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Overview of the Kenaston SK Canada (Brightwater Creek Observatory) Soil Moisture Monitoring Network

Aaron Berg, University of Guelph Brenda Toth, HAL MSC Environment Canada Jessika L'Heureux AAFC



Outlin

- Location and physiography
- Instrument calibration approach
- Approach to representing the SMAP product
- Scaling approach
- Pre-launch field campaign





Kenaston (2701)



Thick red lines with circles denote the 36-km grid; dashed magenta lines with squares denote the 9km grid, and dotted red lines with dots denote the 3-km grid.

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Approach to representing SMAP product: Typical Soil Moisture/Precip site



3 depths/orientation •0-5 cm vertical (EC), 5 cm horizontal (EC and U of G) •20 cm horizontal 50 cm horizontal Stevens Hydra Probe II Site specific calibration

EC 24 sites U of G 16 sites Temporal Frequency halfhourly Variables Observed: Soil temperature Soil Moisture Precipitation Latency: EC network NRT. Guelph: NRT spring 2014 Instrumented for Freeze/Thaw





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AAFC Soil Moisture Observation Sites

- 4 sites located in 3 pastures
- soil moisture profile x 3
- TBRG / Pluvio
- wind speed
- telemetry
- data processed by Ag. Canada







Approach to Instrument Calibration



- Several calibration experiments performed (Rowlandson et al. 2013)
- Wet-up/dry down calibration preferred (RMSE < 0.03 VWC)





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Up-scaling for SMAP products: The CanEx-SM10 data set

SMOS validation SMAP prelaunch algorithm development

> Partners EC, AAFC, CSA, U of Guelph, U of Sherbrooke, USDA, NASA

Kenaston 40 times series sites+ 20 additional ground truth sites







Collection of brightness temperature data sets using passive and active L band sensors











Pre-launch field campaigns

- Limited capacity at 36km scale (partners would be necessary)
- Ongoing campaigns at 3km scale in 2013 (with University of Saskatchewan)
- Opportunities to study field data collected over the network in 2007, 2008, 2010 (9 km scale)







Soil moisture scaling

- Collaboration with researchers at the University of Saskatchewan (Warren Helgason, Andrew Ireson)
- Flux towers

- COSMOS & Neutron Probe array
- Repeated variability sampling (~3km scale)



Network Time Series May-Oct 2013



Comparison with the SMOS L2 product

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RMSE	0.034
correlation	0.76
bias	-0.007

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