



Enhancing Hydrologic Forecasting in the Rio Grande Basin

Develop a hydrological model with forecasting capabilities and prototype a decision support tool for water supply management in the Rio Grande Basin, leveraging NASA data, models, and technologies.

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Water Watch Analytic (WWA): Model solutions derived from direct NASA observations and modeling approaches

- We employ satellite Earth observation to measure surface water extent and stream flow discharge using SWOT, Sentinel-1 (SAR), Sentinel-2, Landsat, and ICESat-2. This includes retrospective analysis (2015-2024) and near real-time monitoring at 10m input model resolutions.
- We developed three efficient water balance models for the cloud using monthly data from NASA's GLDAS models (NOAH, VIC, and CLSM). These models—Model-N, Model-V, and Model-C—rely on precipitation and air temperature inputs to accurately replicate evaporation, runoff, and soil moisture.



Water Watch Analytics (WWA) and Inundation

Model

Water Balance Model

(WBM) Model:

Contains 3 scalable models that mimic runoff & evaporation productions of the 3-LSMs (land surface models) the NASA GLDAS system – NOAH3.6, VIC2.0, and CLSM at the daily time scale.

Inputs:

Precipitation and T2M

Daily evaporation, runoff and soil moisture

River Routing Model

(RRM) Model:

Two linear reservoir models that run on 291,284 watersheds comprise the River Routing Model (RRM).

Inputs:

Daily total runoff in the Watershed (either from WBM or an outside source)

Daily streamflows on river reaches in the watershed

Flood Inundation Model

(FIM) Model:

Model:

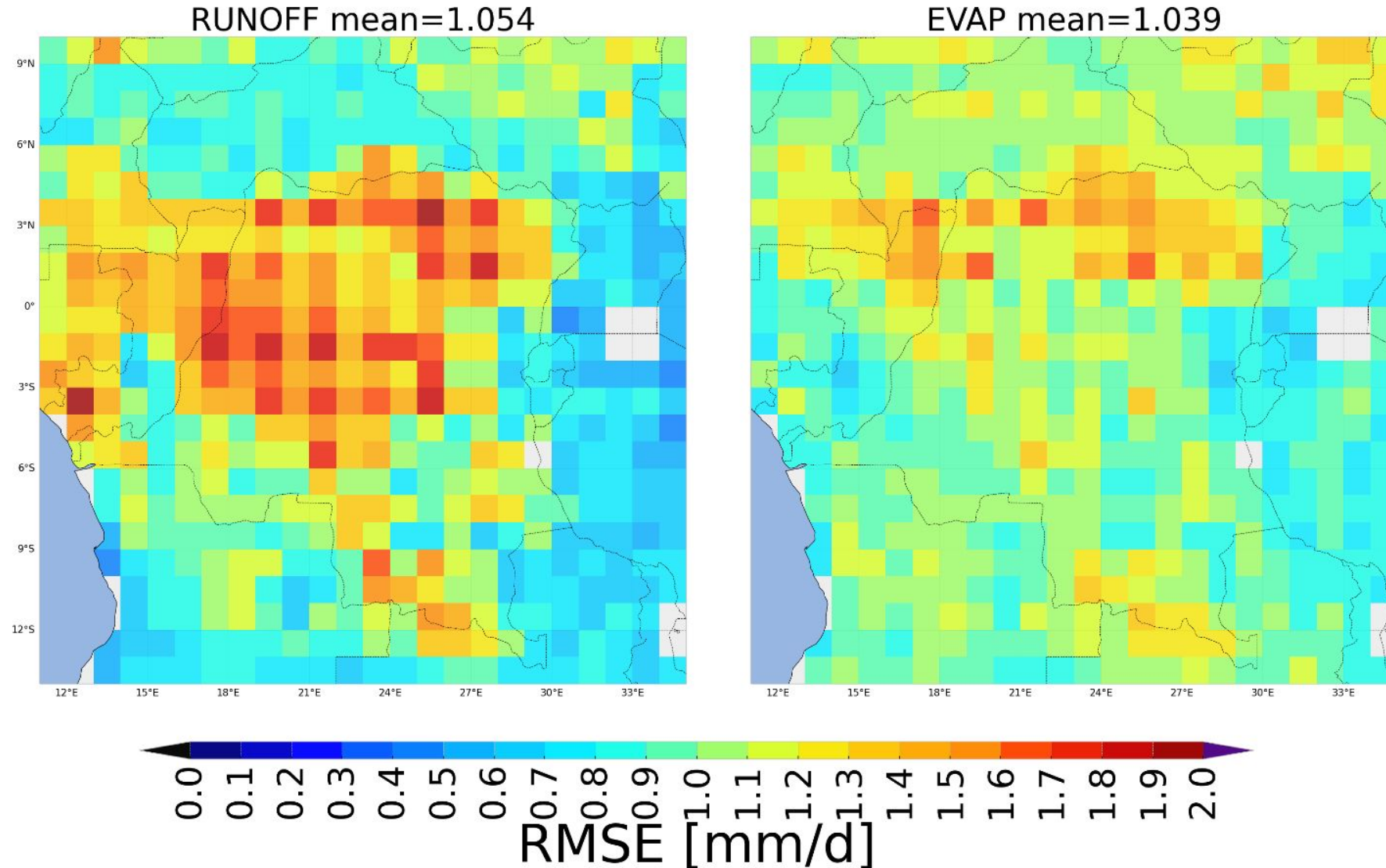
Global River Data Assimilation System (GRDAS)

