



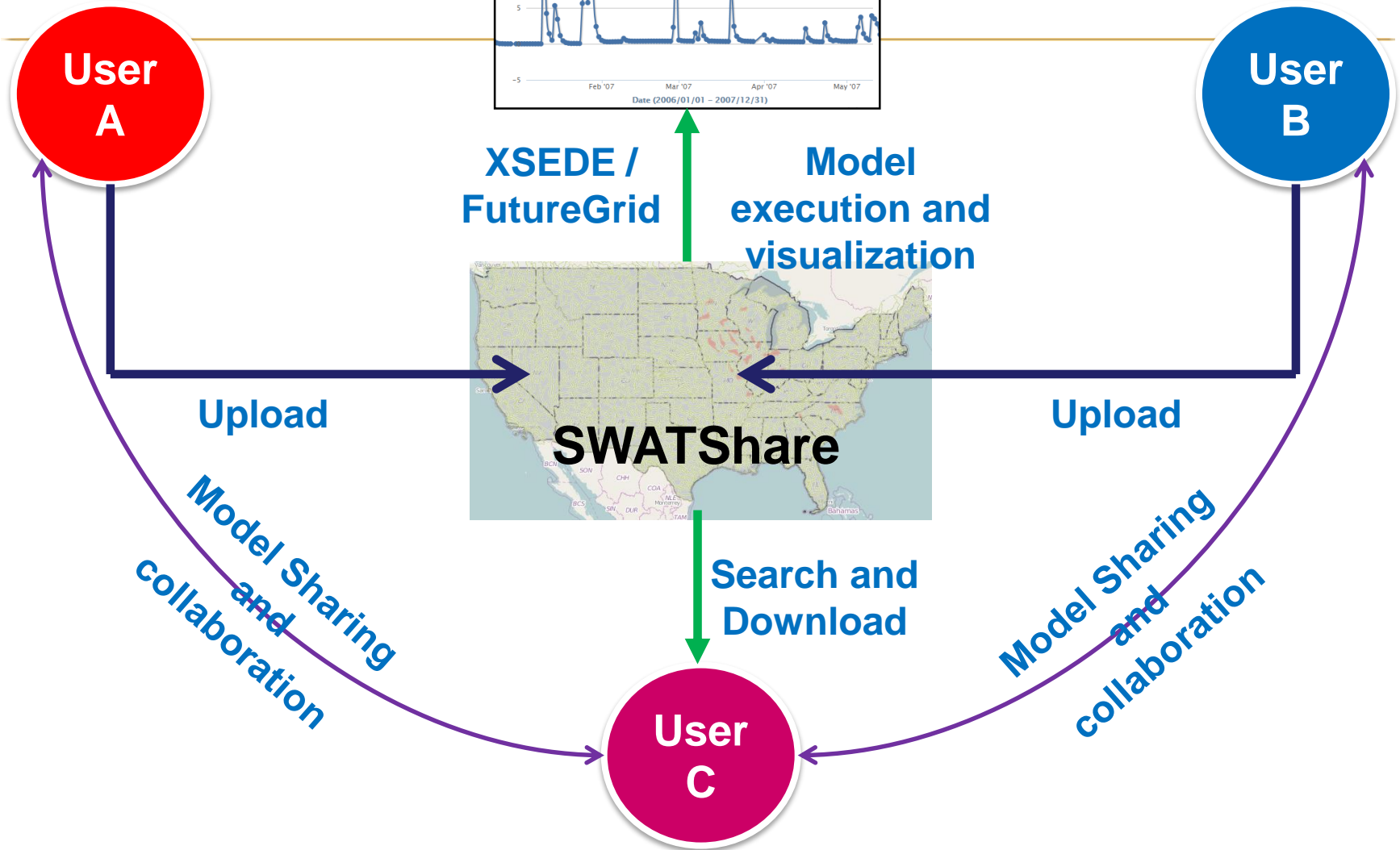
Spatio-temporal visualization of SWAT Outputs using SWATShare

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What is SWATShare

- SWATShare enables
 - Searching for existing SWAT models
 - 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 simulations, sensitivity analysis and calibration runs
 - Visualization of outputs
- Computations are enabled by using XSEDE /Cloud resources



