
earth information system
NASA
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Earth Information System (EIS)
Monthly Highlights
October 2023
https://www.earthdata.nasa.gov/eis

Cloud-native dashboard allows researchers to easily access and analyze SWOT Sea-Surface Height measurements

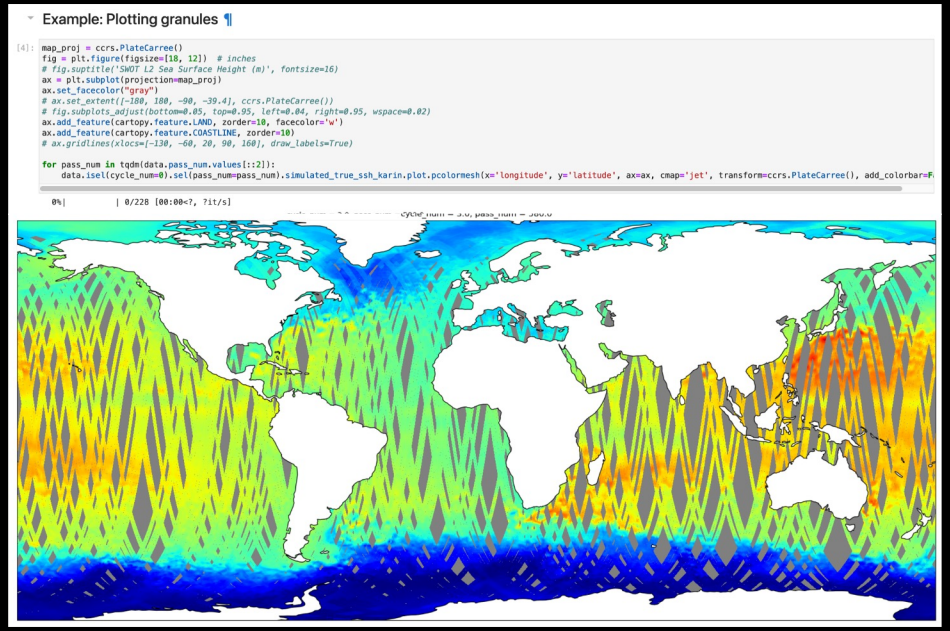
Need: Researchers need easy access to SWOT data from interactive notebook environment.

Problem: SWOT swath format results in a 17-minute load time for just one cycle of data.

- One year of data contains ~18 cycles (over 17k granules).

Solution: SWOT/EIS developed a cloud-based Jupyter notebook that serves as a data exploration and analysis dashboard, allowing 1 year of SWOT data to be (lazy) loaded in <1 sec (a ~30k speed increase).

- We tested netcdf, zarr, and kerchunk to identify best cloud-native format for SWOT.
- Cloud integration streamlines data access, visualization, and analysis in a single cloud notebook, reducing the need for data downloads (egress).



One cycle of global SWOT Sea-Surface Height measurements plotted in the cloud-based SWOT Dashboard Jupyter notebook. Access the SWOT Dashboard as a static Jupyter notebook or launch an interactive session with one-click in the NASA VEDA 2i2c JupyterHub.

Developed by Ayush Nag (intern); Mentor: Jinbo Wang
EIS support: Mark Carroll, Jian Li, and the SMCE team
Sponsored by California Space Grant, EIS, PODAAC, NASA PO program

Accessible ECCO Modeling Utilities in the cloud

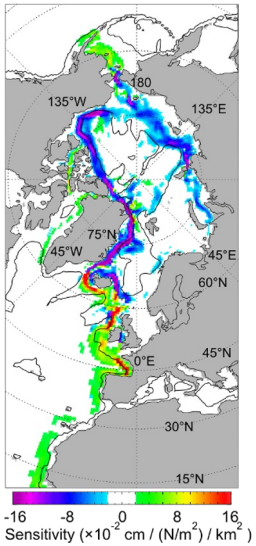
ECCO Modeling Utilities (EMU) have been deployed in the cloud to enable oceanographers, who are not modeling experts, to run the Estimating the Circulation and Climate of the Ocean (ECCO) model and understand the impact and sensitivity of sea-level change around the globe using NASA's ocean state estimate.

EMU puts ECCO in the hands of oceanographers and greatly reduces the barriers to using the model for researchers.

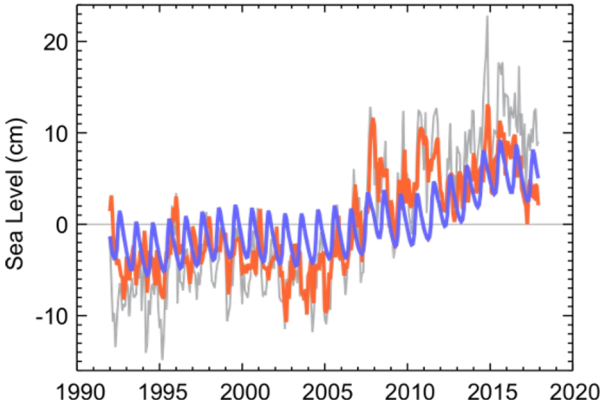
Four utilities have been deployed on the EIS Science Managed Cloud Environment (SMCE): (1) *sensitivity*, (2) *causation (type)*, (3) *causation (location)*, and (4) *origin, fate, and pathway*.