Inputs:

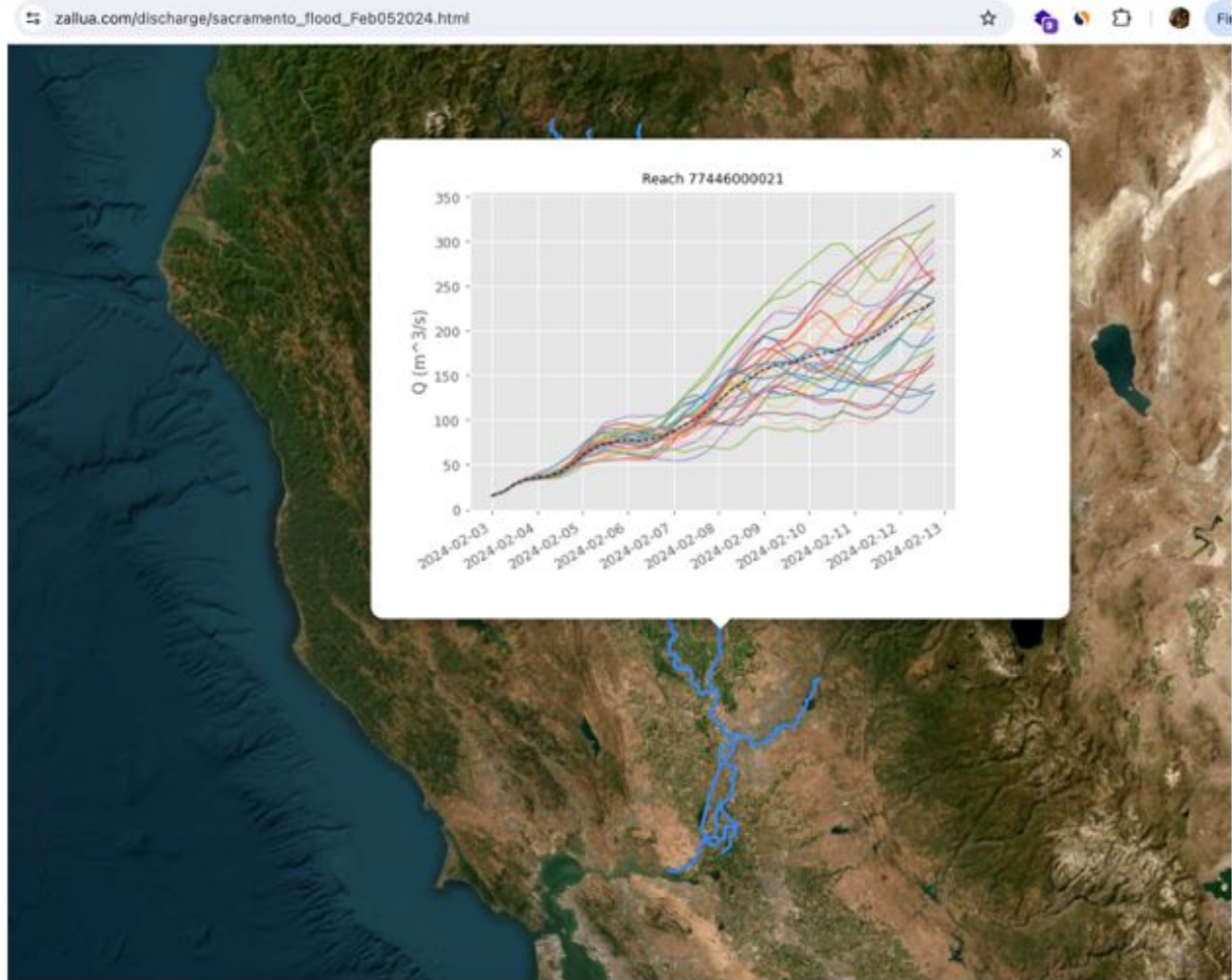
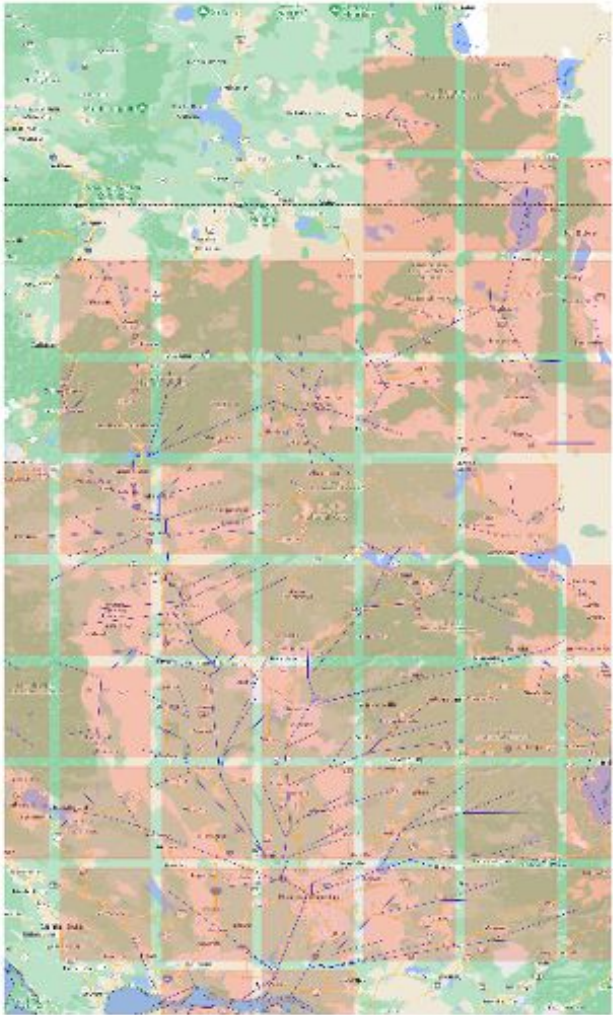
Daily total runoff in the Watershed (either from WBM or an outside source), Individual width, depth, surface water extent, slope observations

