

# Andrew S. Jones

## Using Remote Sensing for WCF Objectives

- New Opportunities
- Thoughts regarding very useful linkages

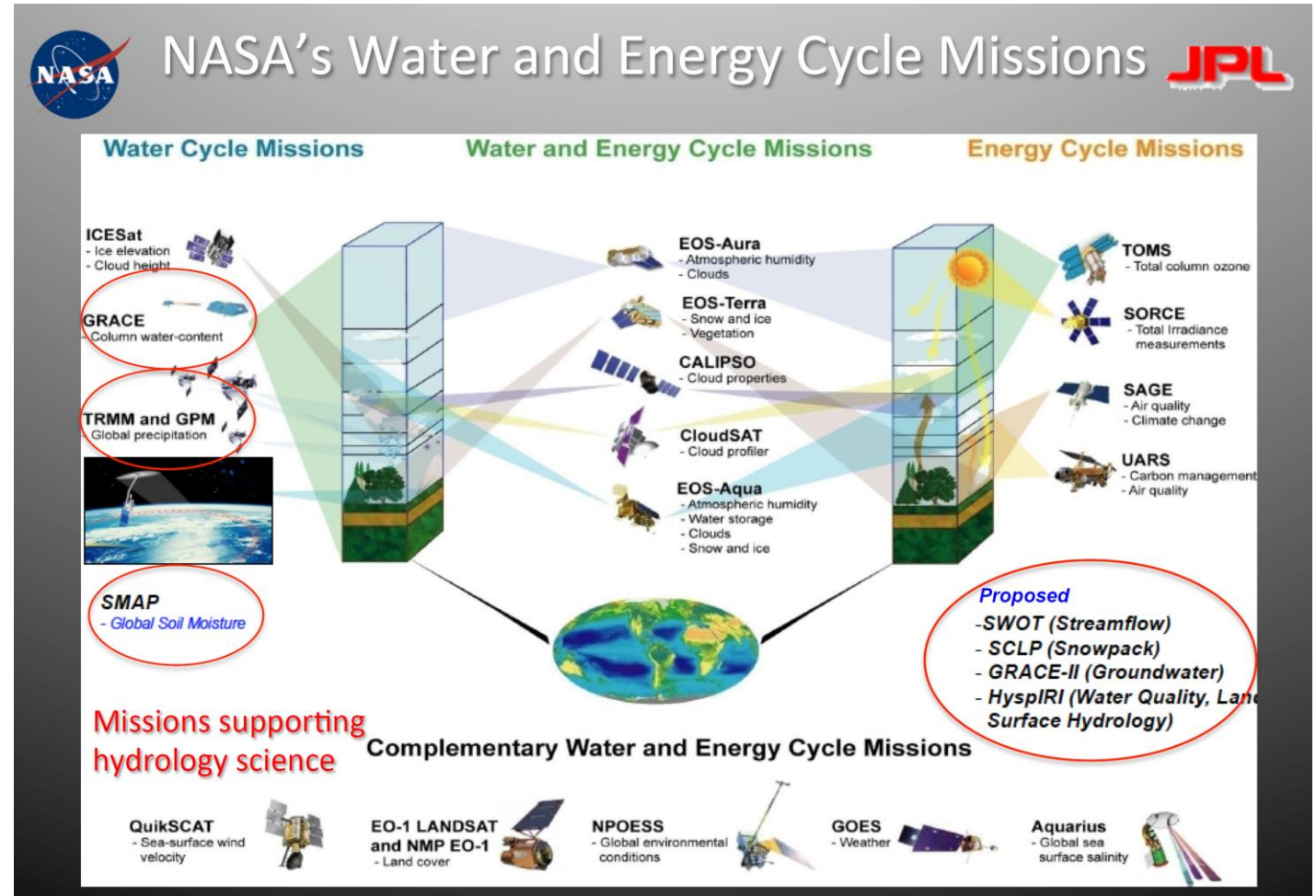
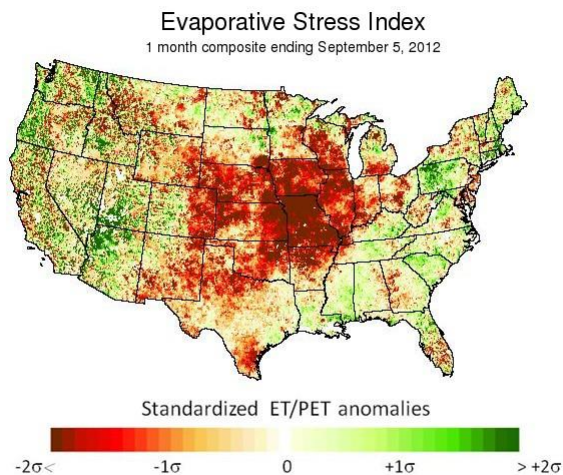
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Integrated Data and Tools for Watershed Condition Assessments

