

Breakout Group 1

In-Situ and Remotely Sensed

Data

by

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State of Observations

- State of practice:
 - Observations
 - Currently OWP/NWC uses USGS level and Streamflow observations (operational flows) – operational defined as stable with Service Level Agreements (SLAs) – use for Operations (O) and Validation (V)
 - Aerially sensed snow pack and soil moisture (human in loop process to correct snow states, tbd on soil moisture flights) delivered on a spot and irregular basis – primarily snow season –not used in NWM (O)
 - Assimilation:
 - Based off nudging – not state of science
 - Only assimilate USGS streamflow observations (O)

Gaps in Observations, Potential to address gaps (1 of 3)

- In Situ

- 20% of discharge stations covered - gap in coverage, 8100 USGS gauges / 120,000 miles gaged out of 5M total miles, addresses stream and level, moderately biased to populated areas
- Potential Operationally available and suitable existing in-situ data sources (O), (V).
 - Hydropower and energy companies (snow data, temperature, flow, discharge, precipitation)
 - Water systems (levels, real time water quality)
 - River authorities, flood management districts (level, precip)
 - Engineered systems and diversions (level, flow, quality – some cases)
 - Irrigation districts (soil moisture and precip, evapotranspiration)
 - State and local networks (ground water, water level, precip)
 - CoCoRHaS
- Gaps in particular in rural areas. Most instrumentation focused on where people live.

Gaps in Observations, Potential to address gaps (2 of 3)

- Remote Sensed – available now (O), (V)
 - Moderate resolution (350M – 2KM) imagery (blended polar / Geo)
 - High resolution imagery
 - Radar Altimetry, gravimetric
 - Wide swath SAR
 - Microwave, hyperspectral
 - Quantitative Precipitation, Vegetation, Soil moisture, evapotranspiration, snow cover, ice monitoring,
- Remote Sensed – advances
 - New sensors and missions planned out for next 7-8 years, many having applicability
 - New science – limited investments focused on water needs, but include cryosphere, altimetry (fully focused SAR), water quality,

Gaps in Observations, Potential to address gaps (2 of 3)

- Airborne and Episodic (O) / Campaign based (V) in-situ and remote sensing used today
 - FEMA mission assignments
 - Temporary gauges
 - High water mark diagnostics
 - NOAA airborne snow and moisture measurements for snow water equivalent
 - Airborne incident and post incident vis, IR and Radar observations for floods and inundation, damage assessment
- Episodic / Campaign based in-situ and remote sensed available with potential for use primarily in model validation (V)
 - Satellite field validation campaigns (NOAA and NASA), example Snow X
 - Private versions of field campaigns

Methods to acquire data and make useable

- In-Situ observation owners / data suppliers
 - General needs
 - Published criteria / processes to become a data source (quality, service level) and an ambassador program to communicate the value proposition and onboard the contributions
 - Data ingest infrastructure (NOAA secure ingest)
 - Intellectual Property (IP) policies
 - Data Management Policy / mechanism (archive, curation, stewardship)
 - Specific categories which may need some unique approaches
 - Private Entities
 - Purchase of aggregated / Quality Controlled data
 - Cooperative agreements for data sharing
 - Public authorities, States and Local Governments
 - Partnerships under MOAs / IAAs
 - Cooperatives to aggregate
 - Other Federal Agencies beyond NOAA and USGS
 - MOAs, Joint Centers
- Remote Sensed
 - Identify types and forms of data required for assimilation, and co-develop assimilation capabilities in a priority order, and set up operational delivery agreements according to R2O schedules
 - Identify types and forms of data required for validation, jointly specify required products and service level agreements

Gaps in Science to use observations

- Model Operations
 - NWM needs an assimilation system
- Validation
 - Diagnostic infrastructure and evaluation system