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Enabling computational modeling and geospatial data analysis through HUBzero

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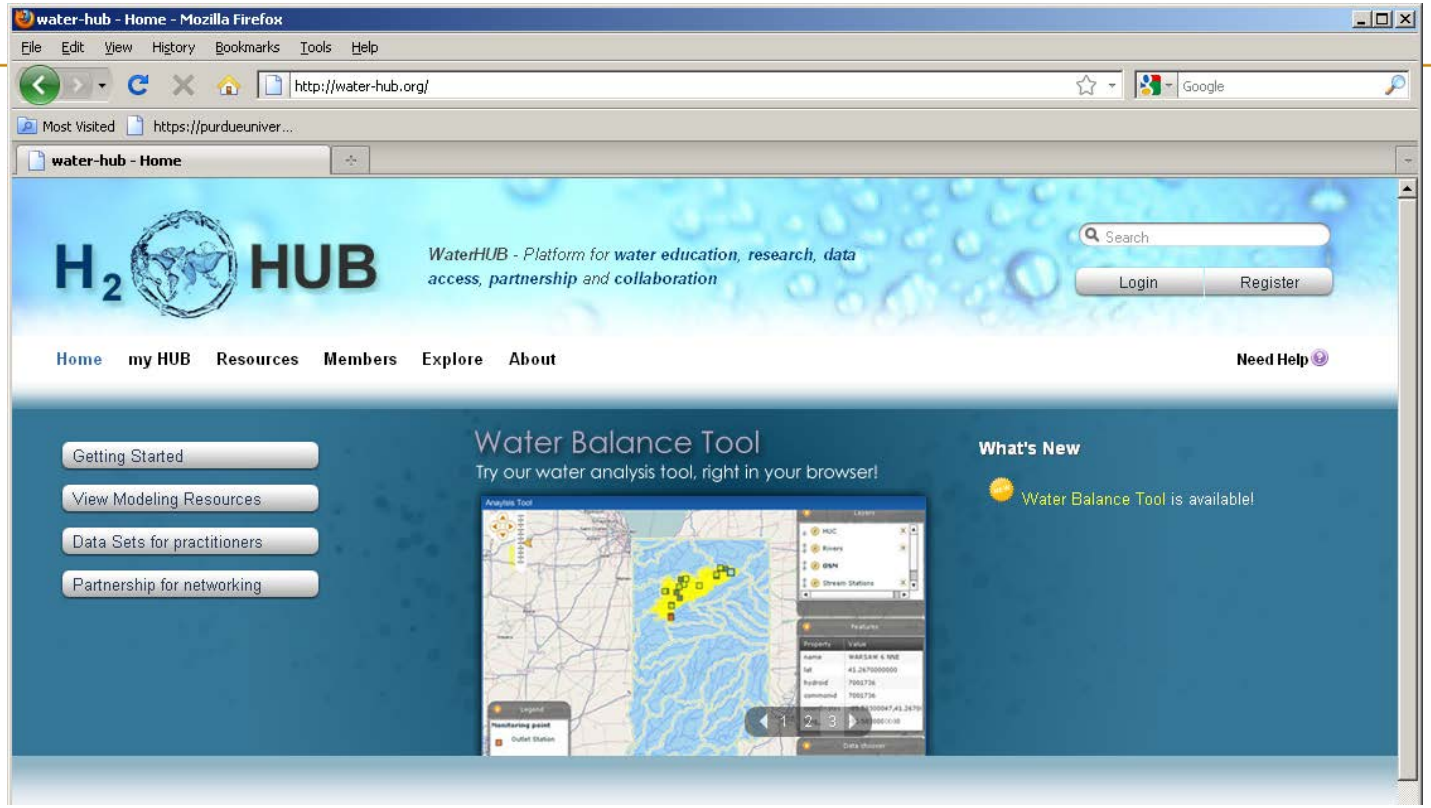
WaterHUB



- Based on HUBzero technology at Purdue, WaterHUB uses open source packages to create an environment in which researchers, educators, and students can access tools and share information

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SWATShare

- One of the tools on WaterHUB
- SWATShare enables
  - Searching for existing SWAT models on WaterHUB
  - Downloading of previously created SWAT models and their outputs by the community
  - Publishing and sharing of your own SWAT models with the community
  - Execution of single or multiple normal, sensitivity analysis and calibration runs
  - Visualization of outputs
- Everything is enabled by using XSEDE resources