EMU scripts and more information can be found here.

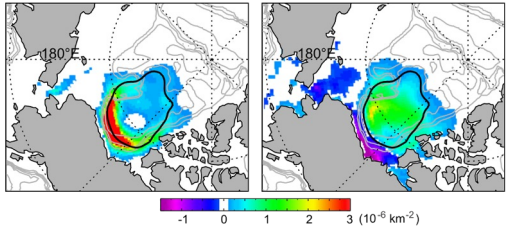
Sensitivity



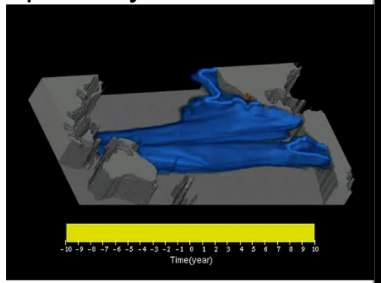
Causation (type)



Causation (location)



Origin, fate, and pathway

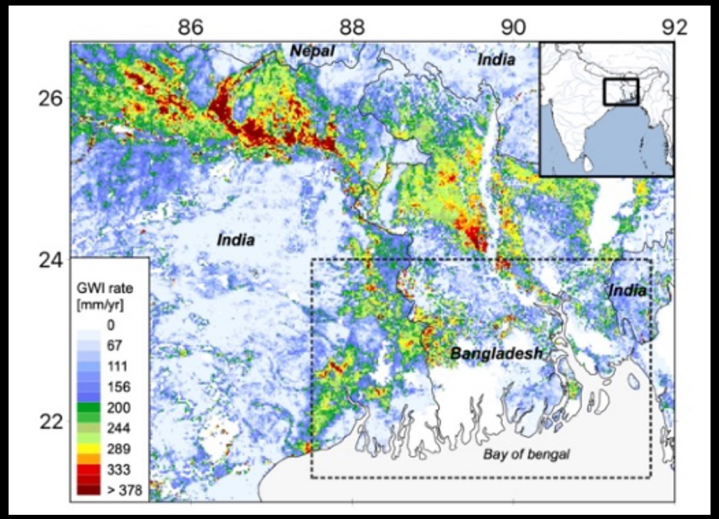


Compound flood risk in the Bay of Bengal

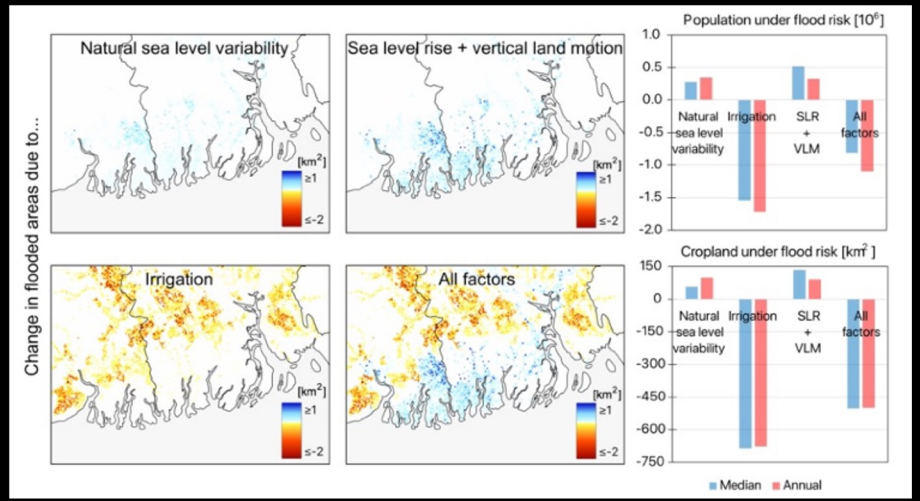
EIS engagement with Bangladeshi stakeholders granted access to hydrological and farming data.

Integrating ground and satellite data into NASA models allowed the construction of “what-if” scenarios to isolate impacts of multiple factors on coastal flooding.

Scenarios show that intensive groundwater-fed irrigation depletes aquifers and reduces runoff that feed crops during flood seasons. Simultaneously, the region witnesses substantial sea level rise that increases saltwater flooding and further impacts cropland and coastal populations.



Study domain and average annual groundwater irrigation (GWI) rate over 2002-2021 derived from NASA models



Maps on the left and middle show spatially distributed change in flooded areas due to natural sea level variability, sea level rise + vertical land motion, irrigation, and all factors combined. On the right, population and cropland impacted by each factor and their combination in median and annual flood events.

Expanding EIS Fire Tracking to Canada

Published: 10/25/23

Individual fire data provide critical insights into the timing, behavior, and emissions from large fires in 2023.

We partnered with the Earth Observatory to visualize the five largest Canadian fires in the FEDS database for 2023.