Harmonized River Geometry & likelihood in Inundations

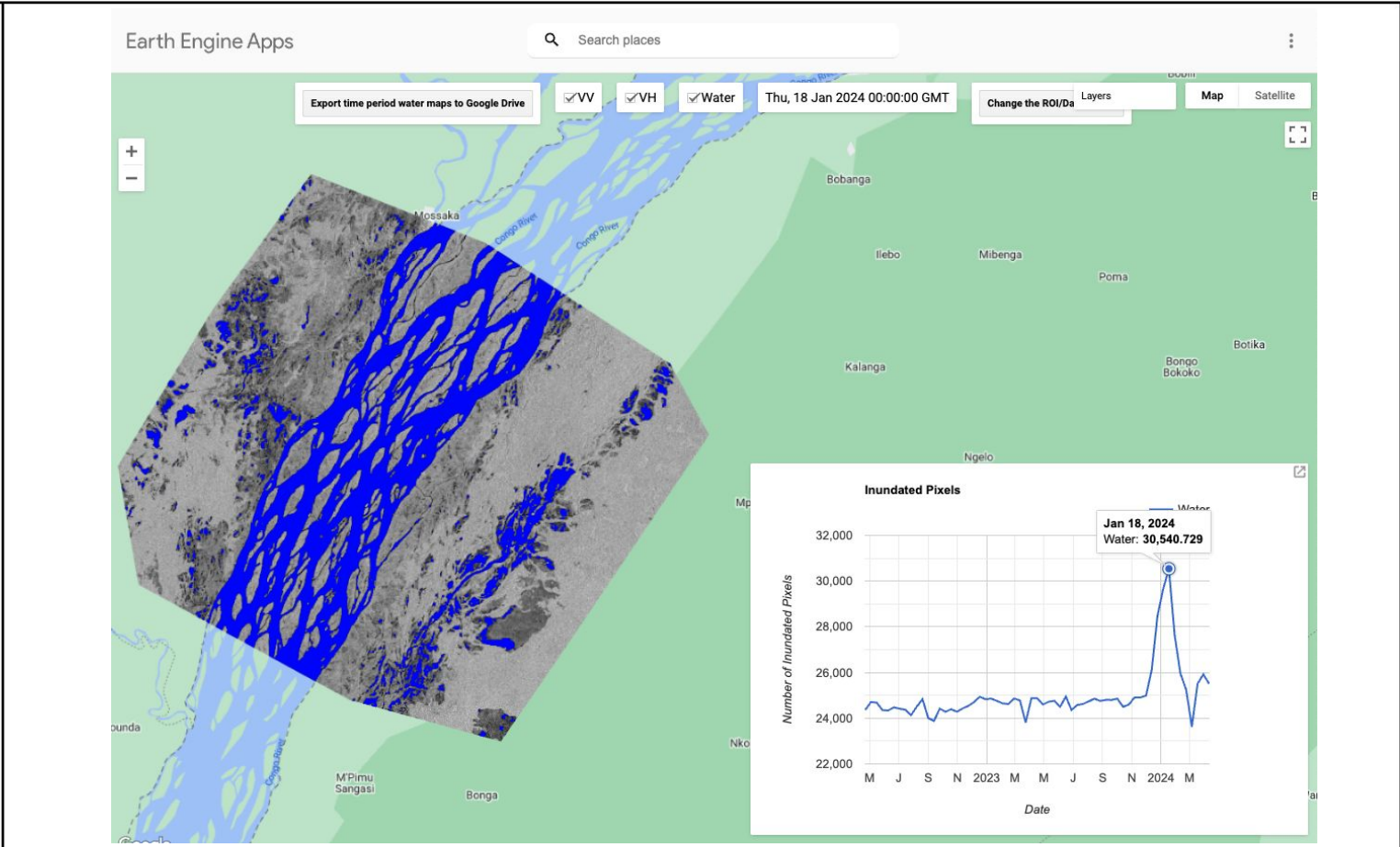
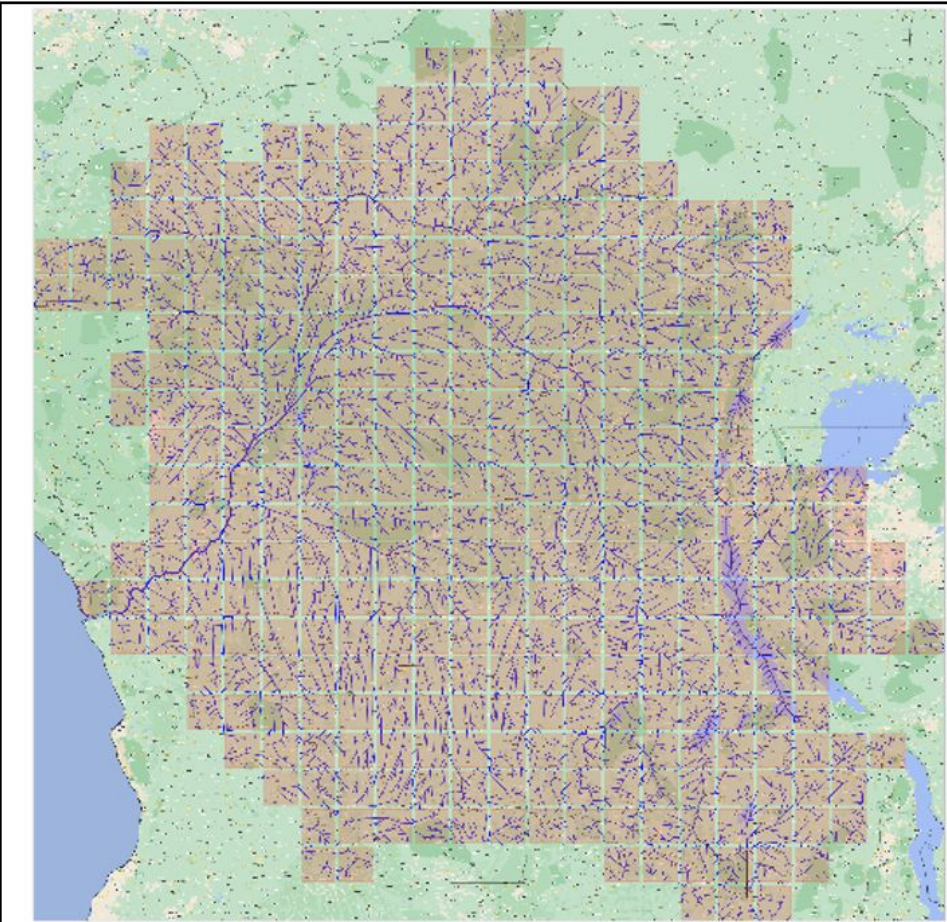
Spatial maps showing the computed Root Mean Square Error (RMSE) of daily runoff (left) and evaporation (right) between WWA's Model N and GLDAS NOAH model for the period 2017-2021



