



Tethys Platform™



An Introduction to Tethys Platform

Nathan Swain | PhD | Aquaveo | Tethys Geoscience Foundation



About Me



- PhD from Brigham Young University
 - Civil and Environmental Engineering
 - Water Resources
 - Hydroinformatics
- Director of Development Services at Aquaveo, LLC
- Creator of Tethys Platform
- Chair of Tethys Platform Project Steering Committee since 2015
- Chair of the Board of Directors of the Tethys Geoscience Foundation

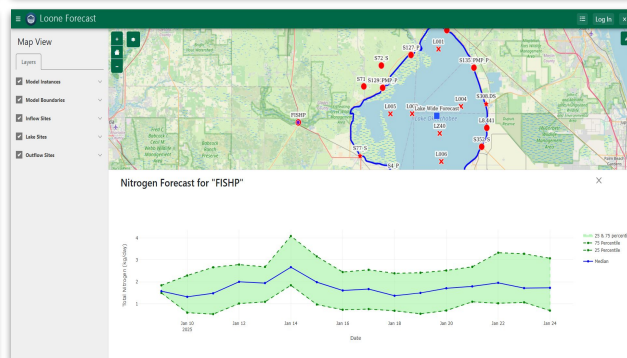
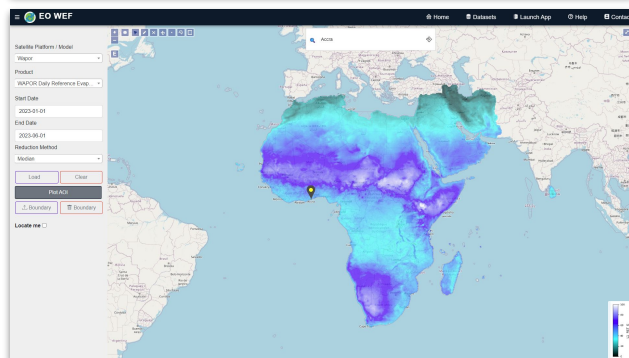
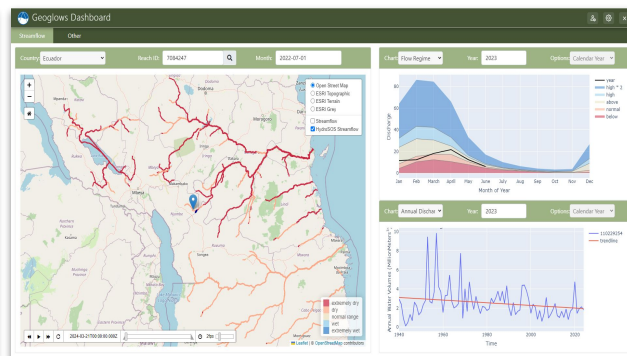
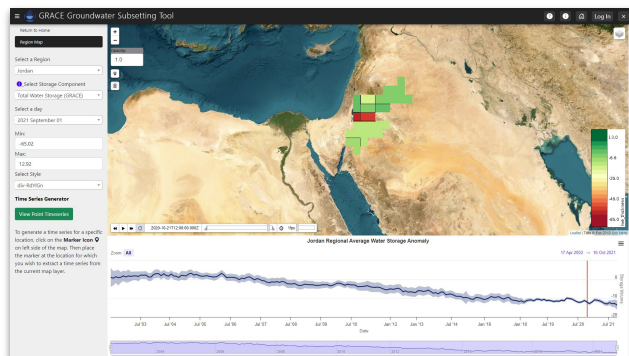


What is Tethys Platform? (High-Level)





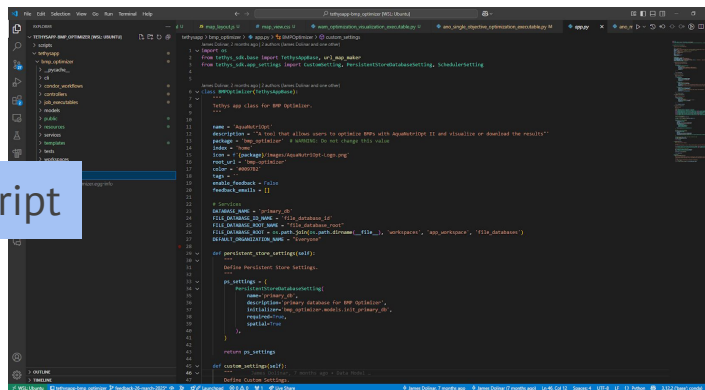
Scientific Web Application Development Framework





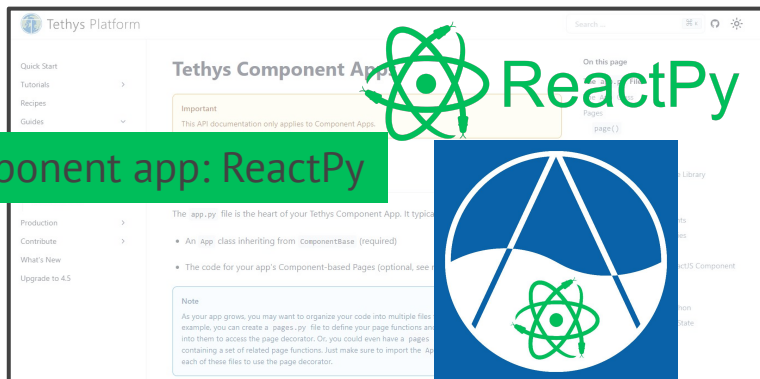
1.

Standard app: Python + JavaScript



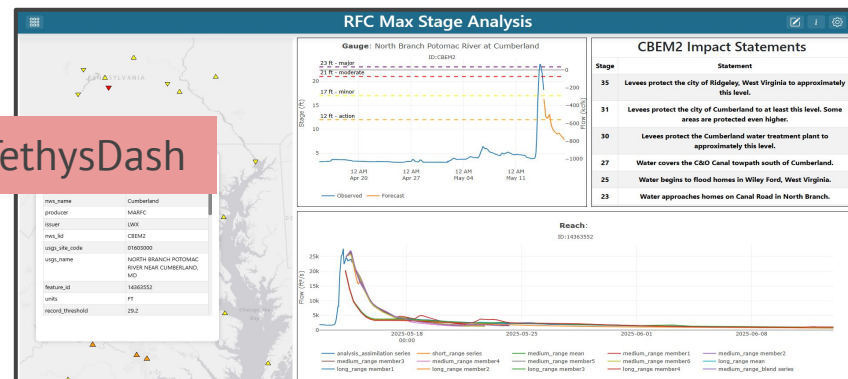
2.

Component app: ReactPy



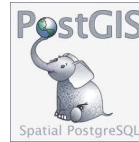
3.

TethysDash





Synthesizer of Web-based Geospatial Technologies



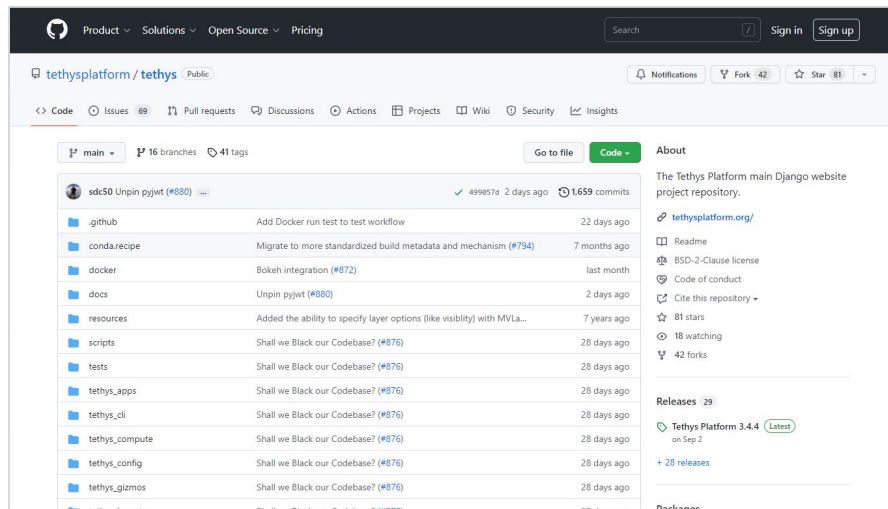
What is Tethys Platform? (More Details)





Overview of Tethys Platform

- Open Source
- International User Base
- Easy as 1-2-3!
- Tethys Portal
 - One-Stop-Shop
 - User Management
 - Content Management
 - Security
- Tethys Apps
 - Application Scaffold
 - Data Visualization
 - Streamlined Templates
 - Curated SDK
 - Interoperable GIS



tethysplatform.org

github.com/tethysplatform/tethys





International User Base

- Used worldwide by
 - Researchers
 - Universities
 - Government



Readership report for Nathan Swain's dissertation *Tethys Platform: A Development and Hosting Platform for Water Resources Web Apps* for the period between 3 May 2016 and 25 Feb 2025.



Tethys Platform



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First install miniconda, then run:

```
conda create -n tethys -c conda-forge tethys-platform  
conda activate tethys  
tethys quickstart
```

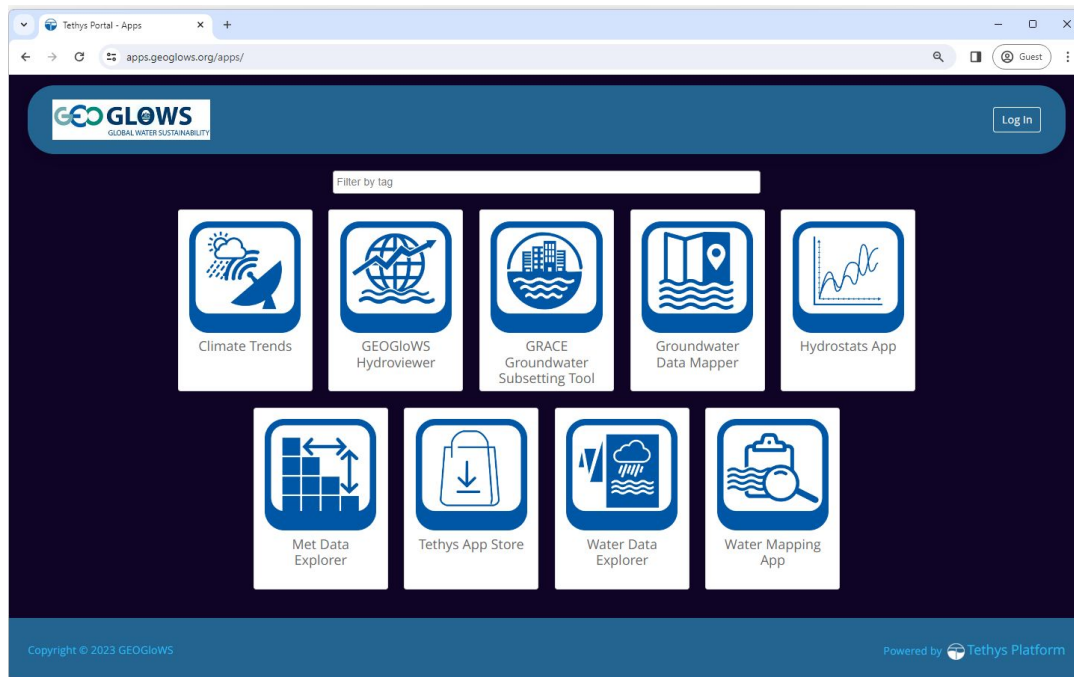
To install using pip:

```
pip install tethys-platform  
tethys quickstart
```