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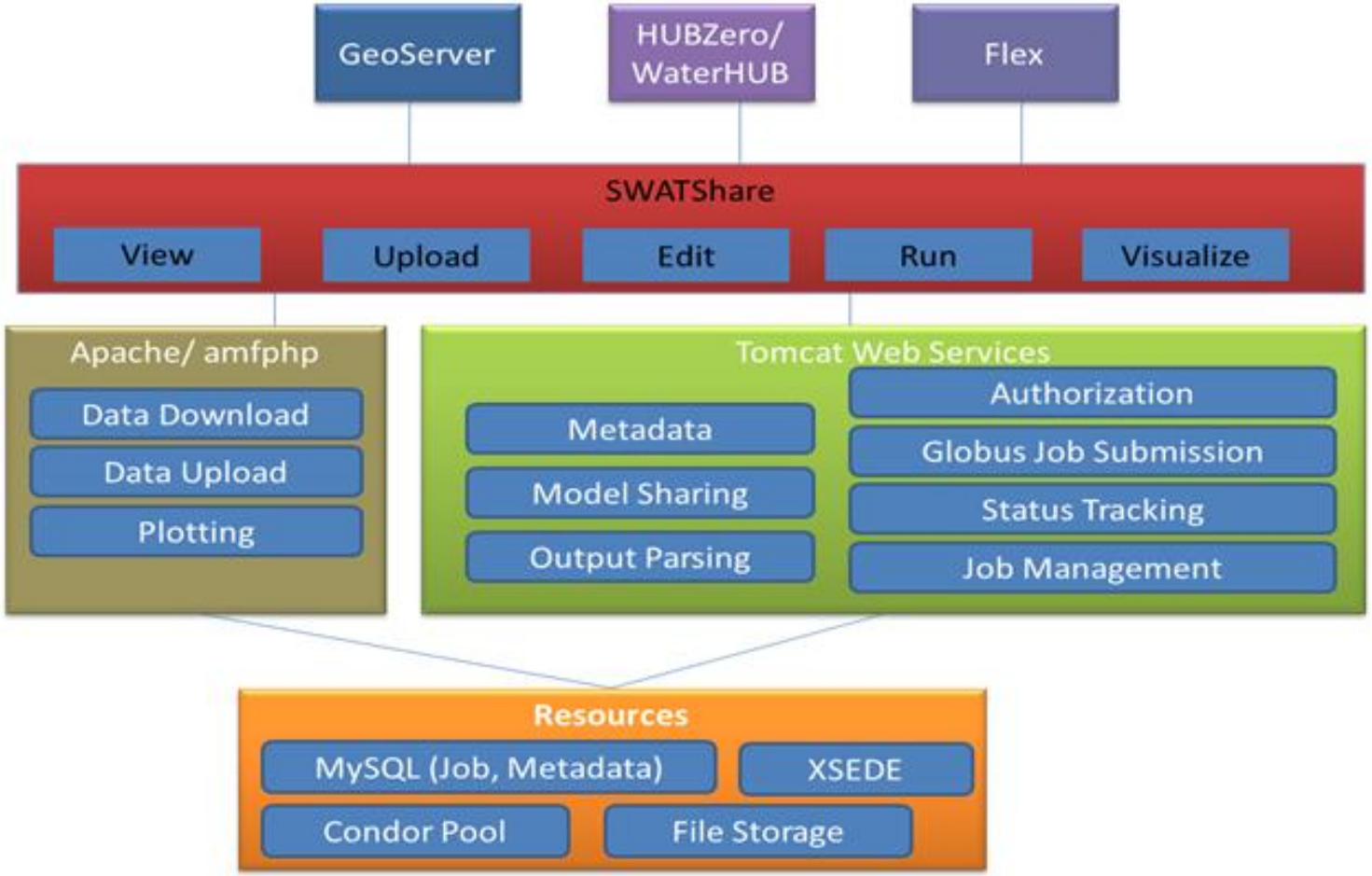
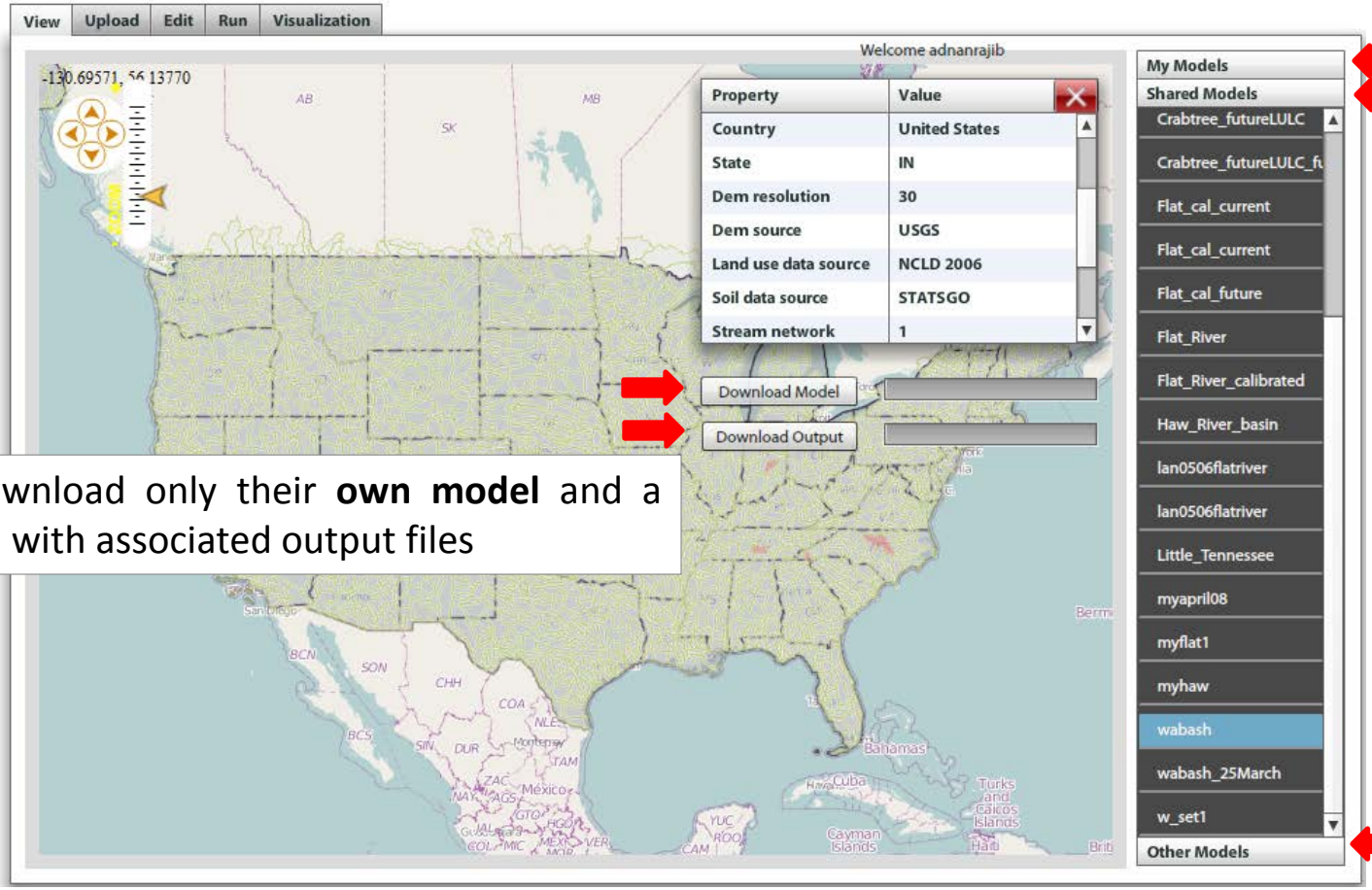
SWATShare Architecture



SWATShare User Interfaces

View



Users can download only their **own model** and a **shared model** with associated output files