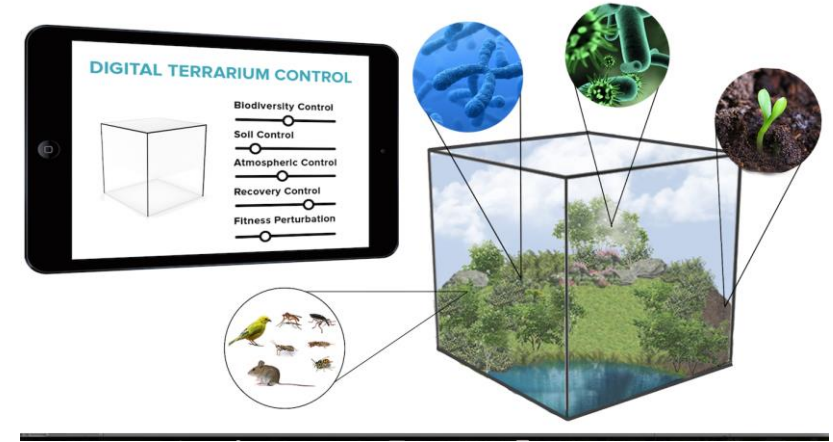
# NASA Research Satellites of Interest to WCF

- Many possibilities
- Most interesting incl:
  - SMAP (now)
  - SWOT (2020)
  - GeoCarb (2021)
  - HyspIRI
  - Precipitation (various)



From Margaret Srinivasan (NASA/JPL)