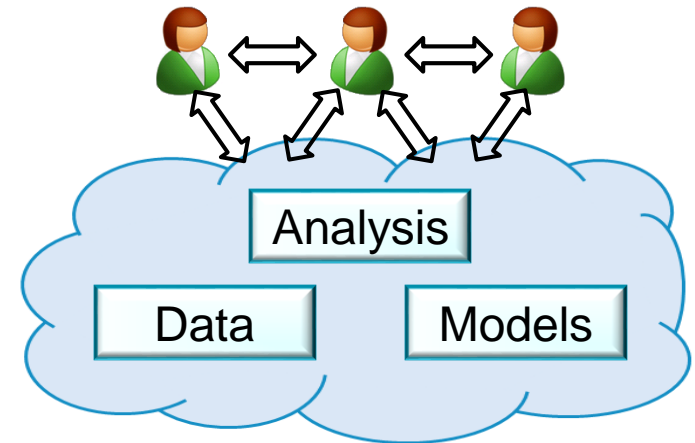
*Model parameter sensitivity to processes in semi-arid and agricultural watersheds
Evaluation of model uncertainty under different geographic and climate settings*

Why SWATShare?

- Saves time and money
- Facilitates collaboration among all users
- Can bring rewards and recognition in the form of publications and community access
- Provides a platform for your model repository
- May provide avenue to keep your models updated by other users
- Provides access to HPC resources for your SWAT models

SWATShare will be part of HydroShare

- HydroShare will be a community collaboration website that enables users to easily discover and access data and models, retrieve them to a desktop computer or perform analyses in a distributed computing environment that includes grid, cloud, or high performance computing model instances as necessary.
- Understanding will be advanced through the ability to integrate information from multiple sources.
- Products (data, results, models) can then be published as new resources that can be shared with collaborators.



SWATShare Demo

www.water-hub.org/swatshare

View

The screenshot displays the SWATShare web application interface. At the top, there is a navigation menu with 'View', 'Upload', 'Edit', 'Run', and 'Visualization'. The main area features a map of the United States with a 'View' window showing coordinates (-130.69571, 54.13770) and a 'Properties' table. The 'Properties' table lists the following details:

Property	Value
Country	United States
State	IN
Dem resolution	30
Dem source	USGS
Land use data source	NCLD 2006
Soil data source	STATSGO
Stream network	1

Below the map, there are 'Download Model' and 'Download Output' buttons. On the right side, a 'My Models' panel lists various models, categorized into 'Shared Models' and 'Other Models'. Red arrows point to the 'Download Model' and 'Download Output' buttons, and to the 'My Models' panel.

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

Upload

View Upload Edit Run Visualization

Please follow the two steps to create case for SWAT simulation

Step 1: Enter model meta data Please start filling the model meta data

User Name:

* Model Name:

Description:

* Simulation Time Step:

HRU Threshold (Landuse):

HRU Threshold (Soil):

Land use data source:

* Soil data source:

Shared?

HUC code:

* Type: Normal Simulation Sensitivity Analysis Auto-Calibration

Date from: to:

Step 2: Upload input data

Click upload button to launch data mover tool and upload input data

✓ Simulation time step (daily/ monthly/ yearly) needs to be the same as the *file.cio* variable **IPRINT**

✓ IPRINT = 0 (monthly), 1 (daily), 2 (yearly)

If a user wants to share the model with others, the 'Shared' box must be checked

✓ User can select the required simulation type

✓ Must be compatible with **ICLB** flag in *file.cio* of the TxtInOut

✓ ICLB = 0 (normal), 1 (sensitivity), 2 (auto-calibration)

Name	Type	Size
info	File folder	
RasterStore.idb	File folder	
Scenarios	File folder	
Watershed	File folder	
log	File	1 KB
RasterStore	Microsoft Access Database	1,036 KB
SWAT2009	Microsoft Access Database	14,192 KB
WabashRiver	Microsoft Access Database	11,060 KB
WabashRiver	ESRI ArcMap Document	4,618 KB