The uploaded models are displayed in 3 groups

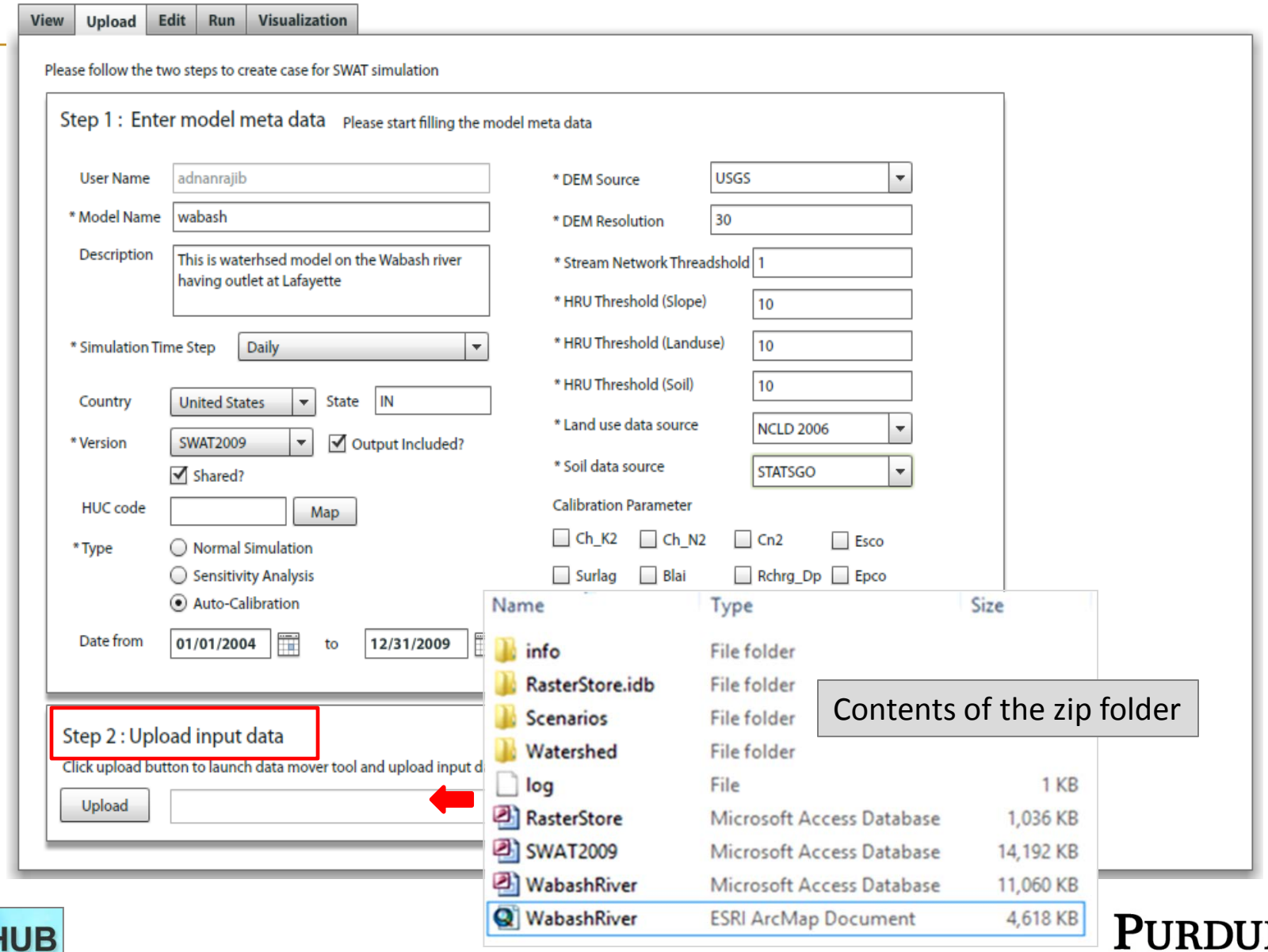
(i) **My Models**: models that are uploaded by the current user

(ii) **Shared Models**: models that uploaded by other users, but are shared with all users

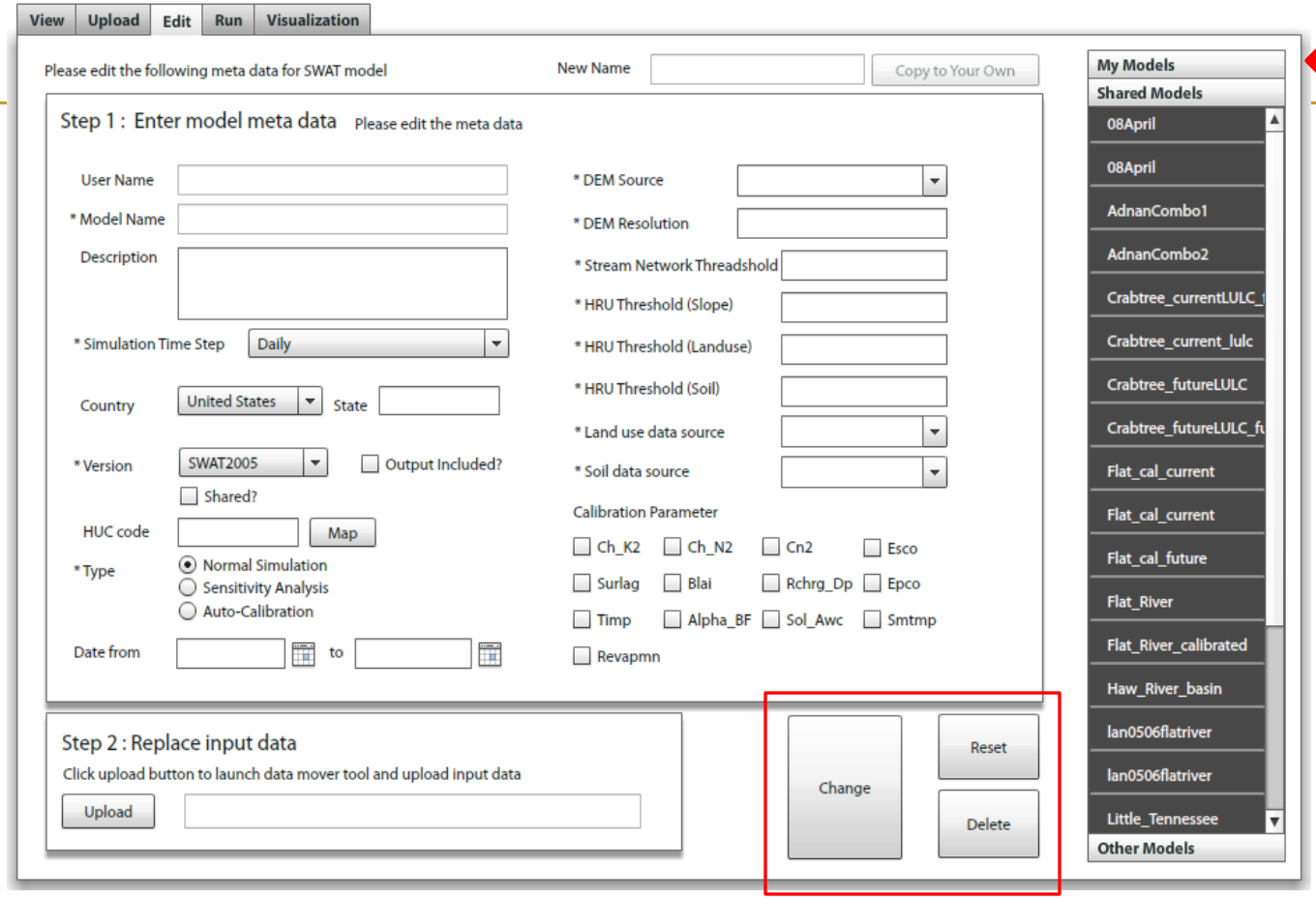
(iii) **Other models**: models that are uploaded by other users but not shared