Tethys Platform

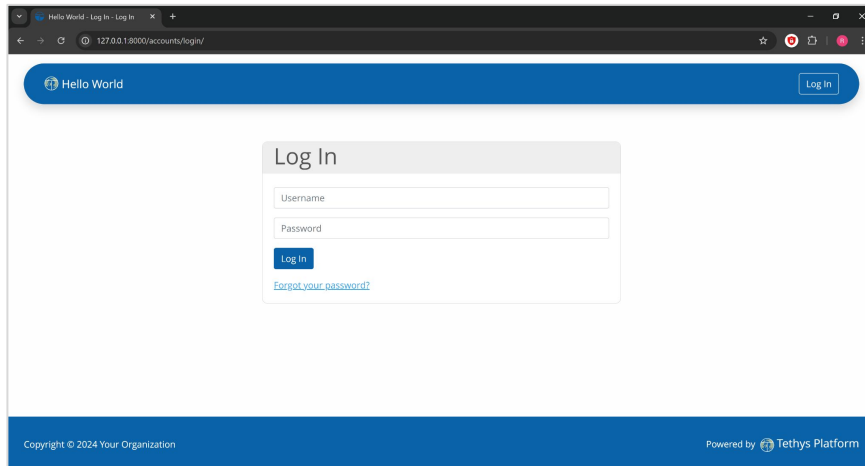
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User Management

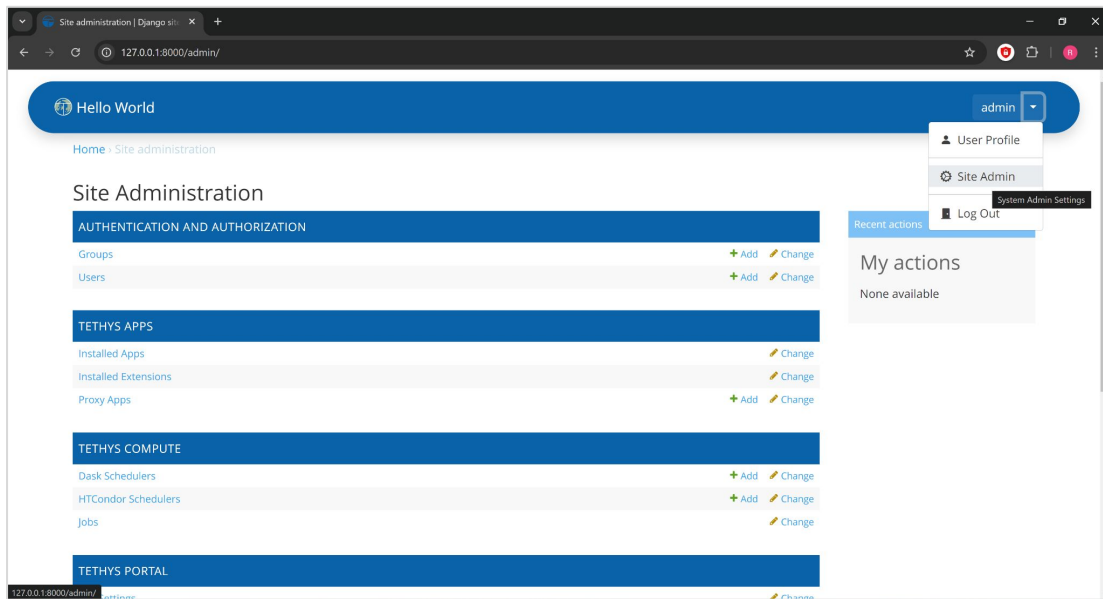
- Secure user authentication and login
- Administrators can easily create and manage user accounts
- Permissions tools to allow groups of users access to pages and data
- Integrates well with OAuth and Single Sign-On (SSO)
- Built on Django's user management and security tools





Tethys Platform

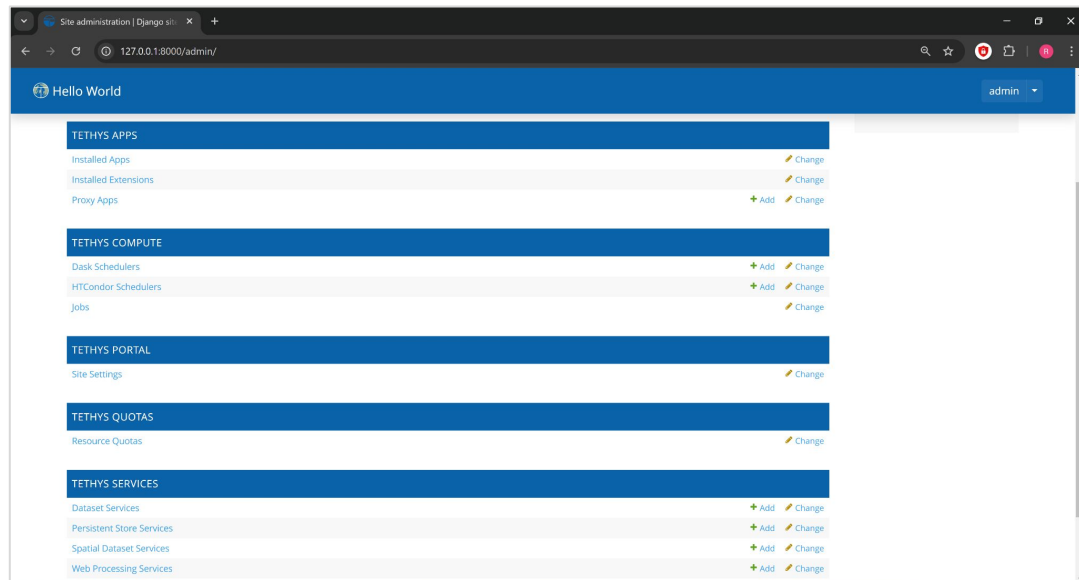
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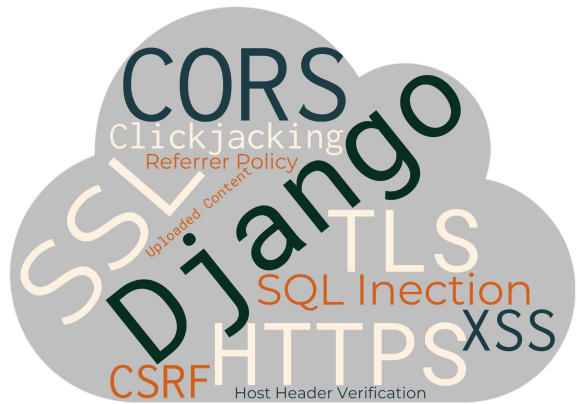




Security



- Built on top of Django framework
- Supports secure user authentication
- Protects against web attacks like SQL injection, Cross-site scripting(XSS), Cross-site request forgery (CSRF)
- Security can be extended using middleware

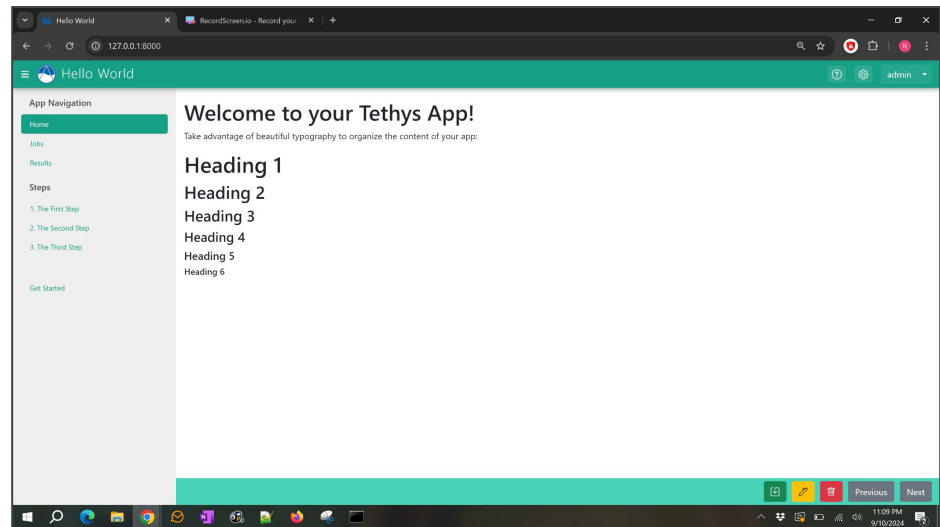




Scaffolding Tethys Apps

- In just a few minutes, you can have a simple web app up and running
- Provided scaffolding/templates for Tethys apps
- Streamlined templates for interactive spatial analysis

