Overview Soil Moisture

Global Energy and Water Exchanges

Version: 1.0.0 (August 31, 2013)

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ISSUES

- (Too) Many initiatives dealing with soil moisture observations and data collection
- Dispersed, various communities, lots of overlap, continuity still a problem
- Scientists and practitioners not on common ground

SMAP

- **SMAP:**
  - Under the terms of the MOUs between SMAP and the data providers (CV Partners) SMAP is not allowed to redistribute data without their permission. However, the actual data sets used for Cal/Val will be provided to the public archive (NSIDC) as part of the reports. This arrangement protects the provider., hopefully by the time we need them in 2015. We (SMOS Science team) are also going to be pressing for scaling/calibration campaigns for these networks.
  - There are a number of new resources that are being brought up to speed, hopefully before launch.
  - SAMP has a Cal-Val (CV) Workshop Sept 8-10 near Pasadena and will be encouraging the CV Partners to attend. It would be a good time to press further data sharing.

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The International Soil Moisture Network

Status overview
May 2014

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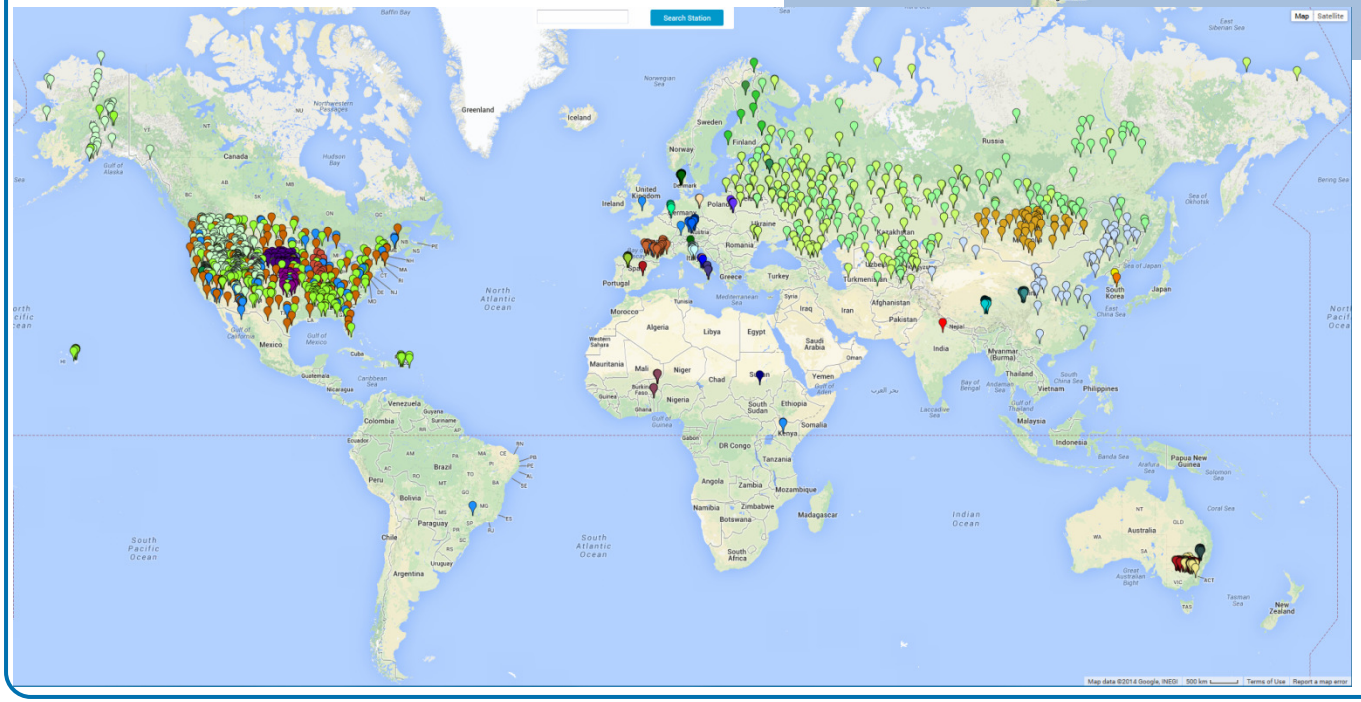
International Soil Moisture Network