SWATShare User Interfaces

Upload

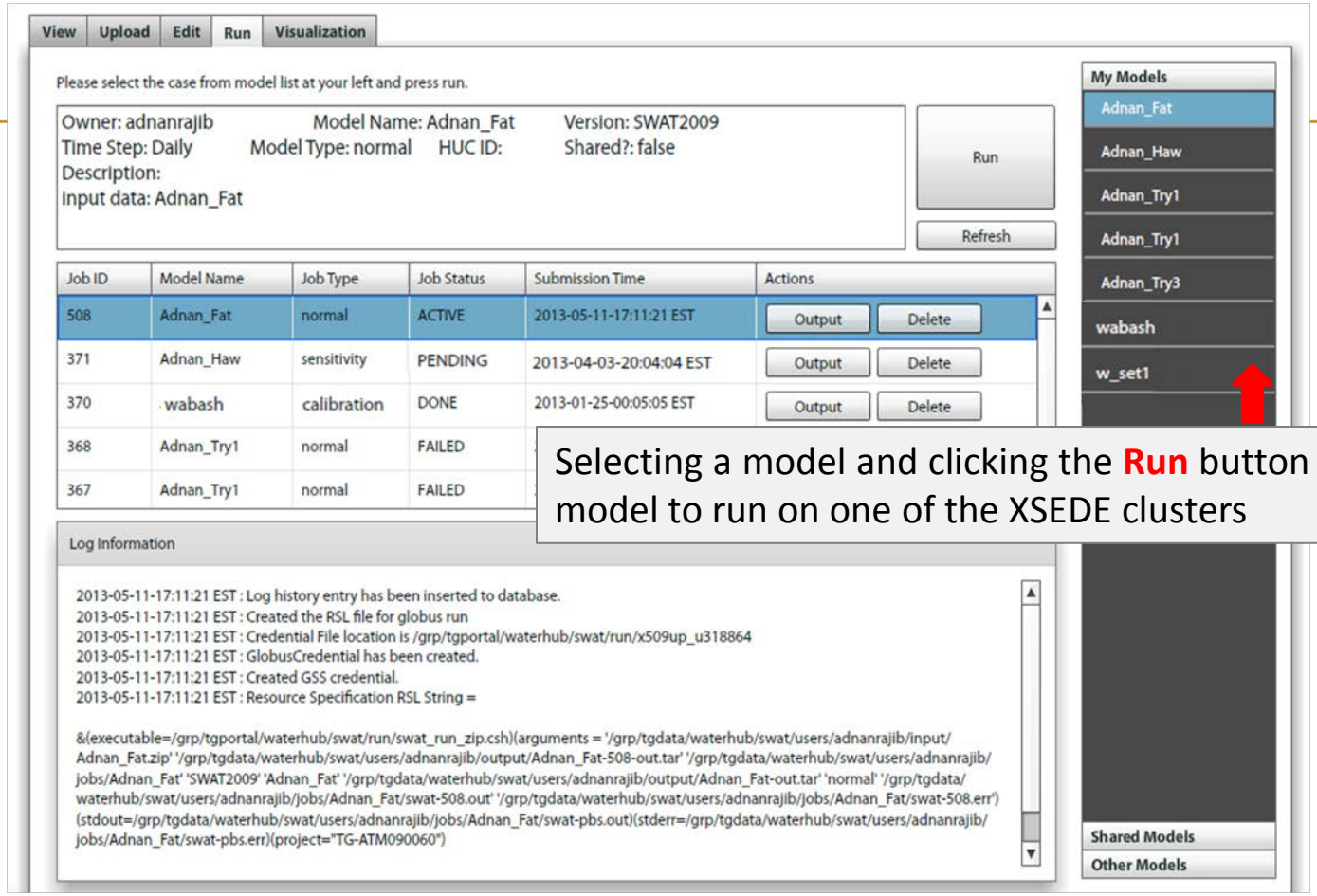


SWATShare User Interfaces



- ✓ Select any model from My Model section. Related information will show up in left panel
- ✓ Manually edit or replace information including the model input file. Click on **Change**
- ✓ The **Reset** button will restore all the original information previously saved

SWATShare User Interfaces



Selecting a model and clicking the **Run** button will submit the model to run on one of the XSEDE clusters

- ✓ A user can import a shared model, and run it in **My Models** section
- ✓ SWATShare selects run option (normal/sensitivity/calibration) depending on model's *file.cio* and information provided in the Upload interface