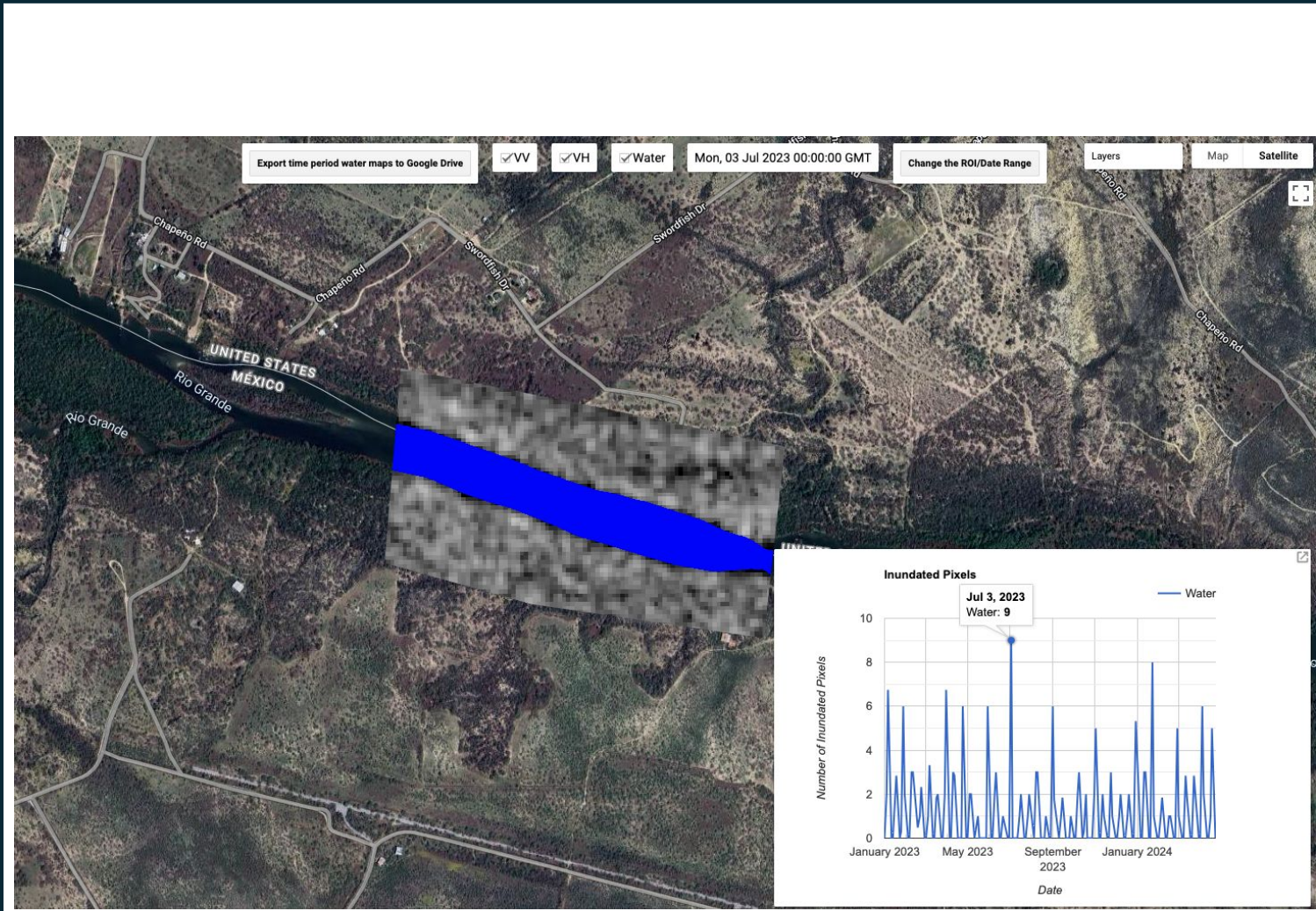
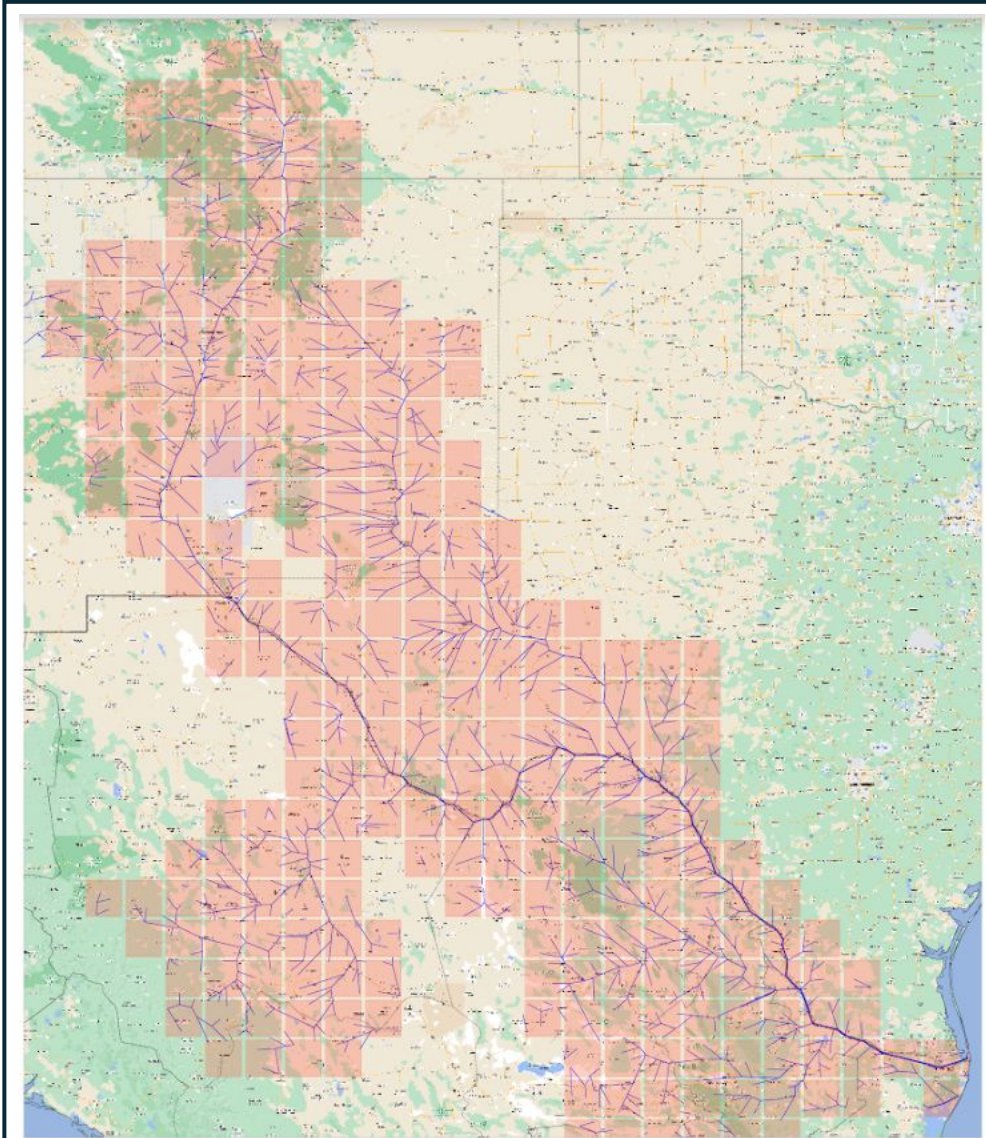
Snapshots of preliminary results: In early February 2024, sections of California experienced widespread flooding, strong winds, and power outages due to the impact of two atmospheric rivers.



