A Soil Moisture In situ Network around CRN Millbrook NY Site by NOAA-CREST

Consortium members:

NOAA-CREST Institute/CUNY

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Site Description

- Type of site
 - Single point evolving to core site level (minimum of 7 points;
 6 probes per point)
- Measurements provided
 - L band brightness temperature (as well as 37 and 89 GHz readings)
 - Soil moisture at 2.5, 5 and 10 cm; Sensors used: Stevens Digital Hydra Probe II
 - Freeze/Thaw
 - NDVI
 - Precipitation
 - Air temperature
 - Streamflow
 - Gravimetric soil moisture



Supports and research interests

- Sustained support is provided by NOAA-CREST Institute/CUNY and invaluable logistic support is offered by Cary Institute of Ecosystem Studies
- These in situ observations are to be used by several ongoing land and hydrology projects by CREST and its partners (e.g., NOAA NWS and NESDIS)
- Heritage and historical records: L band radiometers and soil moisture probes were deployed in November 2010 in Millbrook; The site is adjacent to a well established USCRN site (NY Millbrook 3 W); 19 and 89 GHz were deployed in Caribou Maine in 2009

Particular research focus include:

- Characterization of satellite soil moisture observations in relation to footprint heterogeneity
- Influence of vegetation on soil moisture retrieval
- Continuous brightness temperature observations in relations to dynamic changes in surface conditions including soil moisture and vegetation
- Disaggregation of satellite soil moisture retrievals using in situ network observation (Temimi et al. 2010, Journal of Hydrology)
- Land emissivity determination at different microwave frequencies
- Use of soil moisture observations in the modeling of hydrological processes in NY (jointly with NY DEP)
- Use of soil moisture and FT data in ecological studies done by Cary Institute

Network spatial distribution

	Site	Location	Description	Soil moisture	Ereeze/thaw
Oper ati on al	Cary Institute	Lat 41 deg 47 min, long: 73 deg 44 min, elevation 128 m	- Electric power - UPS unit - solar panel - wireless internet connection.	X	X
	NOAA NWS Caribou ME	Lat : 46°52'2.14"N Lang: 68° 0'48 47"W Elevation : 135 m	- Electric power unit. - 37 and 89 GHz radiom eters - Infrared Therm om eter - Snow Temperature Profiler - wireless internet connection.	x	x
	USCRN/NY Millbrook 3 W site	Lat:41 deg 47 min, long:-73 deg 44 min, elevation: 128 m	- Temperature - Precipitation -Wind / Solar Radiation - Surface Temperature	x	x
To be deploy edin sprin g2011	Giff or d House Fields	Lat:41 deg 47 min lang: -73 deg 43 min, elevation 122 m	- Solar panel - Data Logger - Six - Soilmoisture probes	x	
	Greenhouse Fields	Lat:41 deg 47 min lang: -73 deg 45 min, elevation 124 m	 Solar panel Data Logger Six Soilmoisture probes 	x	
	Dutchess Day School	Lat:41 deg 46 min lang: -73 deg 39 min, elevatian 208 m	- Solar panel - Data Logger - Six - Soilmoisture probes	x	
	Sky Acres Airport	Lat:41 deg 42min long: -73 deg 44min, elevation 210m	- Solar panel - Data Logger - Six - Soilmoisture probes	x	ala - 7 - 1
	Millbr o ok School	Lat:41 deg 51 min lang: -73 deg 37 min, elevatian 243 m	- Solar panel - Data Logger - Six - Soilmoisture probes	x	
	The Fountains at Millbrook	Lat:41 deg 43 min lang: -73 deg 39 min, elevation 310 m	- Solar panel - Data Logger - Six - Soilmoisture probes	x	



Scale: 17.1 mi





Summary

- L band Tb readings are received in real time through internet at CCNY (every 2 minutes). Automated data processing techniques will be implemented to reduce the latency. Soil moisture is obtained from the core site in near real time. with the help of our partners further observation will be promptly obtained from adjacent sites.
- Gravimetric sampling is done regularly at Cary Institute. Partners, like high and middle schools, have expressed great interest in contributing to this effort and ultimately integrating it in their curriculum.
- Additional observation equipments will be acquired and deployed to consolidate CREST in situ observation capabilities. The site in NY with the site in Maine will be expanded to cover larger area in the northeast.
- With the intensive network of continuous SM observations, upscaling point observations to satellite footprint or downscaling satellite observation to point measurements becomes possible.
- These observation facilities are made available for the SMAP Cal/ Val team to achieve the mission goals. CREST expect to leverage on this experience and expand its Cal/Val capabilities to support other missions.