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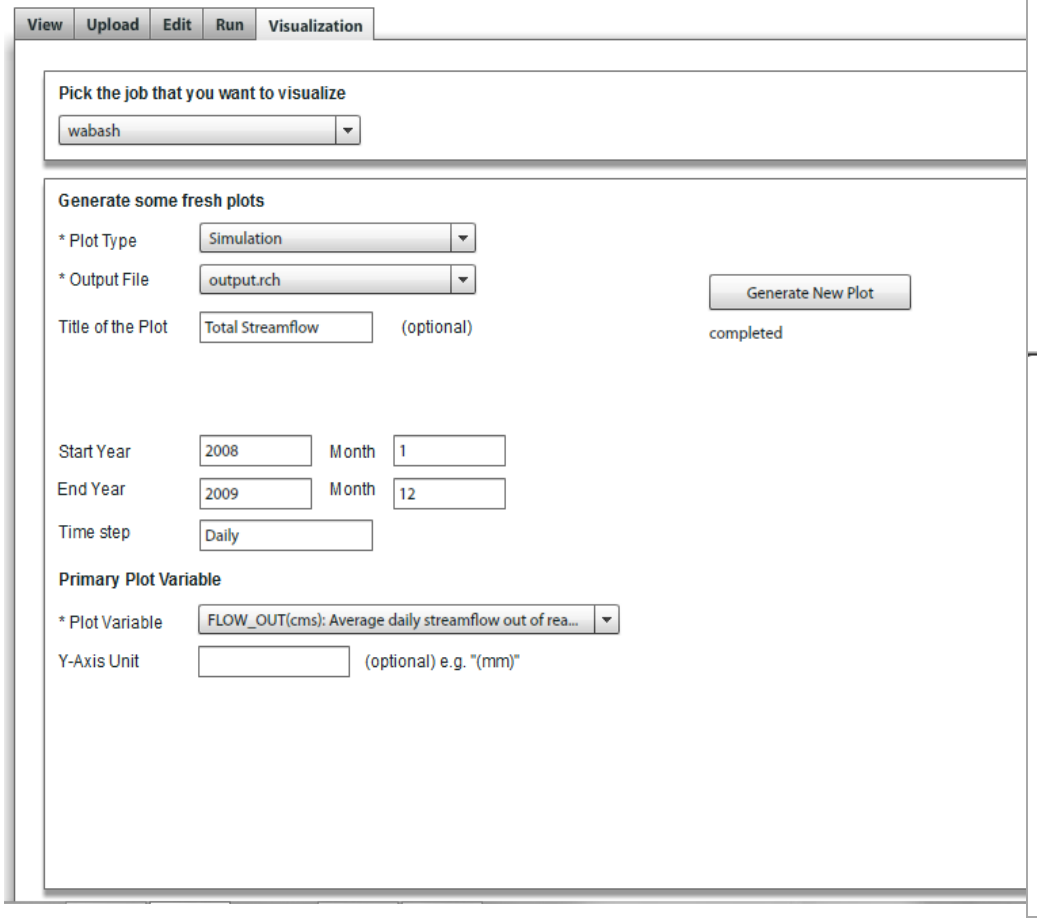
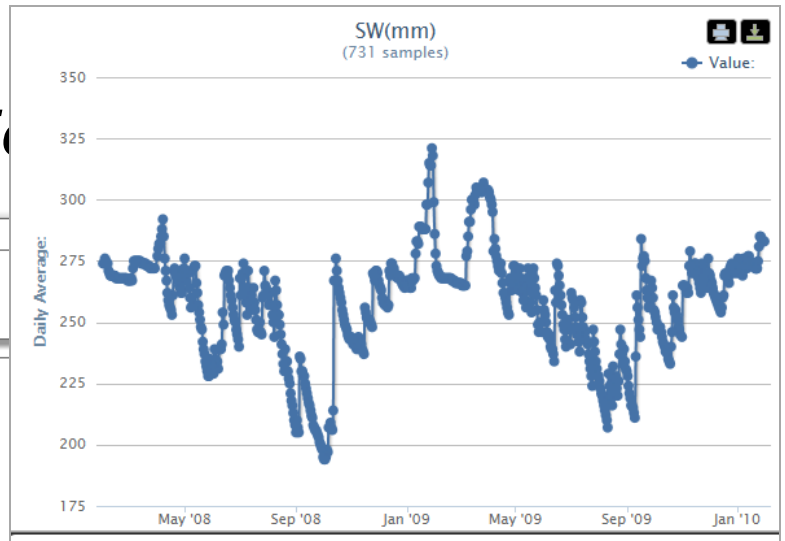
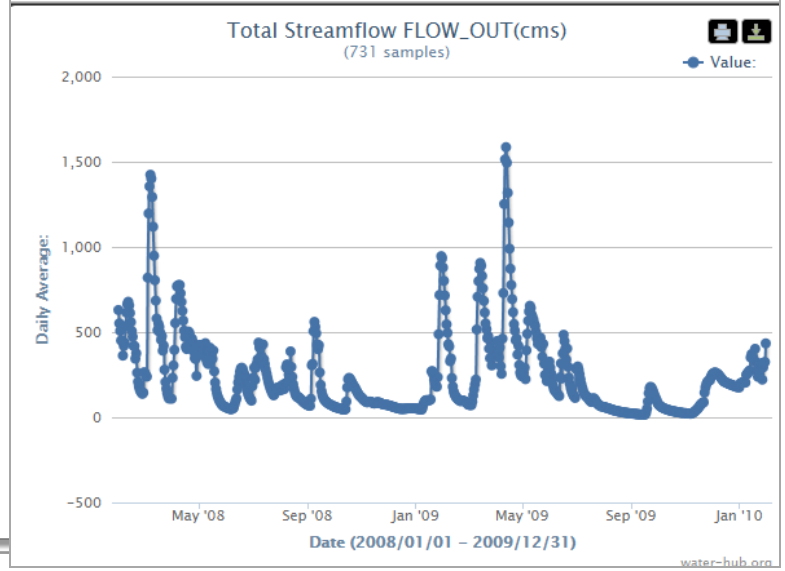
Visualizati