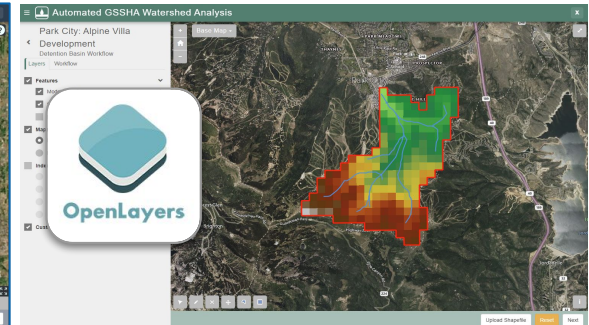
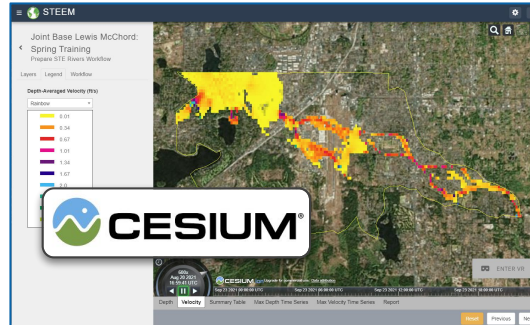
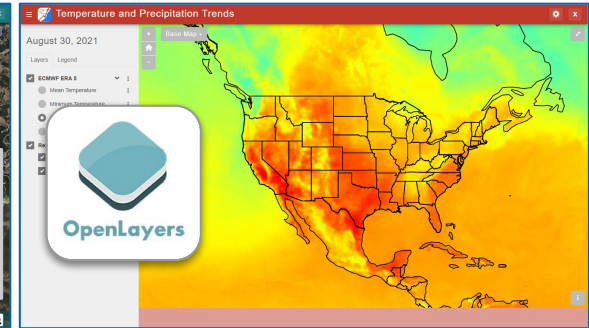
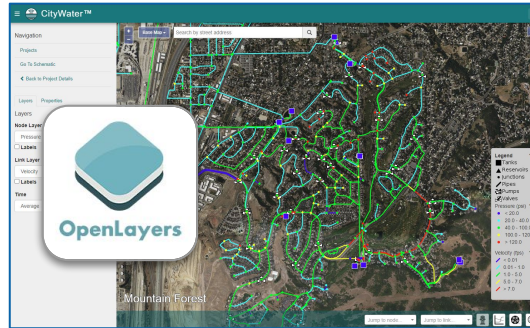
```
tethys scaffold my_app_name  
cd tethysapp-my_app_name  
tethys install -d
```





Data Visualization

- Lots of options for data visualization
- Interactive maps
- 3D visualization
- Graphs





Tethys Platform



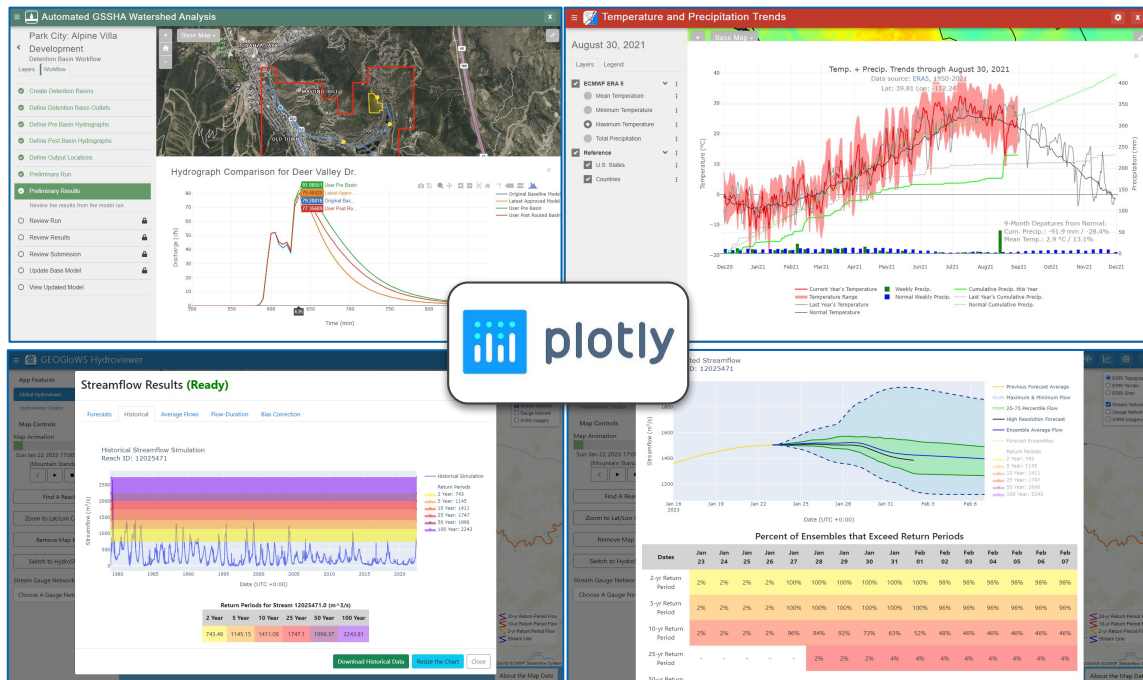
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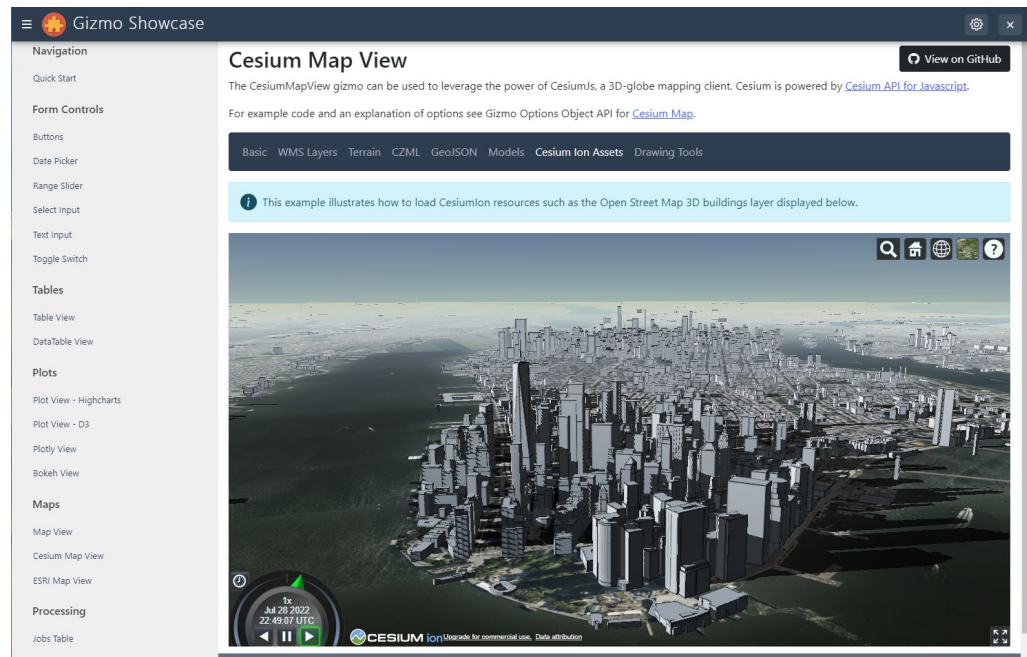
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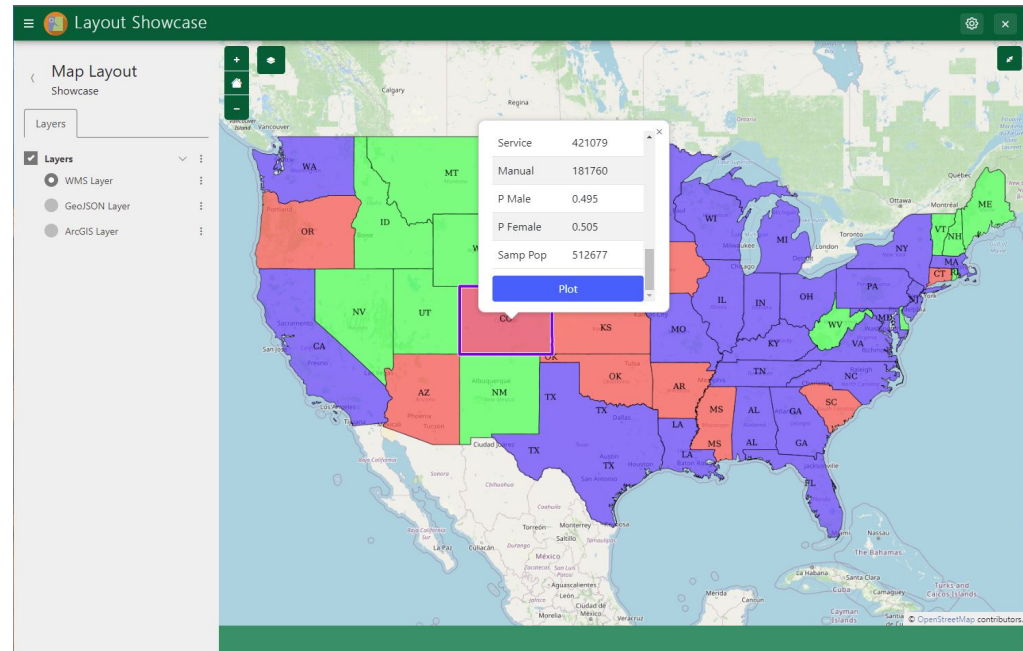
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Tethys SDK: Languages/Libraries