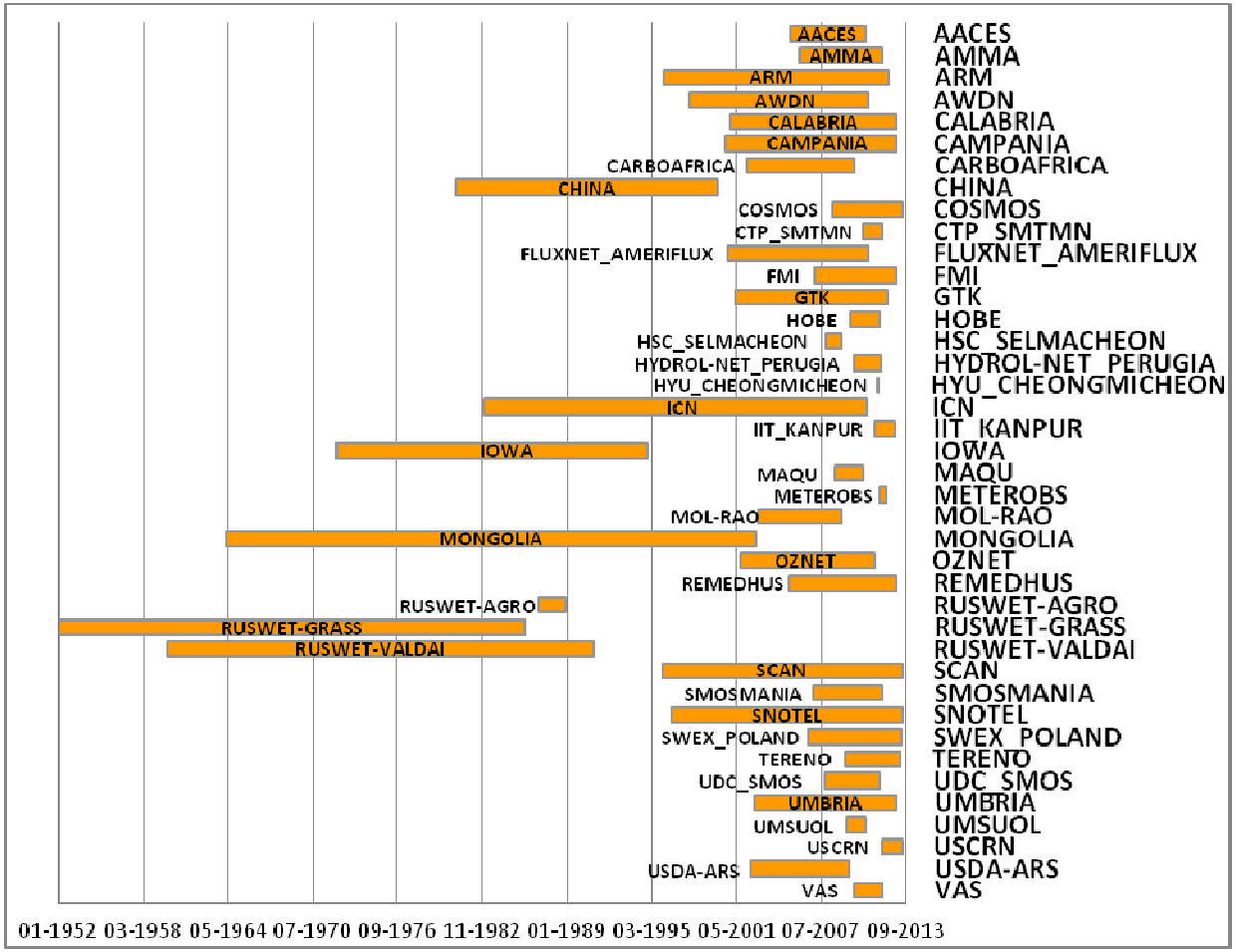
Overview May 2014

- 41 networks
- ~1500 stations
- >6500 soil moisture data sets



Overview May 2014

- Time period spanned by different networks



Recent improvements