- ✓ Visualization for (i) output.std, (ii) output.sub and (iii) output.rch
- ✓ One variable at a time needs to be selected to produce the visual plot
- ✓ All plots in output.rch and output.sub correspond to outputs at the watershed outlet

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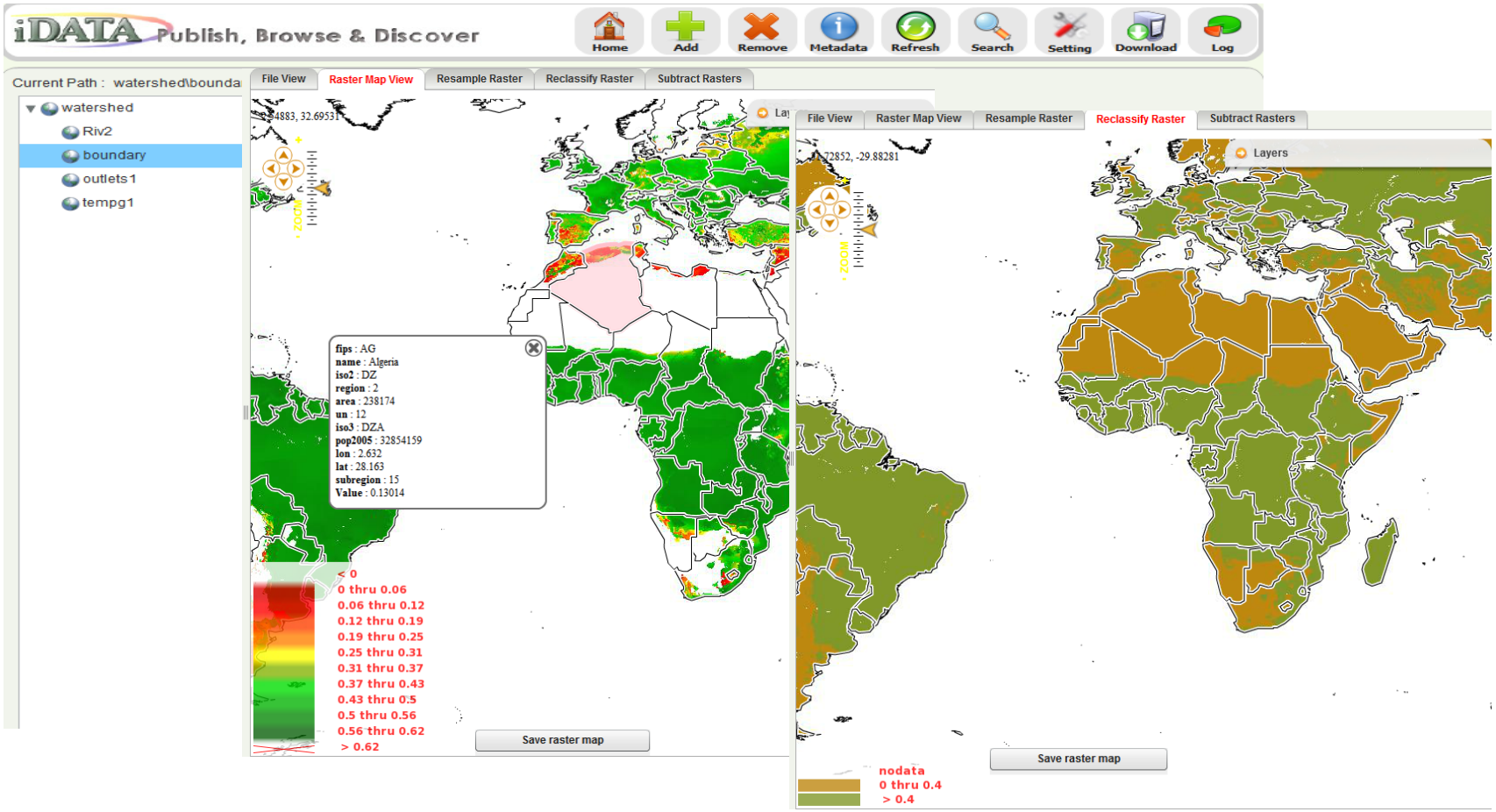
iData- A Community Geospatial Data Sharing Environment

- Integrated data publishing, sharing, visualization, and processing for geospatial data collections



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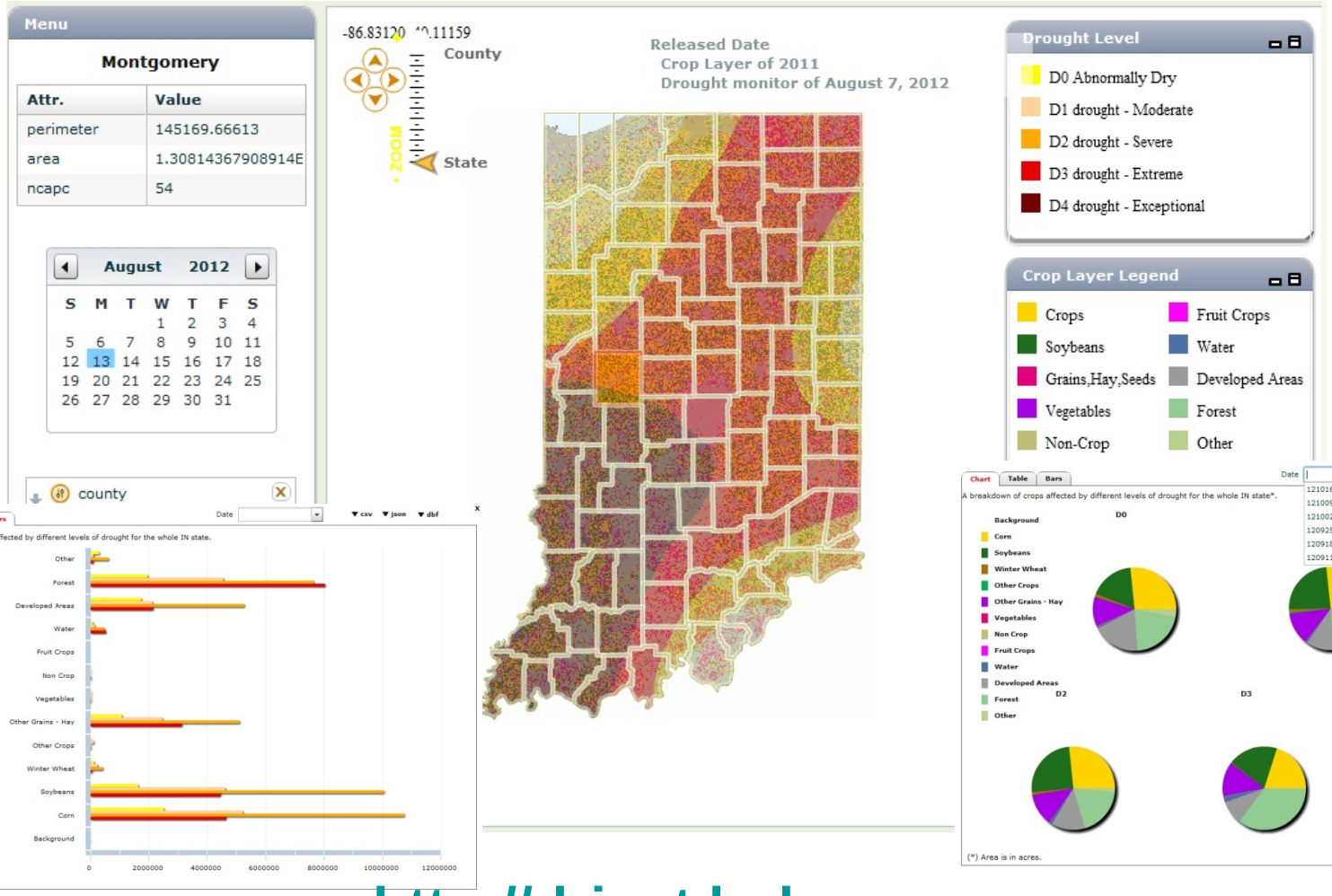
DRINET