Interoperable GIS

- Integrates very well with lots of existing tools, especially GIS tools

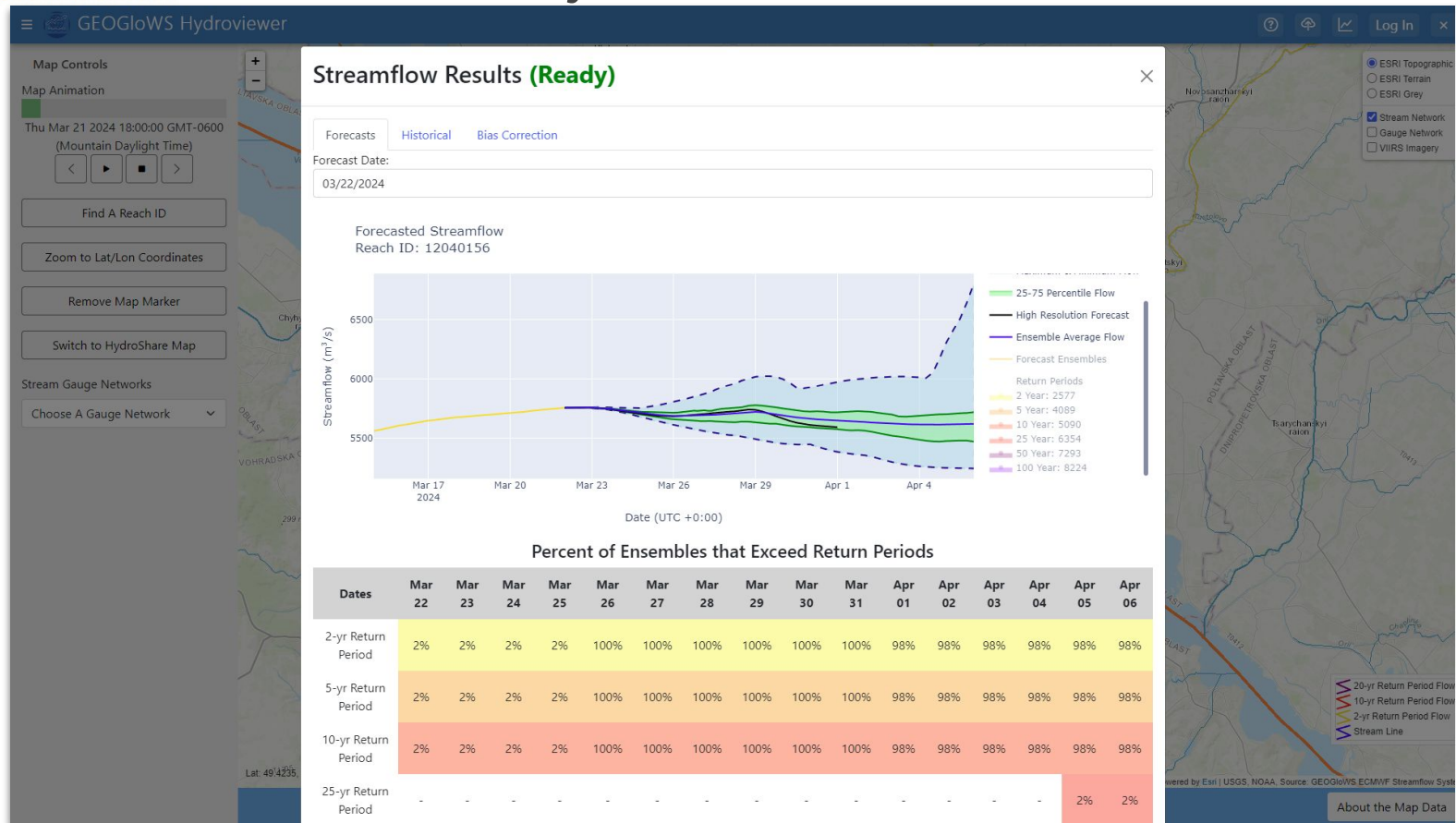


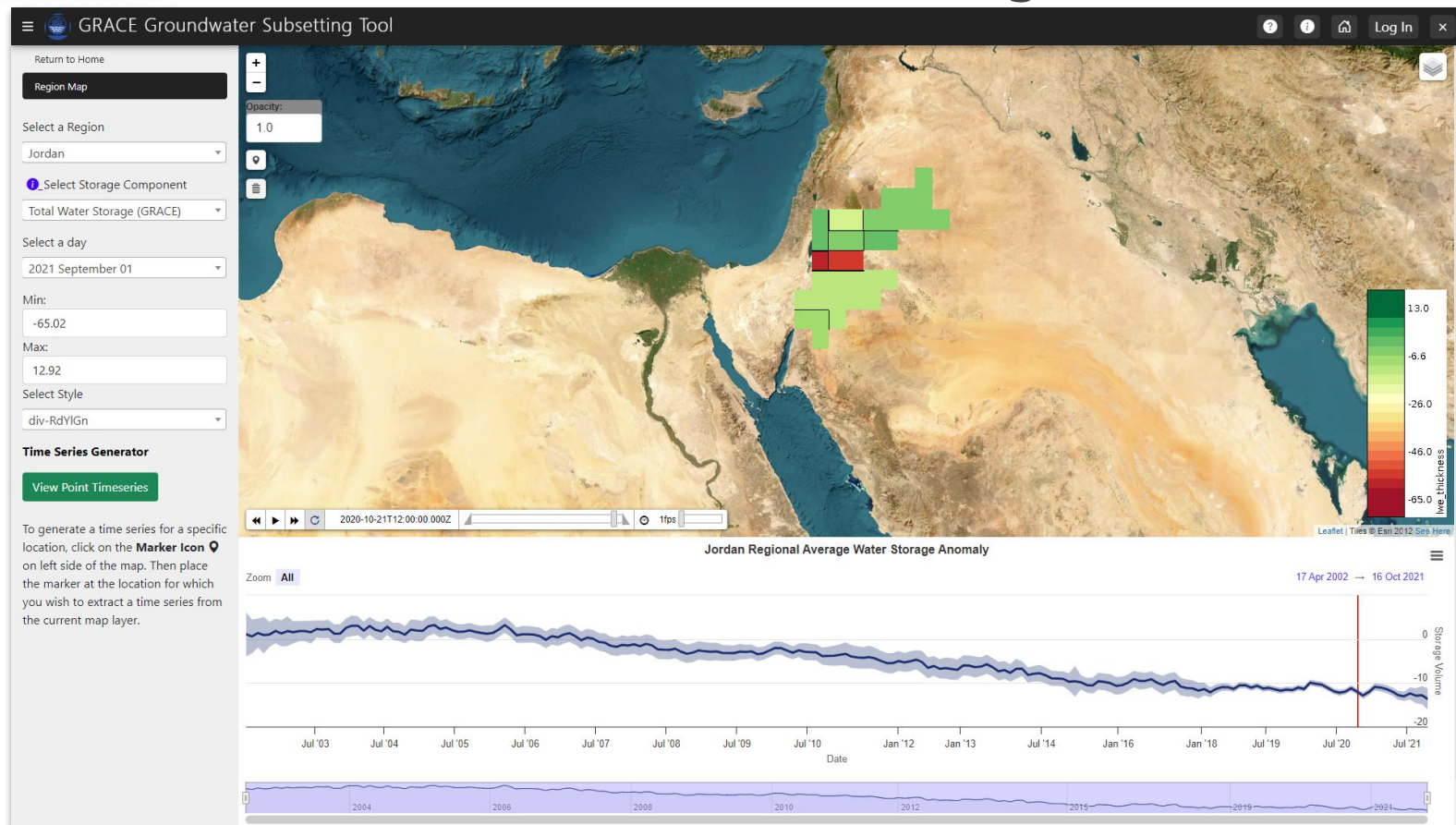
“Big Box of GIS Stuff” -Dan Ames, BYU

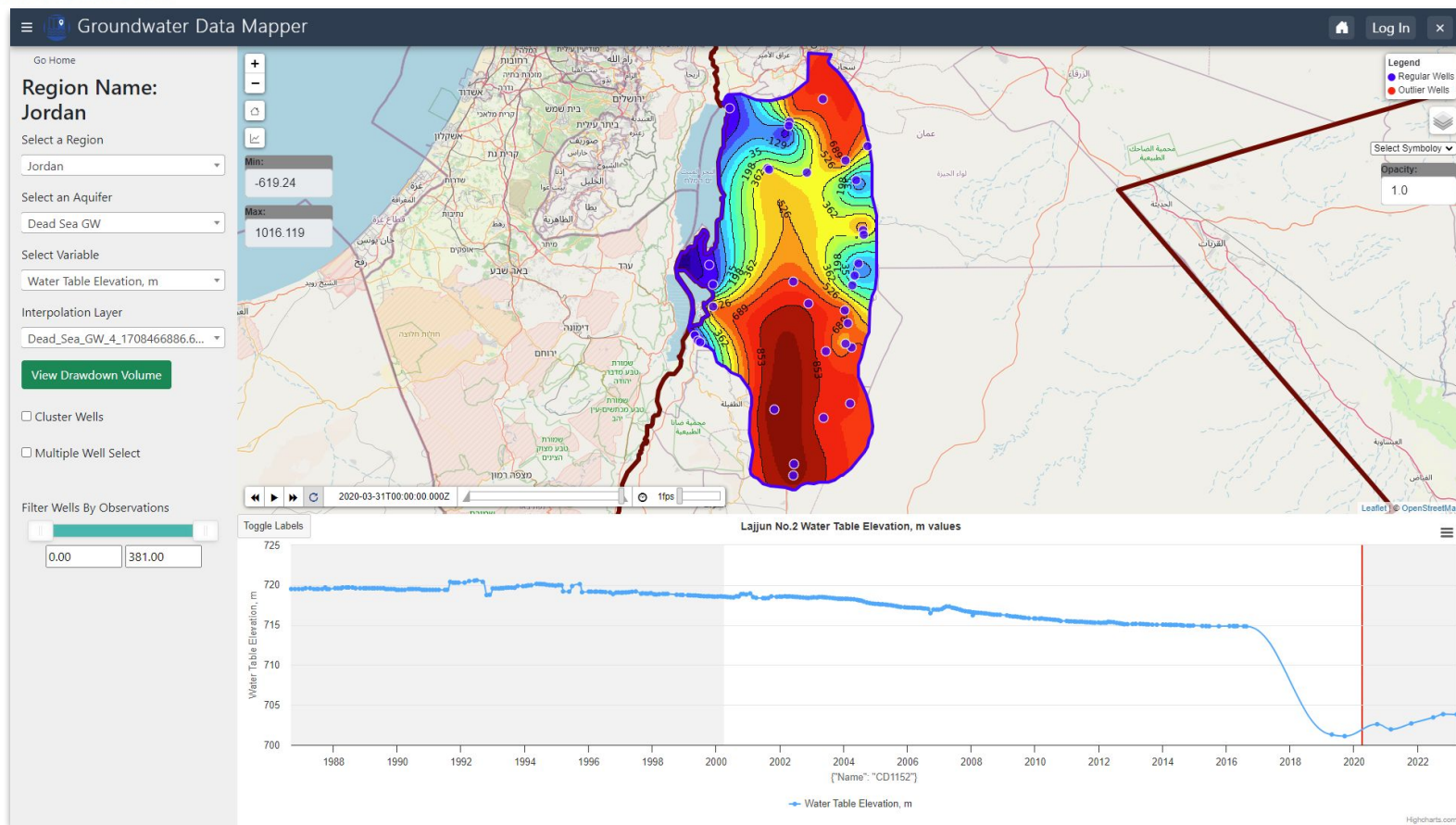


