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Earth Information System (EIS)

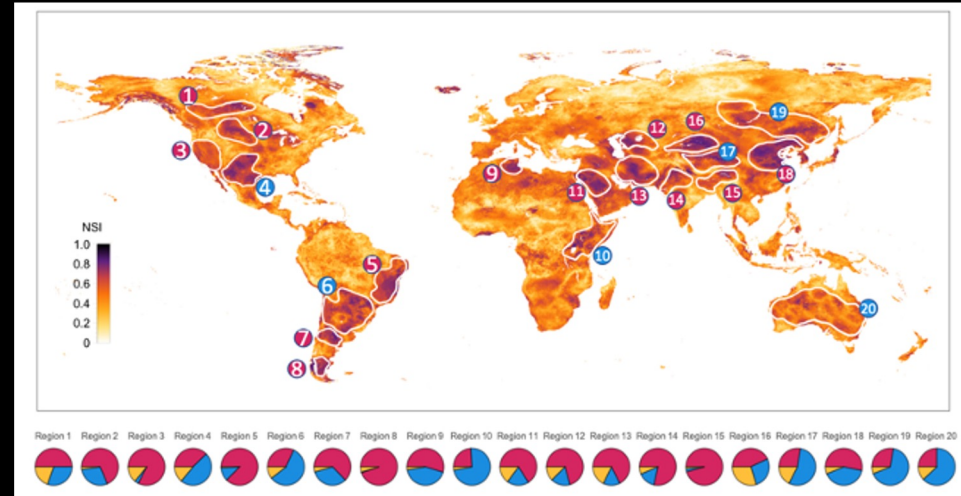
Monthly highlights

January 2023

EIS analysis quantifies the non-stationary patterns in global terrestrial water cycle

The warming climate and human disturbances are leading to more non-regular changes in the global water cycle, implying that assumptions of stationarity are no longer valid.

Through a multivariate data assimilation synthesis, the EIS team developed a novel metric to quantify the non-stationarity patterns of the global water cycle, integrating data about long term trends, seasonal shifts, and extreme changes.



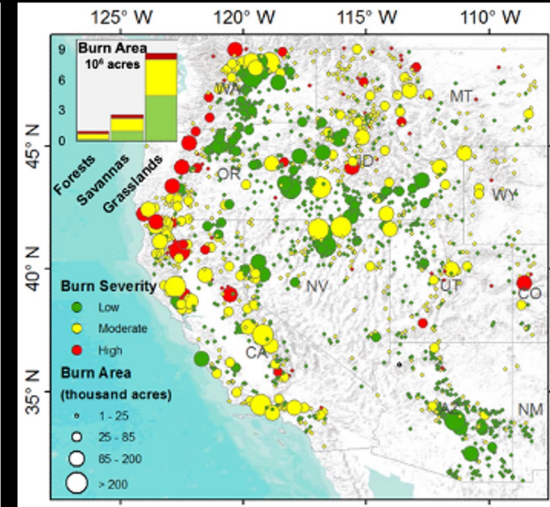
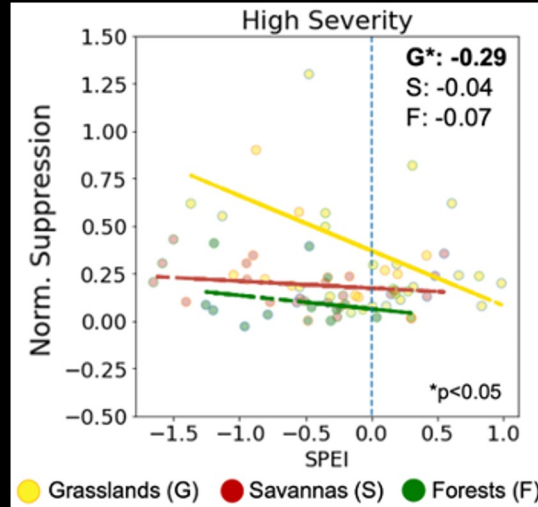
Non-stationarity index (NSI) for global terrestrial water storage

Results show that nearly half of the world is dominated by increasing/decreasing trends (47%), followed by seasonal shifts (36%), and instances of more/less extremes (17%), with strong regional patterns.

NASA EIS Reveals Impact of Droughts on Post-fire Hydrology

Synthesis of ET observations from OpenET within EIS helped explore vegetation response to 1500 fires in Western U.S. as a function of drought stress, land cover, and burn severity.

Severely burned grasslands are most vulnerable to droughts which compound ET suppression and inhibit post-fire recovery. Forests recover slowest from fires (there is a 35% ET recovery in grasslands compared to only 8% over forests), with low sensitivity to dry extremes by utilizing moisture in deeper roots to meet ET demands.