# Major CSU Initiatives

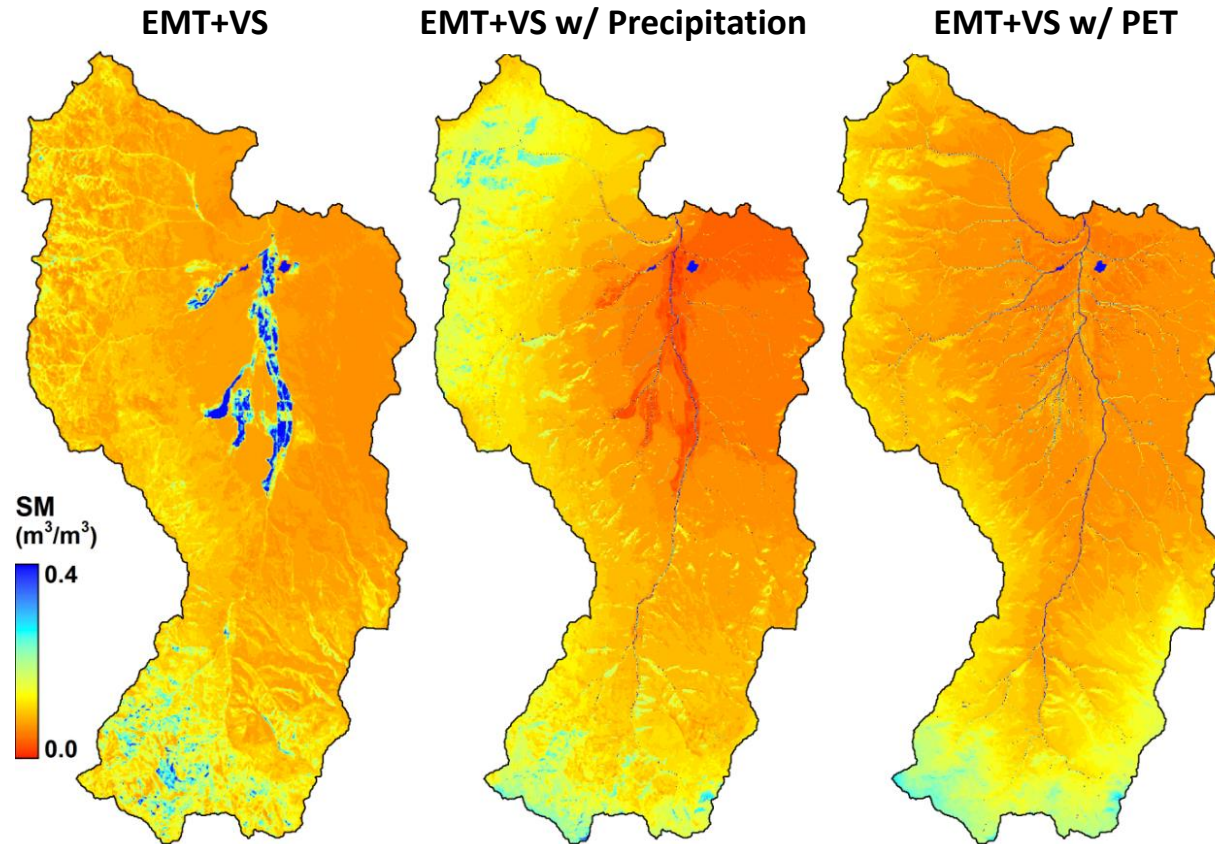


- **Digital “Terraforma”** – A Controlled Ecosystem in a box – BioEngineering Diagnostics, CSU Vet School, Infectious Disease Research Center (IDRC), International Phytobiome Initiative, CSU One Health Institute (linked to remote sensing/environ. data)
- **Rural Wealth Creation** – CSU 17 Faculty Member Team, Links to Colorado Dept. of Ag., CO Governor’s Office, City of Denver – Ag/Economics meets the environment and public health/nutrition, emphasis on society/food production/consumptive linkages – *the complete end-to-end system*. **Complex systems-of-systems modeling/observations.**
- **Innovation Center for Sustainable Agriculture (ICSA)** – Ag./Sustainability – Soil Health / Carbon Cycling Ecological systems modeling. Links back to “Future Earth” and weather/climate change impacts.
- **Ogallala Water Aquifer Project (USDA/NIFA) at CSU (and 5 other land grant universities)** – This project studies the water “draw-down” in its’ agricultural context, including operations, crop rotations, agro-economic impacts, policy choices... Highly relevant to USFS operations. Has Great Plains governors’ visibility. **The aquifer covers 30% of all US irrigated cropland, including USFS grasslands equivalent to the entire state of Rhode Island.**
- **Cooperative Institute for Research in the Atmosphere (CIRA) – NOAA Research Cooperative Institute** – links to NOAA/NASA/DoD/NPS/NFS/USGS: Strong Remote Sensing Heritage, Geostationary/Polar Satellite Data: Site of **NASA CloudSat Mission** Data Center, Future site of **NASA GeoCarb Mission** Data Center, CIRA has strong data assimilation / Bayesian analysis expertise (linking real-time models and data).



## High-Res. Soil Moisture Results using Models/Satellite

Example shown for Reynolds Creek, ID  
POC: Prof. Jeffrey Niemann (CSU)



- Without elevation dependence, downscaling model overestimates role of vegetation and misses saturation at rivers
- With precipitation or Potential Evapotranspiration (PET) included, vegetation dependence is reduced and model captures saturation at rivers

## Multi-Satellite Operational NOAA/NESDIS Results using Models/Satellite, CSU Creates 3 of the top “blended” satellite operational products, bRR, bTPW, and eTRaP.

POC: Andrew Jones (CSU) – Could link to the others...

Viewing Tom Atkins's screen

### Current NESDIS Operational Capability - Overview

Applications	Satellites/Sensors	Products
<b>bTPW</b> - Blended Total Precipitable Water	NOAA-18, NOAA-19, Metop-A and Metop-B, GOES-W/-E, GPS-Met, DMSP F18	Global TPW map
<b>bRR</b> - Blended Rain Rate	NOAA-18, NOAA-19, Metop-A and Metop-B, DMSP F17	Global Rain Rate map
<b>eTRaP</b> - Ensemble Tropical Rainfall Potential (eTRaP)	NOAA-18, NOAA-19, Metop-B, DMSP 17&18, GOES-W/-E, Meteosat-8, Meteosat-10, Himawari-8	Ensemble forecast of 6~24-hour rainfall potential for tropical systems
<b>SMOPS</b> - Soil Moisture Operational Products System	Metop-A/-B, SMOS, SMAP, GPM	Global soil moisture map
<b>GHE</b> - Global Hydro-Estimator	GOES-W/-E, Meteosat-8, Meteosat-10, Himawari-8	Global rainfall estimate with different temporal scale
<b>Blended SST</b> - Blended Sea Surface Temperature	Metop-B/AVHRR, S-NPP/VIIRS, GOES-E&-W/Imager, Meteosat-10/SEVIRI and Himawari-8/AHI	Global Sea Surface Temperature
<b>GBBEPx</b> - Blended Global Biomass Burning Emissions Product from MODIS and Geostationary Satellites	GOES-E&-W/Imager, EOS-Terra/MODIS, EOS-Aqua/MODIS	Daily global biomass burning emissions
<b>MTCSWA</b> - Multiplatform Tropical Cyclone Surface Wind Analysis	NOAA-15, NOAA-18, NOAA-19, Metop-A, S-NPP	Six-hourly estimates of tropical cyclone wind fields
<b>TOAST</b> - Total Ozone Analysis	NOAA-19/SBUV-2 and Metop-B/TOVS	Global ozone map
<b>Enhanced TOAST</b> - Enhanced Total Ozone Analysis	NOAA-19/SBUV/2 and S-NPP/CrIs	Global Ozone map
<b>IMS</b> - Interactive Multi-sensor Snow and Ice Mapping System	NOAA-18&-19, Metop-A, S-NPP, Aqua/TERRA, Radarsat-2, Meteosat-10, Himawari-8, DMSP, GOES-E&-W	Snow and Ice cover maps for the Northern Hemisphere

ST&R JPSS Annual Review - Blended Products Session