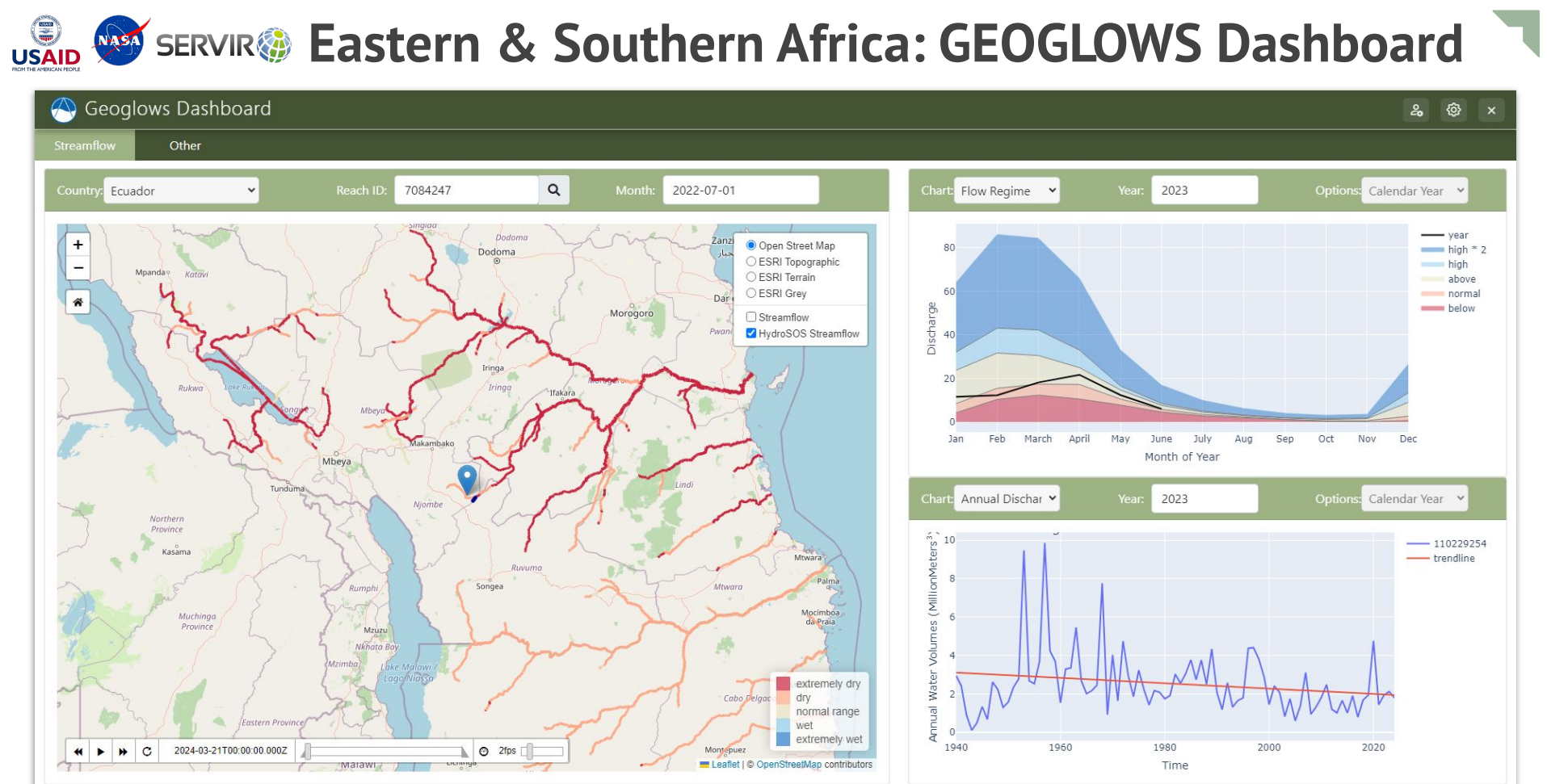
Example Applications







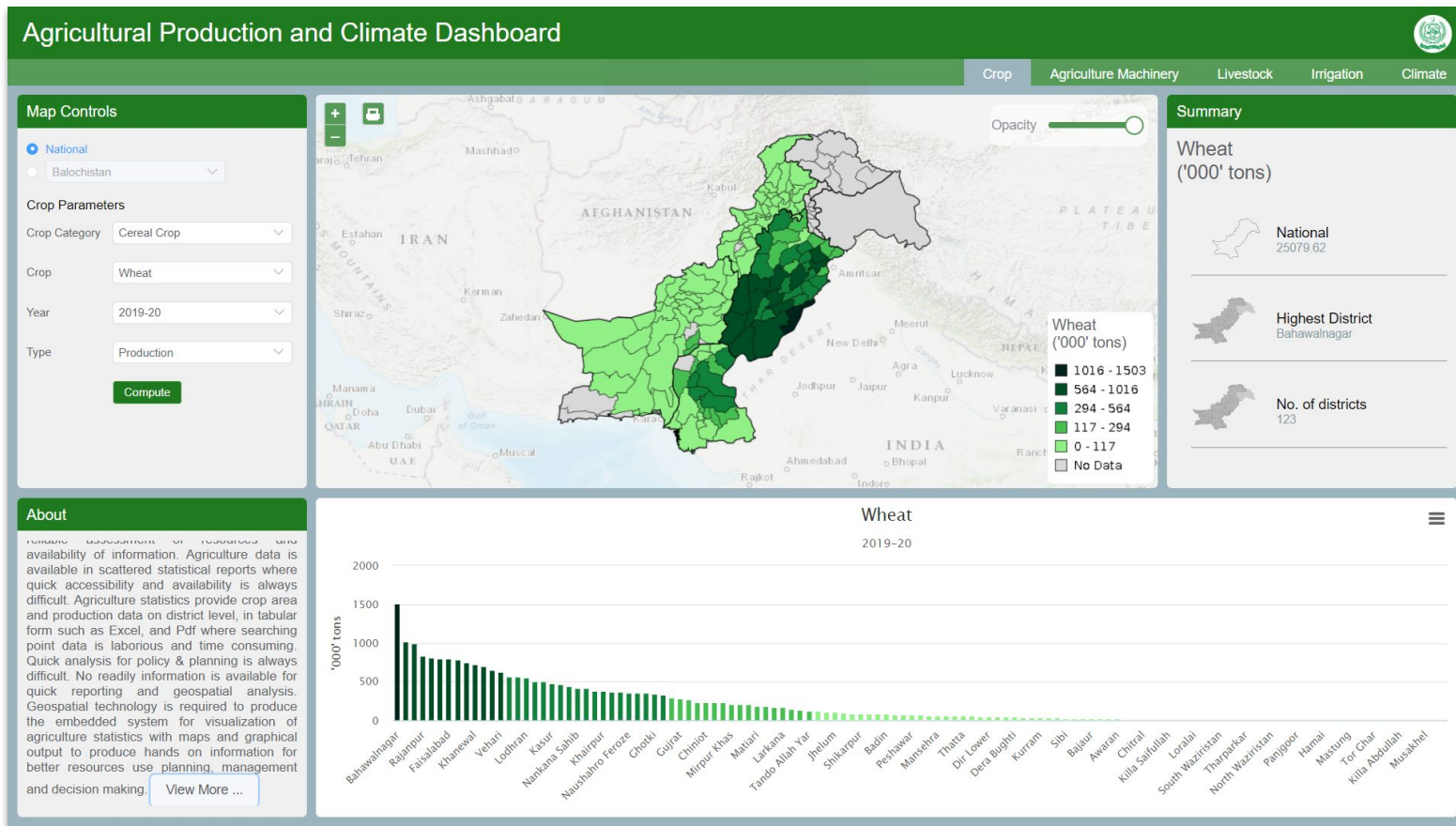


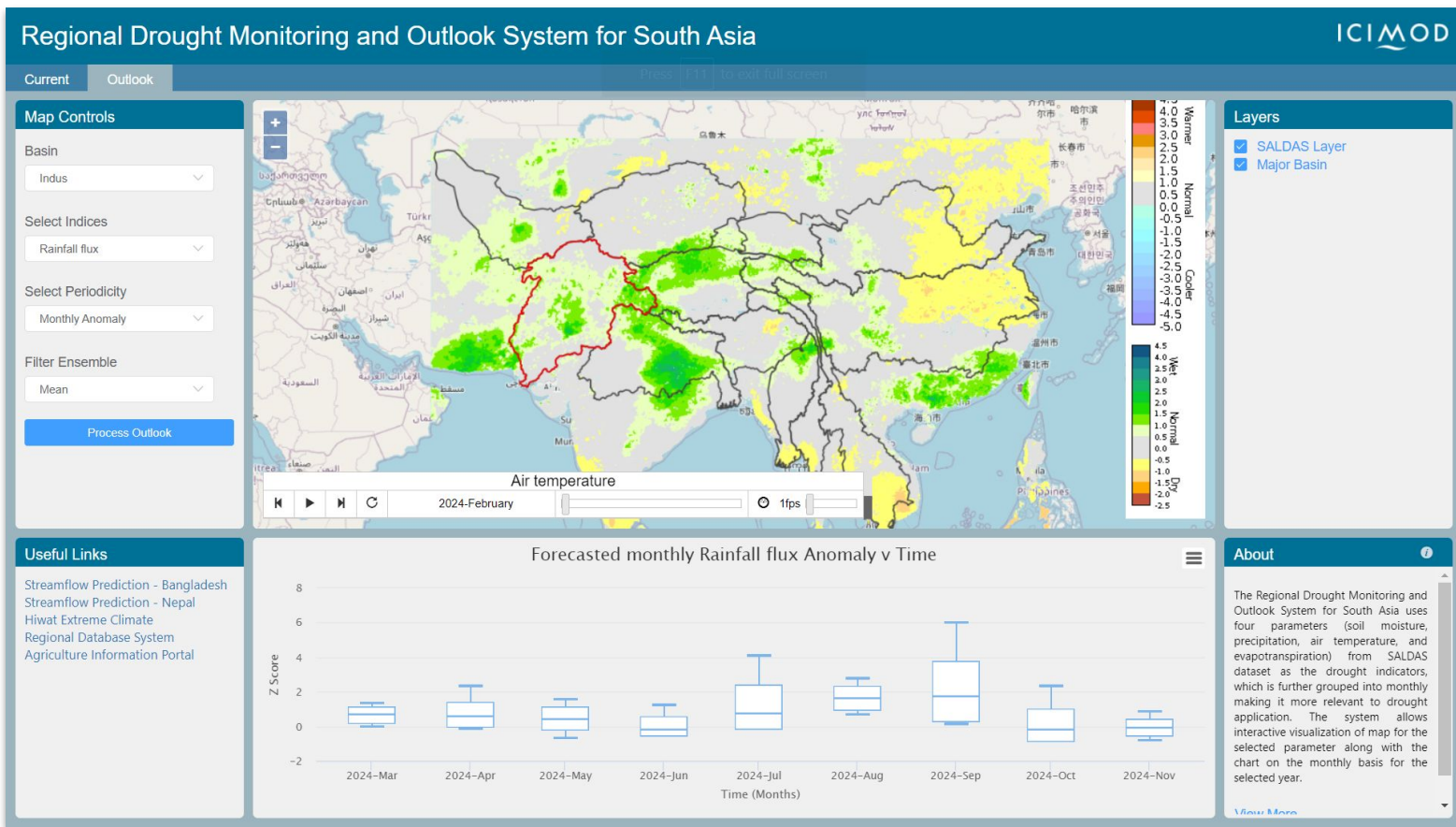


Author(s): Sonia Sun, Rachel Huber

Link: <https://beta.apps.geoglows.org/apps/geoglows-dashboard/>

