MOISST Workshop 2018
Worksheet 2: Day 2 (Data and Research Applications)

Step 1: Reflect

Focusing on your background, knowledge, and what you have learned so far in this workshop, jot down your answers to the questions below. Once you've completed your notes, be prepared to share with others tomorrow morning:

- What data are most relevant and useful for stakeholders in the National Soil Moisture Network (NSMN)? (maps, time series, etc.)

- Storage, maybe it anomaly, current, and historic soil – water and rainfall overlays
- Clear definitions of stakeholder groups e.g. weather forecasting, drought monitoring, watershed management, irrigation management. AW will have very different spatial and temporal scales, descriptive variables, and even units.
- Satellite, in-situ and model simulation data including maps, high spatial and temporal
- Not sure – seems to be dependent on use: potential and soil type are echoed a lot
- 1) QA/QC'ed data 2) Maps for daily soil moisture
- Maps of water balance at reasonably fine temporal resolution (daily) and spatial resolution (<0.5 km)
- Me (as stakeholder): time series of quality soil moisture measurements. Others: maps
- Maps, time series, availability to have on interactive map to choose regions to create base statistics (mean, std, etc.)
- It depends on the stakeholder – in question. An ag researcher may want a time series. However, a regional planner would probably think a map is a better tool.
- Contextualized SM data (not just VWC)
- Higher resolution/large scale soil moisture data and long term data sets
- Absolute data – VWC for input to weather, hydrology, ag models. Relative data – percentile for drought and climate monitoring
- Time series and Band data
- Time series which could define potential extremes
- I think this likely depends on the stakeholder, but would guess (customizable) maps.
- Maps and short-term forecasts/drought
- Different applications drive the resolution of available soil moisture. However, most people wanted a continuous gridded soil moisture product.
- Integrated analysis data products
- Time series and maps of mean, min, max, etc.
- Regional to county-level maps and a history of soil moisture trends for their region.
- Maps, gridded

- Define what should the NSMN provide as a deliverable?

- Stability, continuity, leadership, and a database structure/web interface

- Hard to answer without knowing who the audience is
- SM time series, SM climate dataset
- Data products (standardized) tailored for different, yet specific uses
- 1) Soil moisture measurements that have undergone QA/QC and have appropriate metadata. 2) Gridded soil moisture @ daily timescales over CONUS
- Data
- An interactive website that can provide graphical, user-defined products along with raw data
- The NSMN should provide a suite of products of near real-time data (map, time series). However, it should require registration for more historical data.
- Gridded and large watershed scale maps, downloadable data
- Maps, models, apps
- Absolute data, relative data, in-situ and continuous spatial coverage, metadata for in-situ stations, satellite model inputs to improve spatial estimates
- Map of soil moisture at national scale
- More ways to market
- QC/QA SM data in a standard format with metadata
- A gridded product that matches existing precipitation/land cover/soil products
- 1) Gridded soil moisture product. 2) Multiple depths 3) Outline of best practices on how to utilize the dataset
- Integrated data repository with decision support services
- Ability to set time series at specified intervals (daily avg, daily 6 am, hourly, etc)
- Plot/demonstration: National in-situ map and satellite blend. Longer-term: Gridded blended product, database of in-situ and individual grids
- Gridded maps

- What should the management/administration of the NSMN look like?

- The Brady Bunch
- Don't know
- US government with universities
- Standard and integrate space, in-situ and model
- Funding institution → steering committee → task leads
- Full-time dedicated staff in NOAA/USDA that oversee datasets and associated metadata
- Multiple data inventories / allowing easy downloading using R / Python platform
- Like other national labs
- Long-term members from various sectors/background
- Project manager (federal agency), advisory committee (broad representation), Technical team (at federal agency), Technology Committee (technical experts, grant agency for small seed grants), Commercial sector cooperators
- Make data trustable and reliable. Try to improve the data quantity.
- Stable Fed funding with designated points of contact
- A multi-institutional steering committee
- A group of individuals from multiple sectors of soil moisture measurement; in-situ, modeling, and remotely sensed.
- Non-profit organization/foundation with administrative and data/product management team overseen by a board of directors

- NOAA-USDA partnership with advisory board comprised of other partners
- Federal

- What are some big open questions in soil moisture research?

- Sensor variation… really, just standardization of data collection and QA/QC
- Satellite data look very promising, especially SMAP L4. Reconciling satellite data with in-situ measurements and then interpolating those results along with NRCS soils data and perhaps elevations seems like a big and valuable goal
- SM predictability
- 1) Frozen soil physics and ice phase obs. 2) SM impacts on weather forecasting (convection, NWP, etc.) → land-atmosphere interactions. 3) How do research results translate into viable application practices?
- 1) Interplay between soil physics (chemical?) characteristics and soil moisture values 2) How to best assimilate soil moisture observations (in-situ and satellite) into NWP
- Can farmers benefit from it?
- 1) Rate of soil moisture in weather and climate, especially in terms of forecasting. 2) How to account for, and understand, soil moisture spatial variability.
- The role of vegetation on changes in soil moisture
- How do we better QC soil moisture data in the spatial realm? How do we adjust node/output to better depict soil moisture, especially in areas of extreme soil texture changes?
- Regionalizing in-situ data → data poor areas where topography = significant
- Standardization
- Continuous spatial absolute soil moisture by combining model and remote sensing inputs with available in-situ measurements. Can we get commercial/citizen in-situ soil moisture measurements too?
- Long term research sites.
- How to apply existing soil moisture data? Methods to improve the data quality and quantity
- I can't answer this.
- Upscaling and downscaling. Merging information from different sensors
- Multiple sensor integrations and the challenges associated with that.
- How to co-produce effective technology transfer and decision-support functions?
- How to characterize spatial variability? How to correct measurements for depth (model layer, in-situ sensors, satellites)?
- How do we fix in-situ gaps? How do we address different life cycles of satellites? What is the role of the private sector?
- Representative nature of stations

Step 2: Turn in your notes at the end of Day 2.

Step 3: Be prepared to share all your thoughts during the Framework discussion on Day 3. Your notes from Day 1 and Day 2 will help set the stage for these breakouts.

Step 4: Report

Table groups will be asked to report at least one idea that was discussed.