- Drought Impact Viewer



http://drinet.hubzero.org

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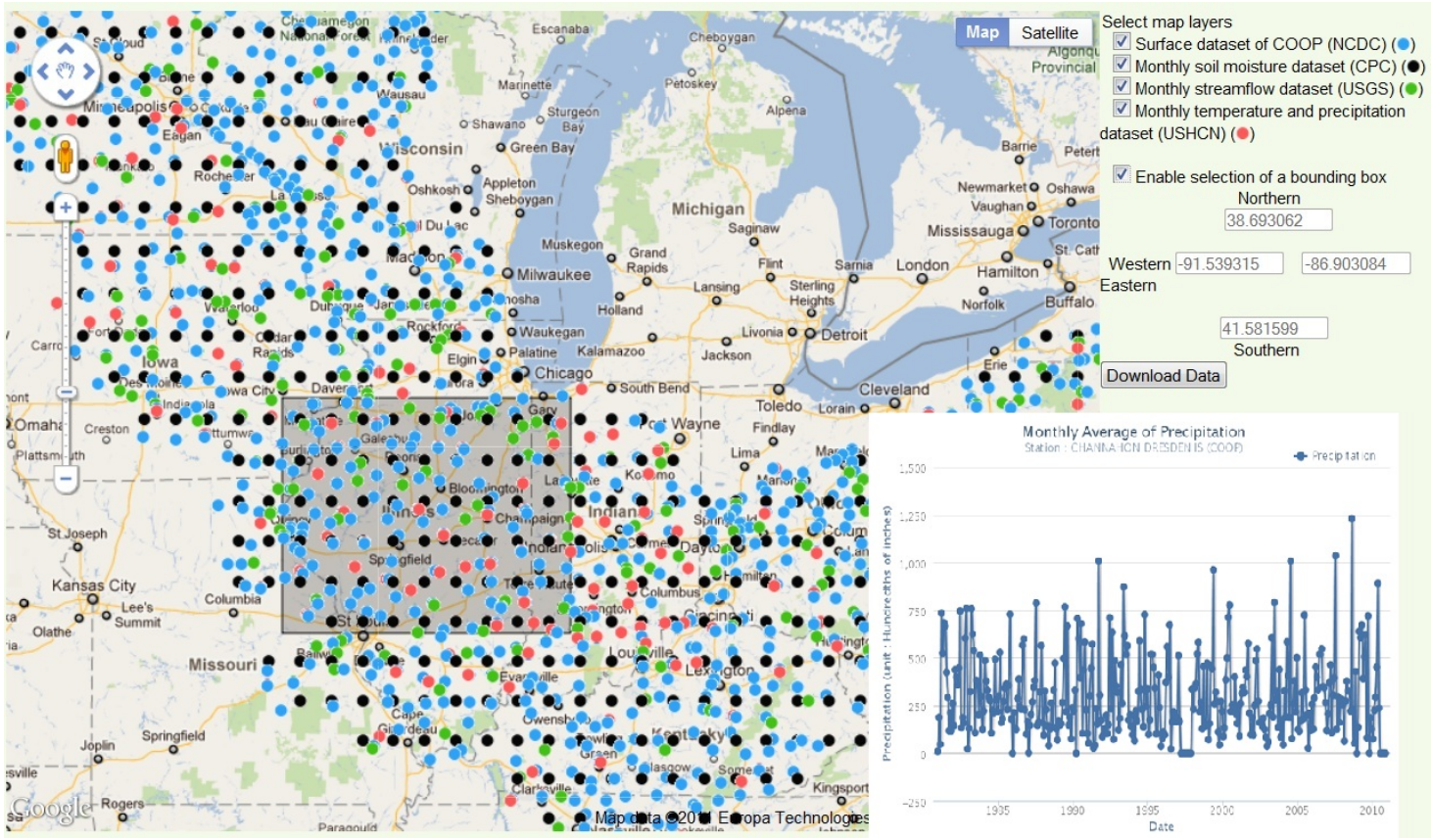
DRINET Tools