Himalaya: Agricultural Production and Climate Dashboard

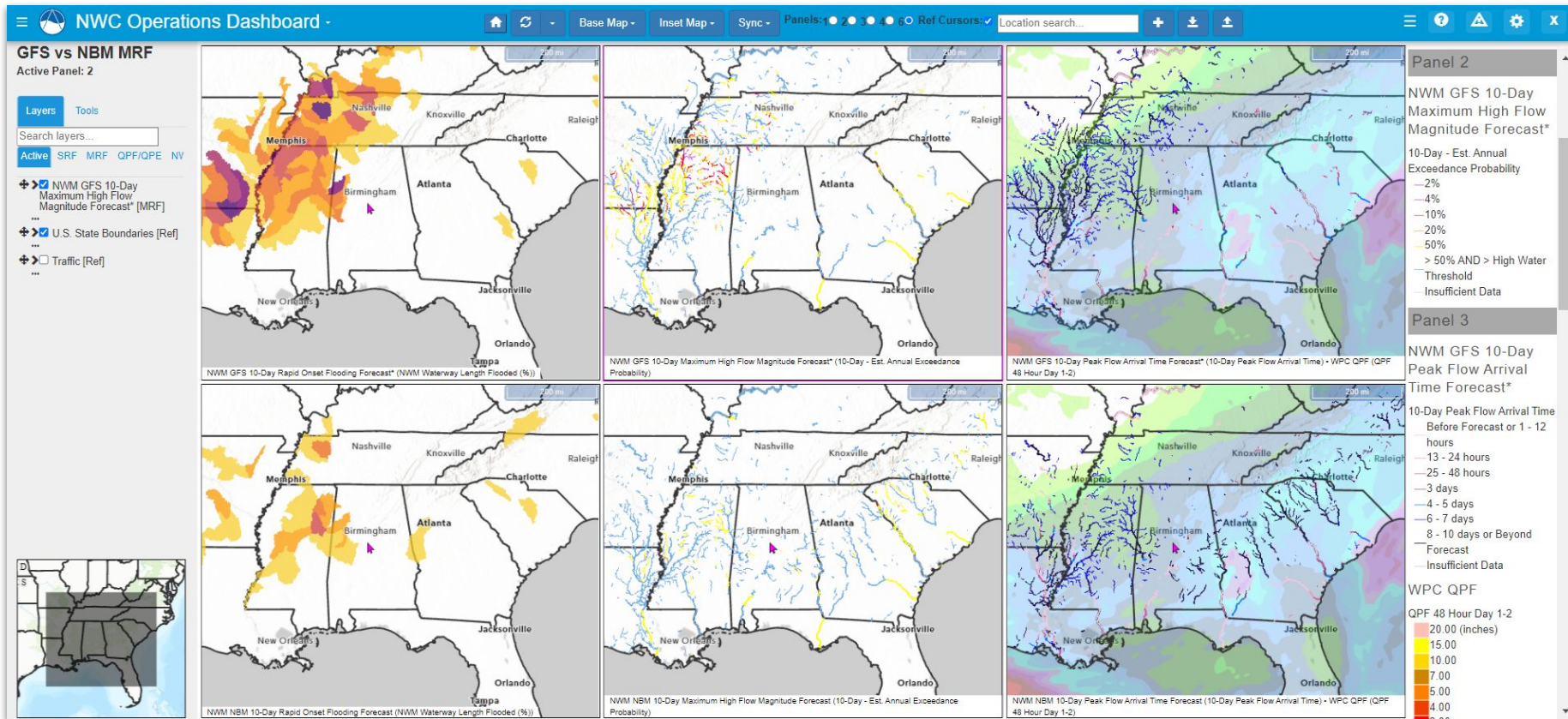






OWP

National Water Center Operations Dashboard

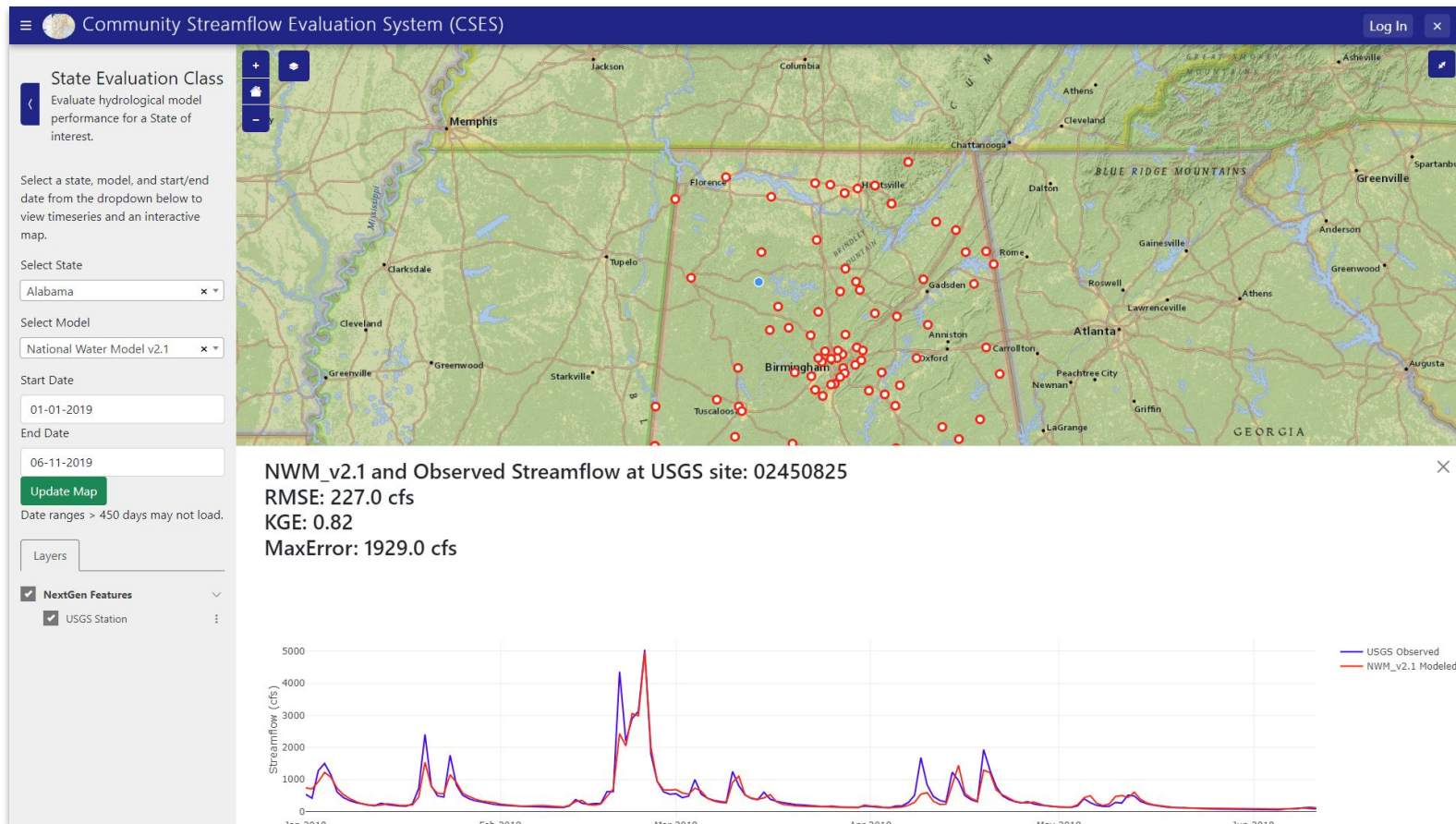


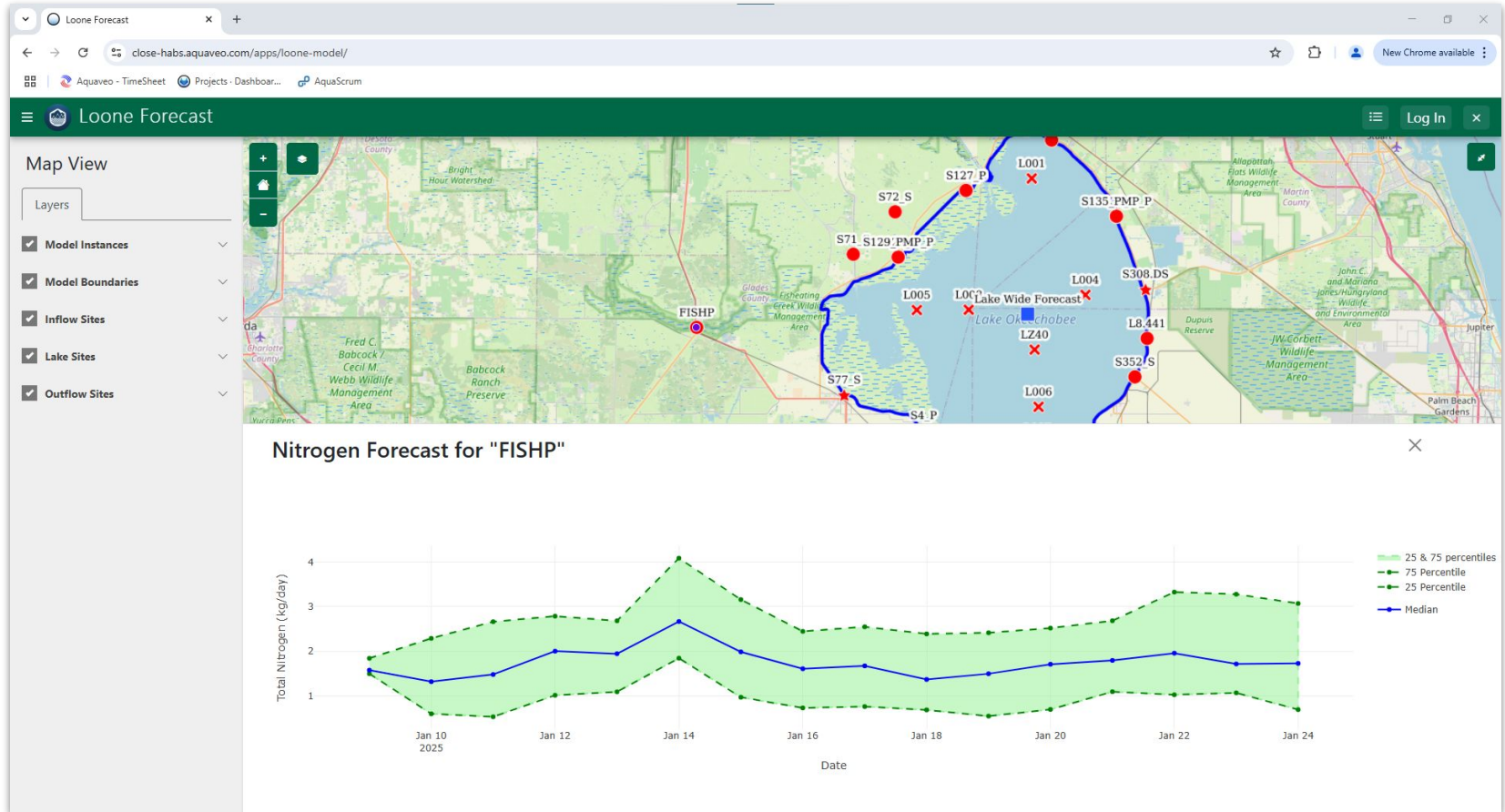
Author(s): Shawn Crawley, Matthew Williamson