Relationship between precip-normalized ET suppression (y-axis) and drought (x-axis) for high severity fires (left); The right panel shows the severity and extent of fires over the Western U.S. being analyzed.

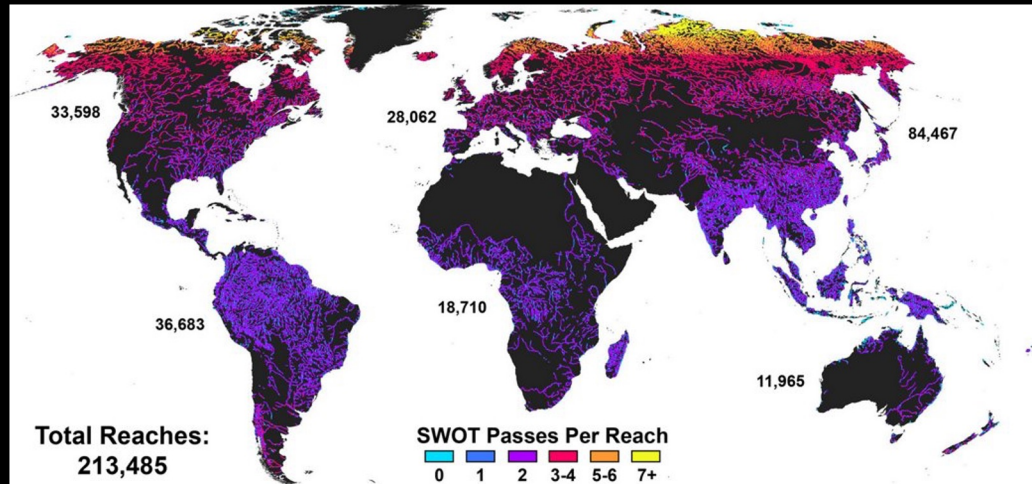
EIS is helping SWOT to deploy Confluence discharge pipeline on AWS

EIS facilitated a collaboration between the SWOT Hydrology Science Team with the SMCE team to explore how to most effectively deploy the Confluence discharge pipeline on cloud computing environments. This includes:

- Establishing a model of cloud computing costs
- Working with AWS to optimize use of cloud compute resources

By working on a common EIS analysis platform, SWOT oceanography and hydrology team members will work together to learn how to best deploy data processing algorithms in the cloud.

The collaboration between EIS and SWOT will lead to better SWOT discharge data visibility and availability for the scientific community through visualizations, notebooks, and documentation. More generally, this will pave the way for NASA to better prepare for deploying other OPEN pipelines in AWS environments.



Global map of reaches for which Confluence will estimate discharge.

EIS Representation at AMS Annual Meeting, Jan 8-12, 2023

Sessions

- From Data Systems to Decisions: Synthesizing Data, Models, and Results to Produce Actionable Earth Science Information (Part 1).
Chairs: Alexey Shiklomanov, Sikchya Upadhayay, Sujay Kumar
- From Data Systems to Decisions: Synthesizing Data, Models, and Results to Produce Actionable Earth Science Information (Part 2).
Chairs: Alexey Shiklomanov, Sikchya Upadhayay, Sujay Kumar

Presentations

- NASA's Earth Information System (EIS): Enabling Integrated and Accessible Earth System Science. Sikchya Upadhayay.
- The Benefit of NASA's Atmosphere Observing System (AOS) Mission Lidar and Polarimeter Observations for Health and Air Quality Applications. Melanie Follette-Cook, Liz Wiggins

Hyperwall

- Hyperwall presentation: NASA's Earth Information System (EIS). Alexey Shiklomanov
- Hyperwall presentation: NASA's Visualization, Exploration, and Data Analysis (VEDA) project. Alexey Shiklomanov

Town Hall

- Town Hall: A remote perspective for living with wildfires. Presenter Liz Wiggins

Posters

- Projected Changes to the Frequency of Rain-on-Snow Events over the Twenty-First Century from Global, High-Resolution (10km) Land Surface Simulations, Melissa Wrzesien

Other EIS Engagements in January

Organization/ Meeting	Thematic Area	Outcome
World Meteorological Organization	Freshwater	Contribution to State Water Report
ECCO Annual Meeting, Pasadena, California	Sea level change	Two oral presentations involving EIS (Denis Felikson and Ichiro Fukumori). Engaged in conversations on EIS with ECCO principals
World Meteorological Organization GHG Monitoring Symposium, Geneva, Switzerland	GHGs	Poster Presentation of GHG-EIS
Presentation to NOAA Administrator Rick Spinrad at JPL	GHGs	Presentation on GHG monitoring from space and GHG-EIS.