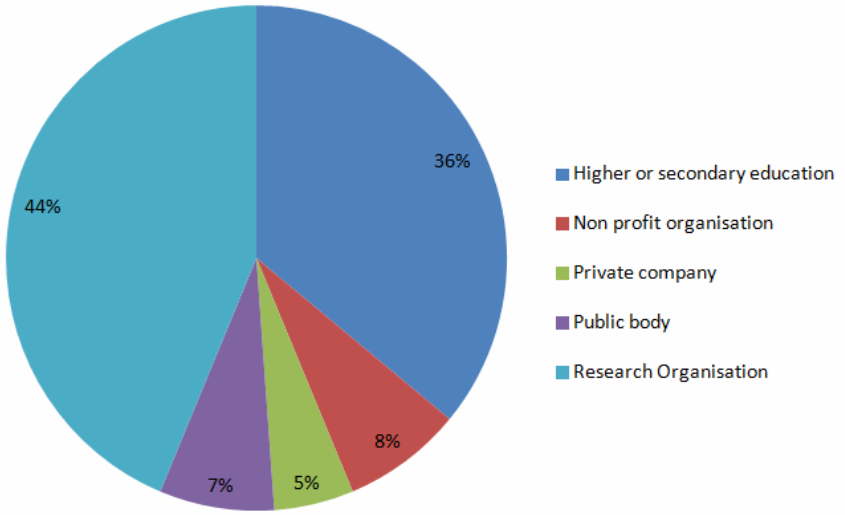
- **Faster and more powerful data server**
- **New quality control methods in automated processing chain**

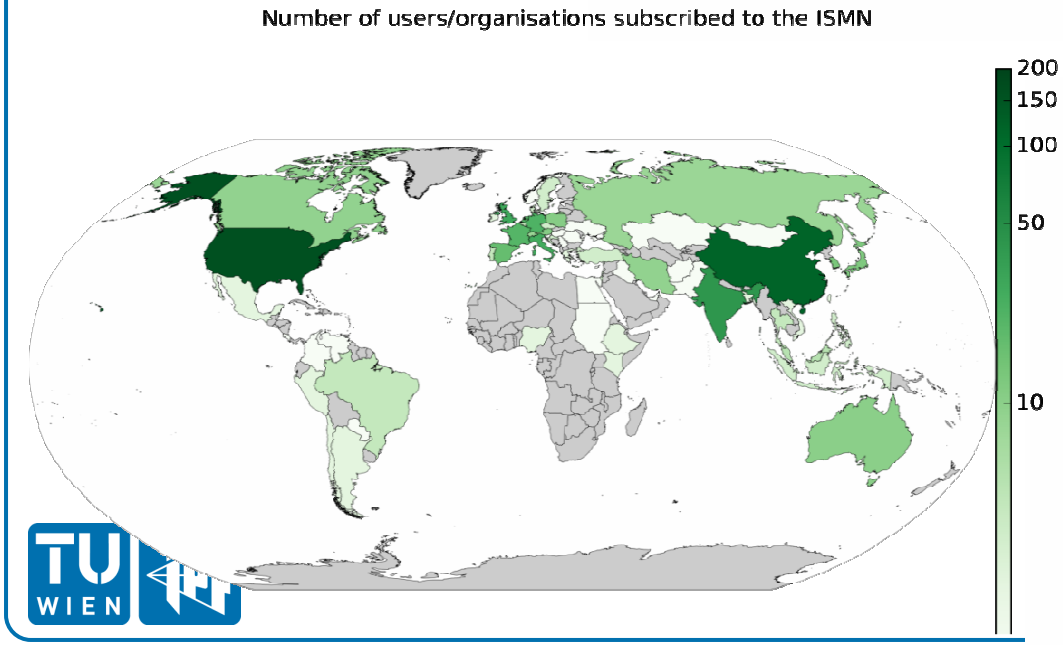
Table 3. Overview of new quality flags for soil moisture