Link: <Internal Use Only>



Community Streamflow Evaluation System (CSES)







XXX

version: 1.0

This service allow users to visualize
FANFAR Forecast.

Select Day

Location

Forecast Settings

Model

World-Wide HYPE v1.3.5

Variable

StreamFlow

Flood Hazard Threshold

Return Period based on Simulati

Map View

Socio-Economic Layers

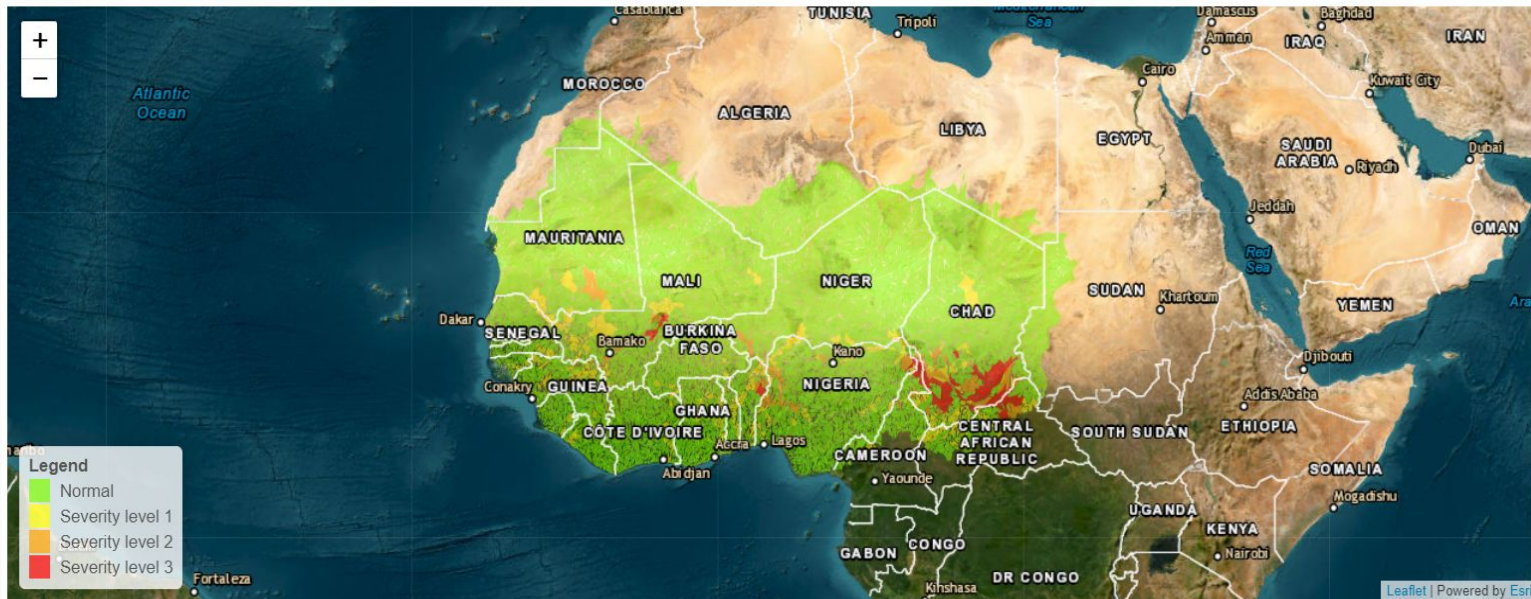
FLOOD SEVERITY LEVELS FORECASTING IN WEST AFRICA

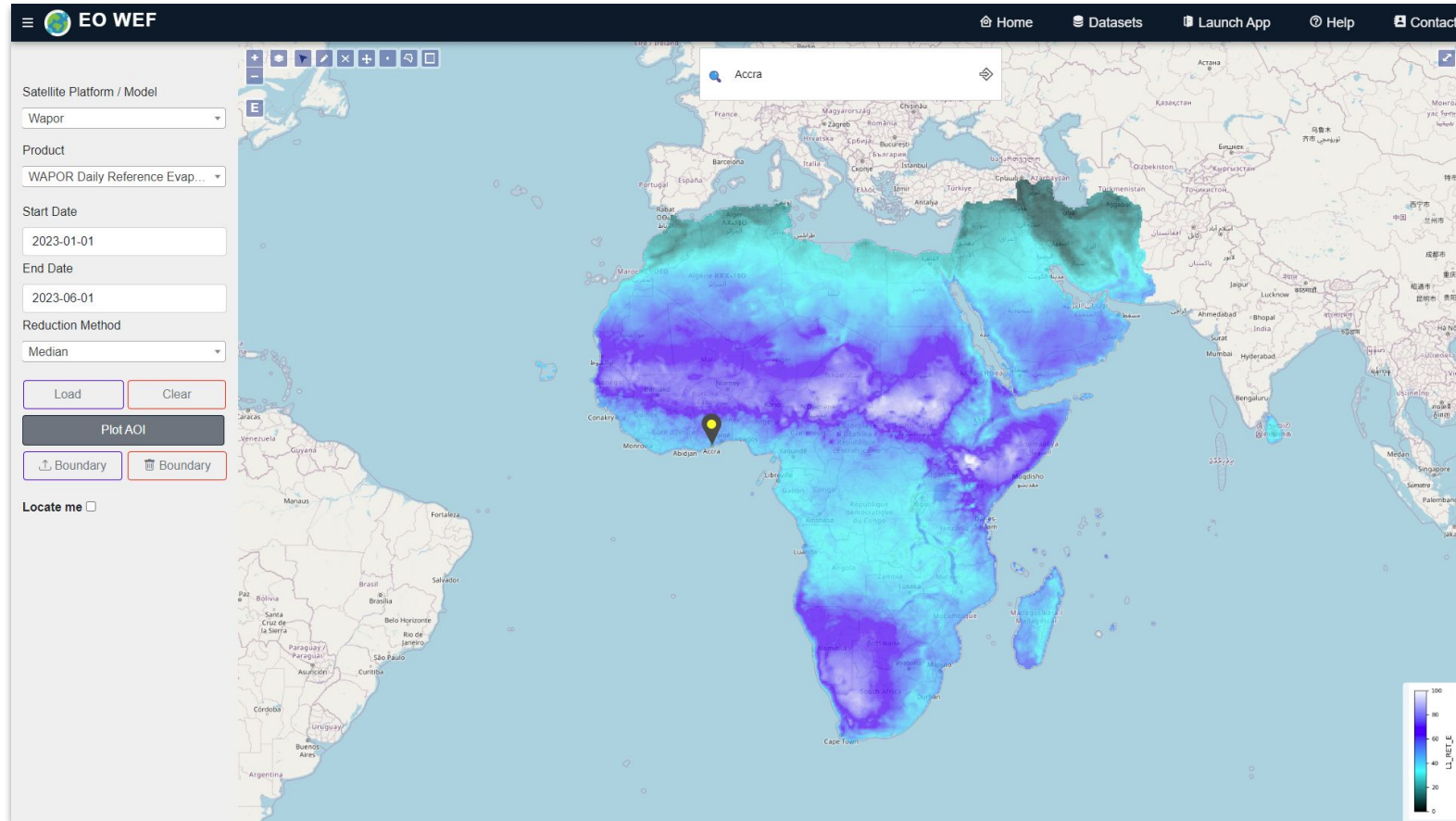


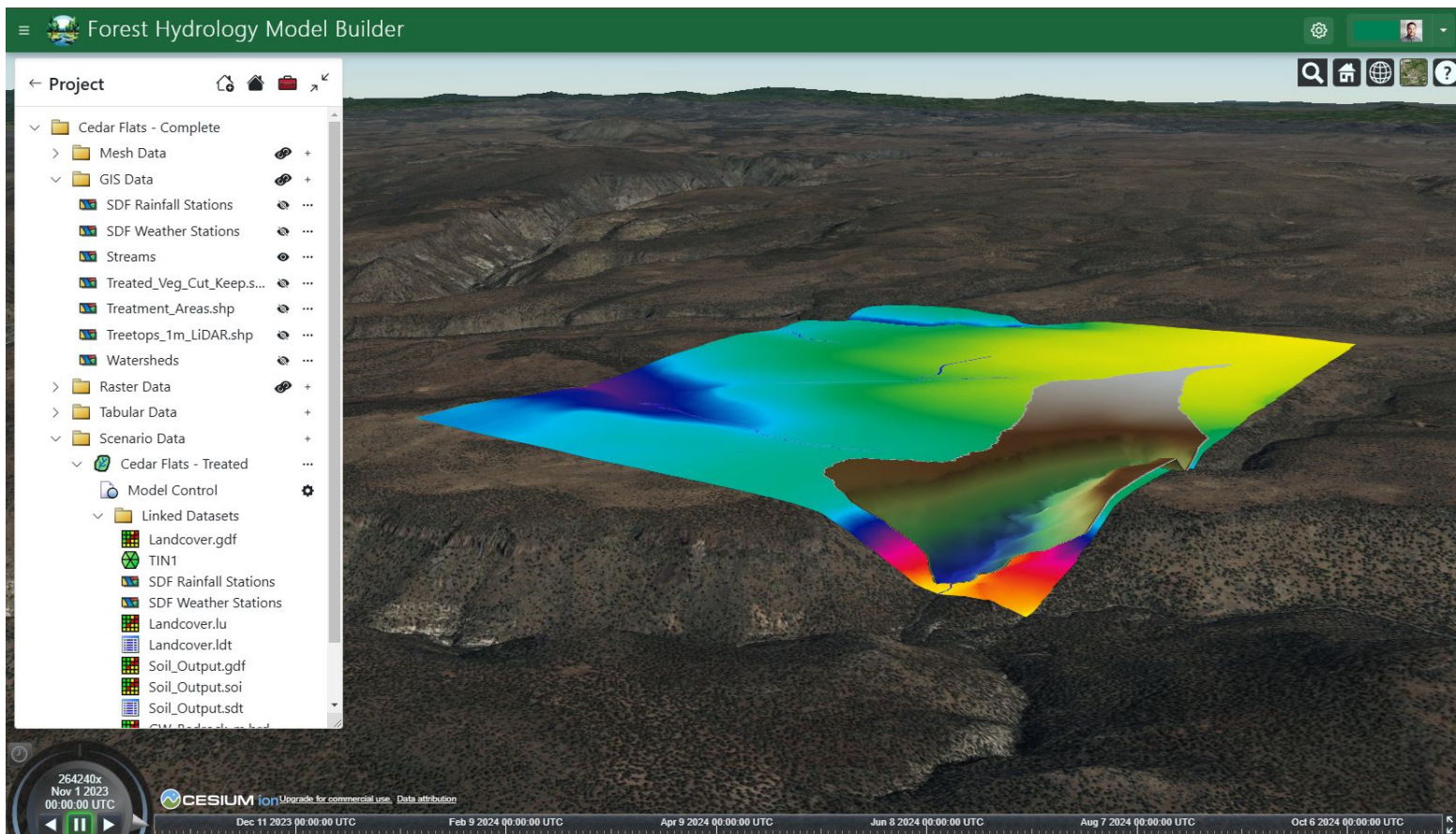
Animation Speed(fps): 0.50

Day:

Latitude: 32.69, Longitude: 37.79

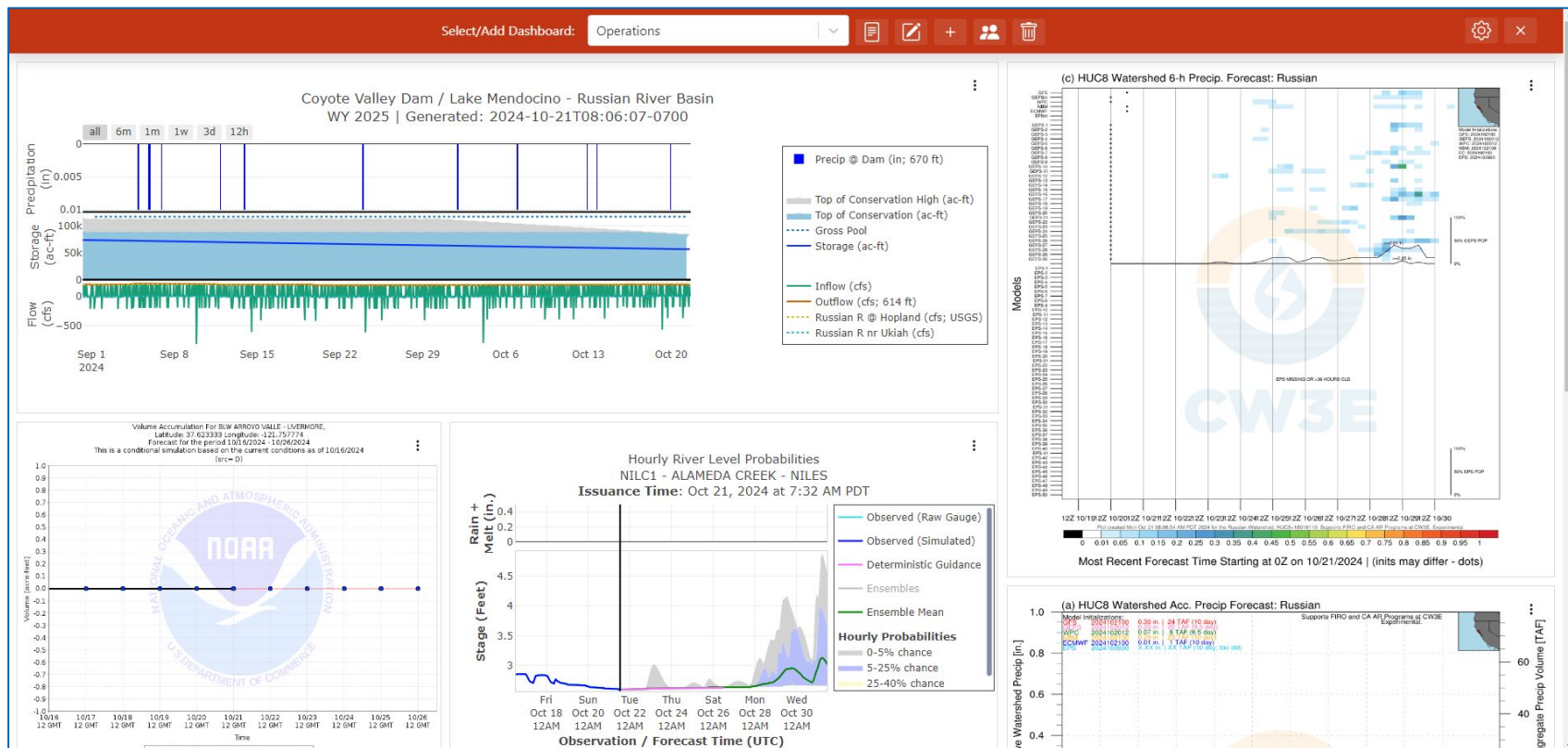






Author(s): Salt River Project, Arizona State University, Aquaveo

Link: <Private>



Lynker Component Apps (ReactPy)

ReactPy Playground

Render (Ctrl + Alt + Enter)

```
1 from tethys_sdk.routing import page
2 from tethys_sdk.components.utils import Props
3
4 @page
5 def my_page(lib):
6     lib.register('react-grid-layout', 'rnl', styles=['https://esm.sh/react-grid-layout'])
7     button_text, set_button_text = lib.hooks.use_state('Press Me')
8
9     return lib.html.div(
10         Props(
11             style=Props(
12                 textAlign="center",
13                 color="black",
14                 backgroundColor="lightgrey"
15             ),
16         ),
17         lib.pm.Map(
18             Props(
19                 height=300,
20                 center=[50.879, 4.6997],
21                 zoom=5
22             ),
23         ),
