (physics) and products. Subsequently, the impact of uncertainties in the satellite products can be evaluated in coupled weather, land-surface and distributed hydrologic modeling frameworks as related to flood prediction.