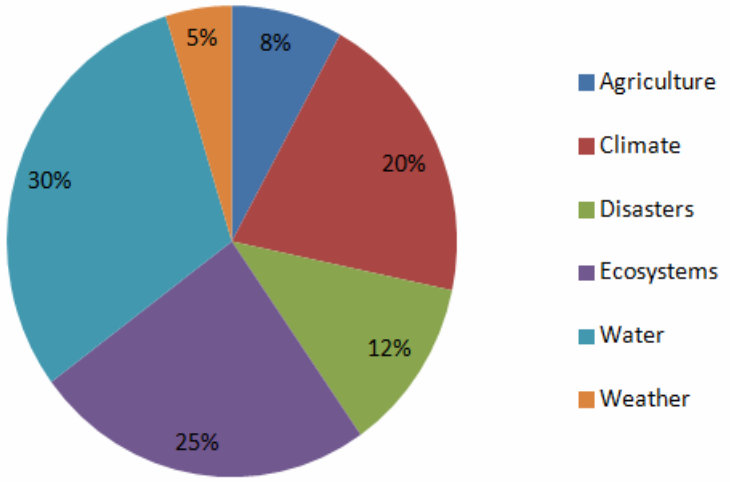
Flag	Flag is set if following condition is met	Implemented in module
C01	Soil moisture < 0.0 m^3/m^3	nrt
C02	Soil moisture > 0.6 m^3/m^3	nrt
C03	Soil moisture > saturation point (derived from HWSD parameter values)	nrt
D01	in situ soil temperature < 0°C	nrt
D02	in situ air temperature < 0°C	nrt
D03	GLDAS soil temperature < 0°C	post-processing
D04	soil moisture shows peaks without precipitation event (in situ) in the preceeding 24 hours	nrt
D05	soil moisture shows peaks without precipitation event (GLDAS) in the preceeding 24 hours	post-processing
D06	a spike is detected in soil moisture spectrum	nrt
D07	a negative jump is detected in soil moisture spectrum	nrt
D08	a positive jump is detected in soil moisture spectrum	nrt
D09	low constant values (for a minimum time of 12 hours) occur in soil moisture spectrum	nrt
D10	saturated plateau (for a minimum time length of 12 hours) occurs in soil moisture spectrum	post-processing

User community

- ~700 users







Way forward

- Insert new networks, update existing networks
- Integrate new user functionalities: interactive user quality control, improved representativeness characterisation for different scales
- Optimize interface to data providers to professionalize and speed-up data exchange

- Funding (through ESA SMOS operations) will most likely stop in Spring 2016
- Potential sources for continued funding are not clear:
  - National funding (e.g. GCOS Austria)?
  - International operational programs (e.g. H-SAF, Climate SAF)?
  - As side activity of research projects?
  - As part of commercial activity of private company?
- Would data providers stay on board for each option? Or would it be necessary to split up between an operational and a research branch?

Key publications

- Dorigo, W. A.,Wagner, W., Hohensinn, R., Hahn, S., Paulik, C.,Xaver, A., Gruber, A., Drusch, M., Mecklenburg, S.,van Oevelen, P., Robock, A., and Jackson, T. (2011). The International Soil Moisture Network: a data hosting facility for global in situ soil moisture measurements, Hydrol. Earth Syst. Sci., 15, 1675-1698,doi:10.5194/hess-15-1675-2011.
- Dorigo,W., van Oevelen, P., Wagner, W., Drusch, M., Mecklenburg, S., Robock, A.,Jackson, T. (2011). A New International Network for in Situ Soil Moisture Data.Eos Transacations American Geophysical Union 92(17): 141-142.
- Dorigo, W. A, Xaver, A., Vreugdenhil, M., Gruber, A., Hegyiová, A., Sanchis-Dufau, A. D., Wagner, W., and Drusch, M. (2013). Global automated quality control of in situ soil moisture data from the International Soil Moisture Network, Vadose Zone Journal, 12, doi: 10.2136/vzj2012.0097, 2013
- Gruber, A., Dorigo, W. A., Zwieback, S., Xaver, A., and Wagner, W. (2013). Characterizing coarse-scale representativeness of in *situ* soil moisture measurements from the International Soil Moisture Network, 12, doi: 10.2136/vzj2012.0170

Bottom line

- More soil moisture research done than ever
- Continuity of observations and data archiving is becoming a bigger problem than ever!
- GEO, GTN-H, GEWEX need to continue working together