Snapshots of preliminary results: Congo Basin Jan 18, 2024 peak flood level since 1970



Snapshots of preliminary results: Rio Grande Basin



Accessing NASA Data for Non-Expert Users(<http://fluvisat.com>)

The screenshot displays the Fluvisat.com web application interface. The browser address bar shows the URL `riverreaches-app-dac1d9e843c0.herokuapp.com`. The main content area features a large map on the left and a grid of smaller map thumbnails on the right. A pop-up window titled "River Reach Info" is overlaid on the main map, providing details for a specific river reach.

Fluvisat.com

River Reach Info

- ID: 13230300081
- Name: Congo
- Length: 10040.440297686131
- Width: 7784

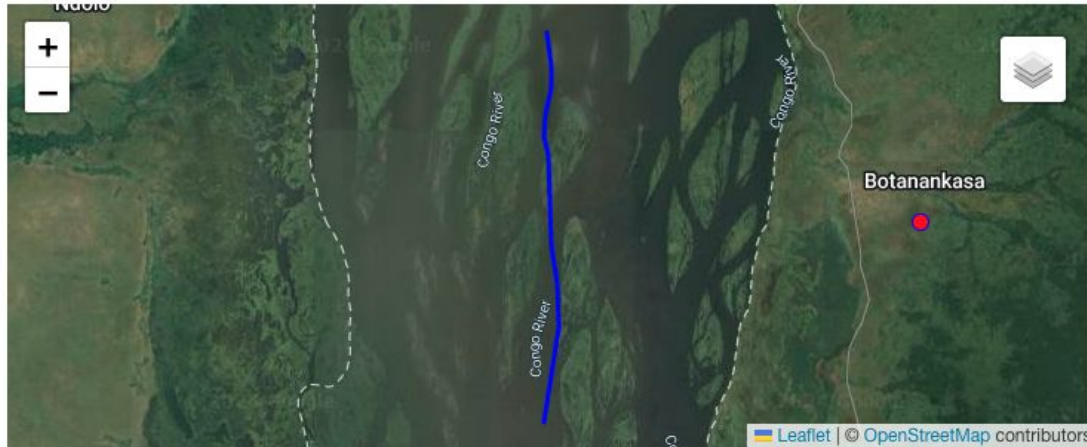
The grid of thumbnails on the right contains the following information:

ID	Name	Length	Width
13230300081	Congo	10040.44030	7784
13217000241	NODATA	11723.51515	80
13217000301	Nsele	9733.81874	63
13218000051	Mayi-Ndombe	9570.14782	42
13217000271	Nsele	11088.69654	63
13217000281	Nsele	9752.80366	84
13218000031	Mayi-Ndombe	19139.12772	48
13217000091	Congo	9174.13634	30

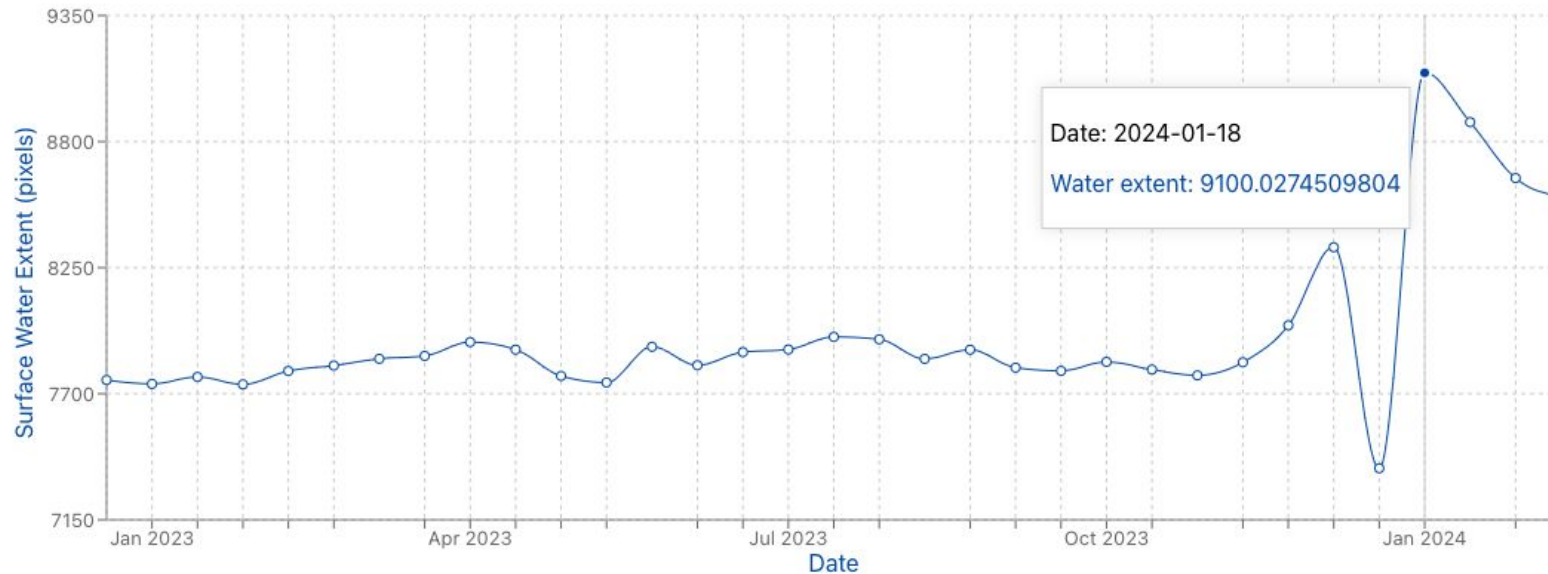
Navigation controls at the bottom include a back button, a page indicator (1, 2, 3, 4, 5, ..., 33), and a forward button.

Accessing NASA Data for Non-Expert Users(<http://fluvisat.com>)

Fluvisat.com



Inundated Pixels



Accessing NASA Data for Non-Expert Users([http:// fluvisat.com](http://fluvisat.com))

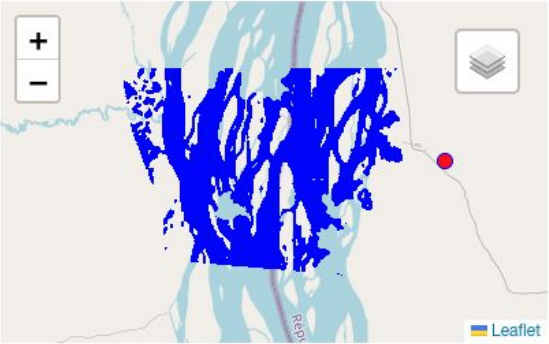
DOWNLOAD CHART DATA AS CSV DOWNLOAD IMAGES