The EO story highlights ongoing EIS Fire research and applications, in collaboration with Canadian scientists (NRCan) and stakeholders (CIFFC).

https://drive.google.com/file/d/1GbmhBj5EJ9nzEEXIQmbtAT3we-Bhj02f/view

https://earthobservatory.nasa.gov/images/151985/tracking-canadas-extreme-2023-fire-season

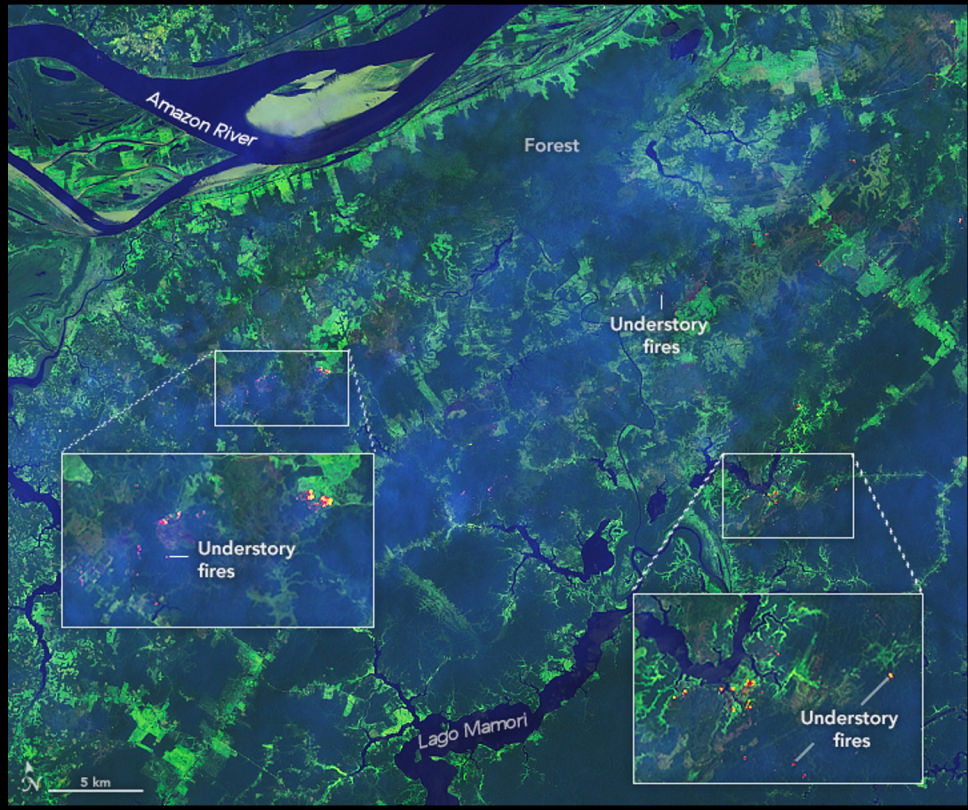
EIS Fire Supports Brazilian Stakeholders Battling Amazon Forest Fires

Published: 10/20/23

El Niño drought conditions in the central Amazon have left Amazon forests at high risk of burning.

The EIS Fire team is sharing VIIRS fire tracking data and candidate fire information directly with IBAMA-Prevfogo, the national forest fire monitoring authority, and stakeholders using the Amazon Dashboard.

We developed new workflows to deliver Landsat and Sentinel-2 fire data to firefighters on the ground, as low-intensity understory forest fires are often missed by VIIRS. This EO story highlights widespread forest fires near Manaus in October.



https://earthobservatory.nasa.gov/images/151965/drought-fuels-wildfires-in-the-amazon

EIS Engagements and Outreach in October

Organization/ Meeting	Date(s)/Location	Thematic Area	Outcome
World Climate Research Open Science conference	Oct 23-27, Kigali, Rwanda	EIS	Presented EIS at the NASA hyperwall; Keynote presentation on the freshwater reanalysis
NASA/Bill and Melinda Gates Foundation meeting at the American Society of Tropical Medicine and Hygiene	Oct 18, Chicago	EIS Freshwater	Presented examples of EIS capabilities for environmental monitoring to map malaria and other vector-borne diseases
Canadian Interagency Forest Fire Centre (CIFFC)	Oct 5, Virtual	EIS Fire	Presented fire tracking and prediction capabilities, and explored potential collaborations
Argentinian Ambassador	Oct. 23, GSFC	EIS Fire, Freshwater	Presented fire tracking and fire analysis data regarding 2020 and recent fire activity in Argentina and South America. Discussed future collaboration with CONAE around wildfire monitoring. Shared SMAP and modeled crop yield scenarios on ag.
Amazon Institute for Environmental Research, Amazon Fire Risk Modeling Workshop	Oct. 9-10, Brasilia	EIS FIre	Presented EIS efforts to characterize fire risk and fire spread in the Amazon region, building on FEDS and the Amazon Dashboard fire tracking tools.
USFS RMRS	Oct. 26 (virtual)	EIS Fire	Engaged with research team leading analysis of prescribed fire activity, based on the ability to leverage FEDS data and additional VIIRS information