- Upper Mississippi River and Ohio River Basin Data



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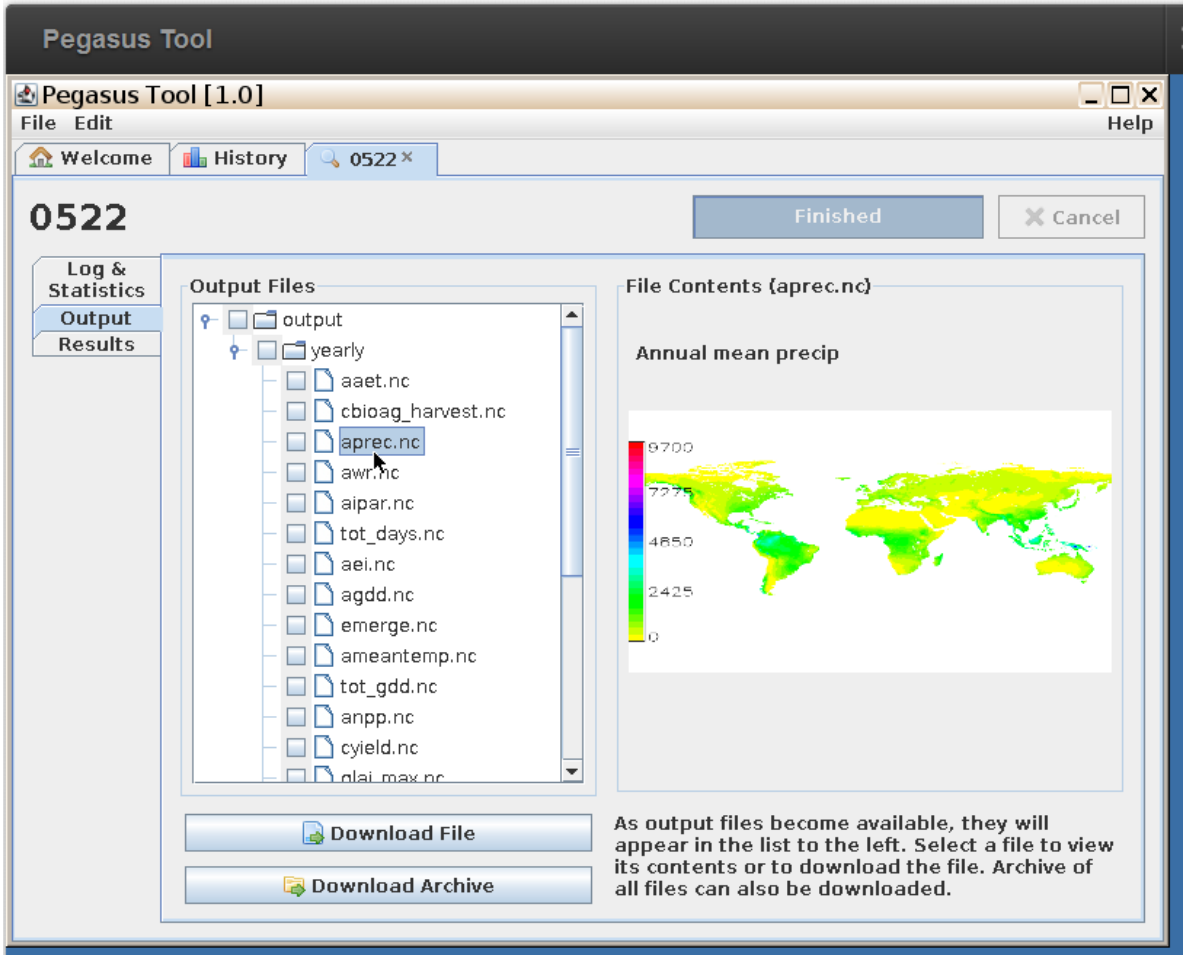
Pegasus

- A hub tool deployed on geoshare hub
- Configure, submit Pegasus crop model simulations to a cluster
- Manage and visualize model output



http://geoshareproject.org

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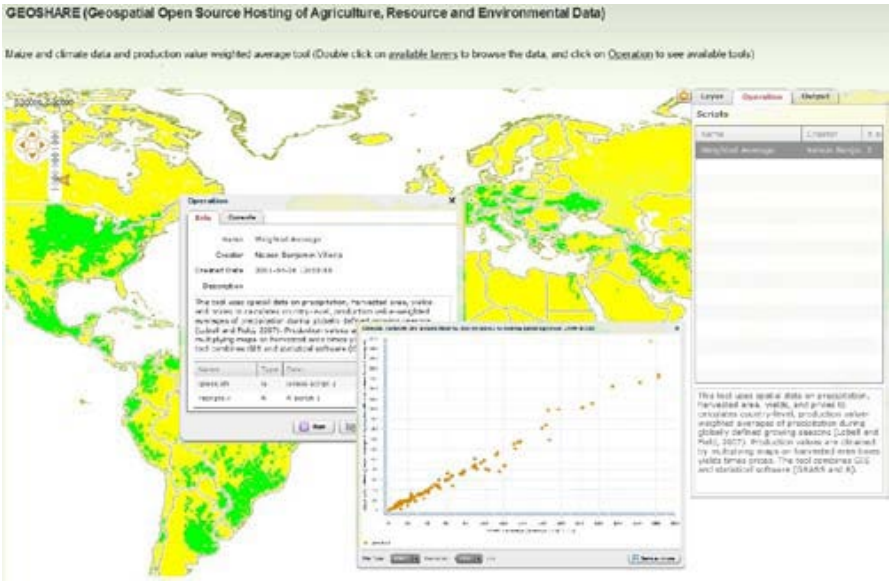
Maize production tool

- A prototype system
  - Agriculture datasets for maize and climate variables
  - Weighted average module (GRASS and R)
  - Data processing, plotting, and download
  - Flex, Geoserver, GRASS, R, PHP



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GABBS

- A new project expected to start soon!
- Develop geospatial data analysis and modeling building blocks for HUBzero
  - Data space supporting geospatial data processing, analysis and visualization
  - New Rappture geospatial APIs and renderers
  - Data services exposing APIs for the data space
  - Enable geospatial data driven workflows between data space and tool space

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Summary

- Tools that support geospatial capabilities to enable simulation models are available for specific models
- Geospaital data analysis tools to process and visualize geospatial data are created for several ongoing project
- Efforts are underway to develop generic tools support computational modeling and geospatial capabilities within HUBZero to support geosciences applications

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Thank you!

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