24         lib.html.h1("Hello World!"),
25         lib.html.p("This is a paragraph"),
26         lib.html.p("This is another paragraph"),
27         lib.html.img(Props(src="/static/reactpy_playground/images/icon.png",height="10")),
28         lib.html.br(),
29         lib.html.br(),
30         lib.html.button(Props(onClick=lambda e: set_button_text("Thank you!")), button_text)
31     )
32
```



Hello World!

This is a paragraph

This is another paragraph



Press Me

Render (Ctrl + Alt + Enter)

Author(s): Shawn Crawley, Lynker

Link: <still in development>



Acknowledgements





NSF EPSCoR



- CI-WATER
- 4 Universities
 - Brigham Young University
 - Utah State University
 - University of Utah
 - University of Wyoming
- Awarded September 2011
- NSF Award #: 1135482



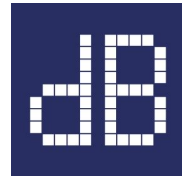


NSF POSE

- Pathways to enable Open-Source Ecosystems
- New National Science Foundation Program
- First solicited in 2022
- Awarded in September 2023
- NSF Award #: 2303756



Scenic





TETHYS SUMMIT

Chicago, IL

June 17 & 18, 2026

Technical
Presentations

Workshops

Travel Grants

Networking

tethysgeoscience.org



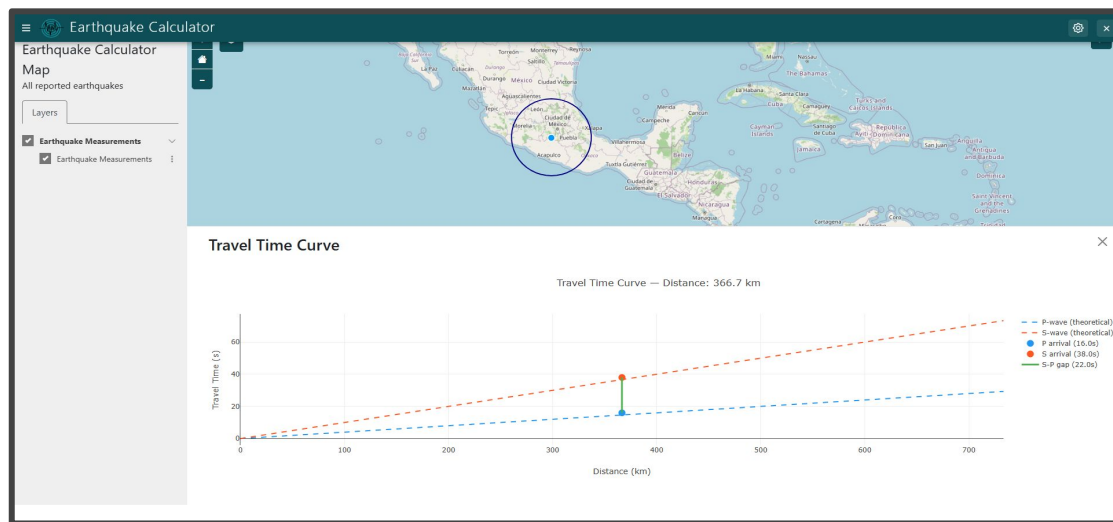
Try it for yourself!



<https://www.tethysplatform.org/workshop/getting-started>



Scan the code or go to the
webpage above to start
building your first app



Use Tethys Platform to build an app to find the potential locations of earthquakes in just 30 minutes!
We will review the results together.