2023

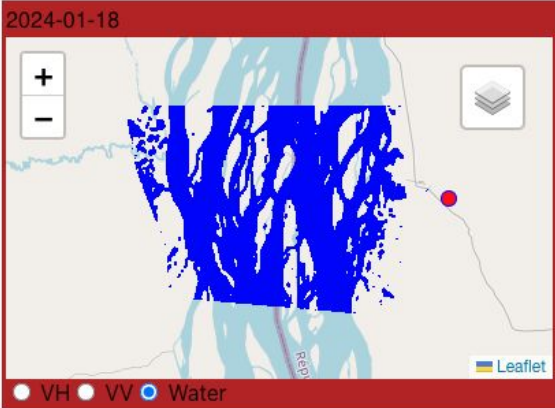
2024

January


2024-01-06



2024-01-18



2024-01-30



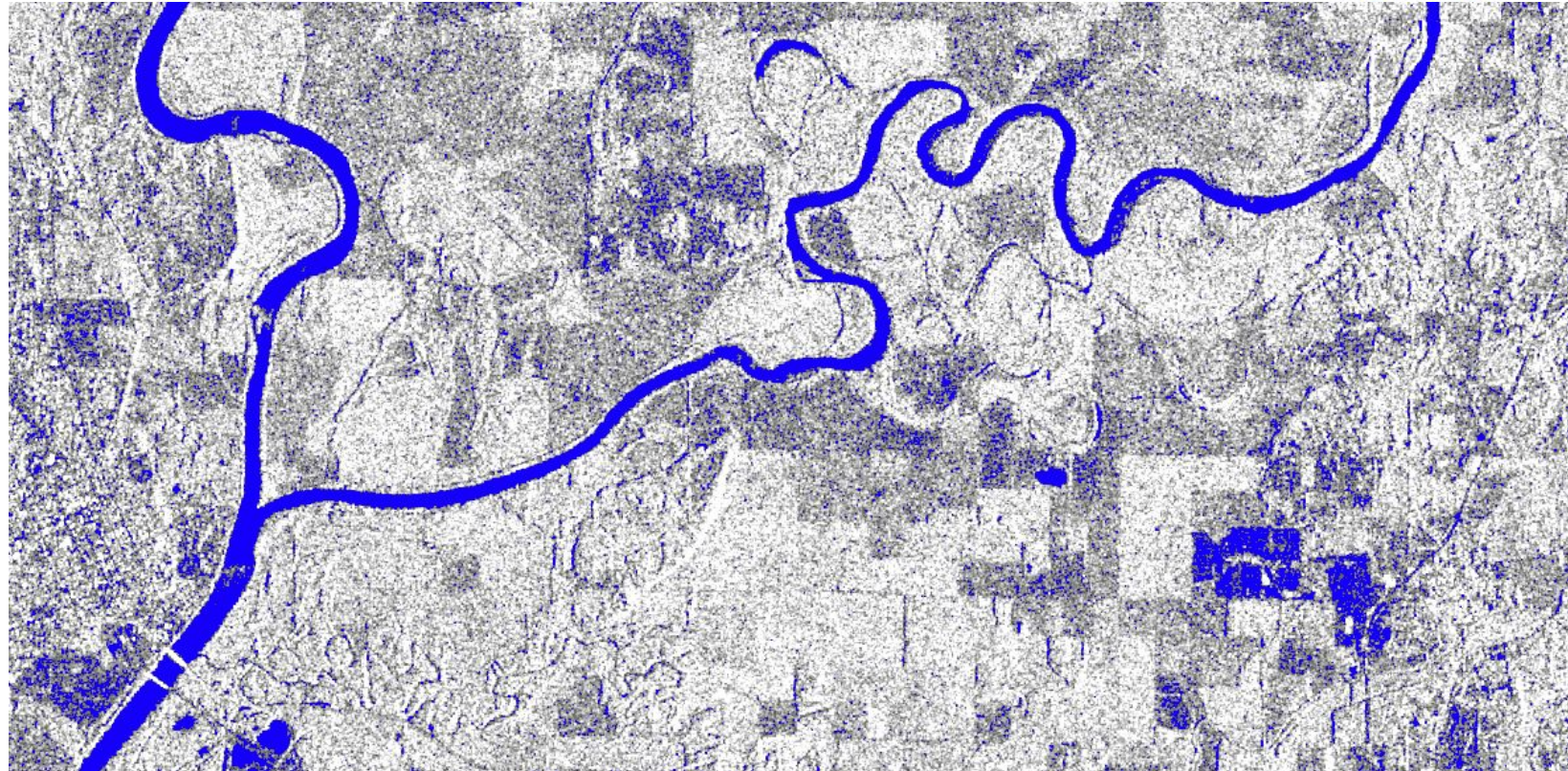
○ VH ○ VV ● Water

○ VH ○ VV ● Water

○ VH ○ VV ● Water

NEWS | October 27, 2020

NASA Funds Projects to Make Geosciences Data More Accessible



Credits: Chandana Gangodagamage, NASA Goddard Space Flight Center/University of Maryland