Contents of the zip folder

SWAT Share User Interfaces

The screenshot displays the SWAT Share user interface. At the top, there are tabs for 'View', 'Upload', 'Edit', 'Run', and 'Visualization'. Below these is a navigation bar with 'Please edit the following meta data for SWAT model', a 'New Name' input field, and a 'Copy to Your Own' button. The main content area is divided into two steps: 'Step 1: Enter model meta data' and 'Step 2: Replace input data'. Step 1 includes various input fields for user information, model details, and simulation parameters. Step 2 includes an 'Upload' button and a text input field. On the right side, there is a 'My Models' section with a list of models under 'Shared Models' and 'Other Models'. A red arrow points to the 'My Models' section. At the bottom right, a red box highlights three buttons: 'Change', 'Reset', and 'Delete'.

- ✓ 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

PURDUE UNIVERSITY SWATShare User Interfaces

Please select the case from model list at your left and press run.

Owner: adnanrajib Model Name: Adnan_Fat Version: SWAT2009
Time Step: Daily Model Type: normal HUC ID: Shared?: false
Description:
Input data: Adnan_Fat

Run

Refresh

Job ID	Model Name	Job Type	Job Status	Submission Time	Actions
508	Adnan_Fat	normal	ACTIVE	2013-05-11-17:11:21 EST	Output Delete
371	Adnan_Haw	sensitivity	PENDING	2013-04-03-20:04:04 EST	Output Delete
370	wabash	calibration	DONE	2013-01-25-00:05:05 EST	Output Delete
368	Adnan_Try1	normal	FAILED		
367	Adnan_Try1	normal	FAILED		

Log Information

My Models

- Adnan_Fat
- Adnan_Haw
- Adnan_Try1
- Adnan_Try1
- Adnan_Try3
- wabash
- w_set1

Shared Models

Other Models

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

The model run may start immediately or it may be dispatched in a job queue waiting to be executed on the cluster

Failed status can show up mainly due to lack of required files in the uploaded zip folder

(stdout=/grp/tgdata/waterhub/swat/users/adnanrajib/jobs/Adnan_Fat/swat-pbs.out)(stderr=/grp/tgdata/waterhub/swat/users/adnanrajib/jobs/Adnan_Fat/swat-pbs.err)(project="TG-ATM090060")

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

Visualization Tab

Step 1 : Select a model to visualize

1. Model Name

CedarCreek

2. Simulation Period

2005 ~ 2010

3. Warm-up Period

0

4. Modeling Time-step

Daily

5. Visualization Time-step

Daily

6. Visualization Type

Spatial

Temporal

7. Output File

Next

Temporal Visualization

Model Name: CedarShort2 Simulation Period: 2009 ~ 2009 Modeling Time-Step: Daily Visualization Time-Step: Daily Visualization Type: Temporal Output File: output.rch

Step 2: Select variables

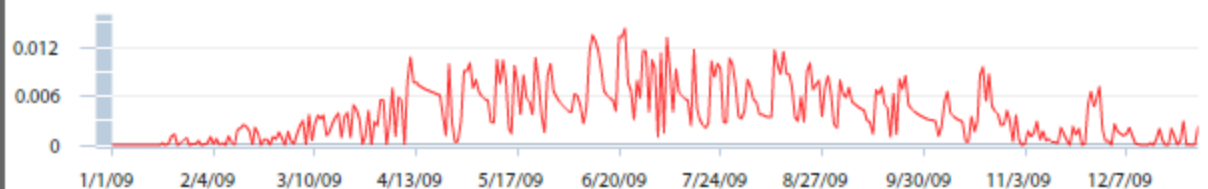
Output variables

- FLOW_IN(cms): Average daily streamflow into reach
- FLOW_OUT(cms): Average daily streamflow out of reach
- EVAP(cms): Average daily rate of water loss by evaporation
- TLOSS(cms): Average daily rate of water loss by transpiration
- SED_IN(tons): Sediment transported with water into reach
- SED_OUT(tons): Sediment transported with water out of reach
- SEDCONC(tons): Concentration of sediment
- ORGN_IN(kg): Organic nitrogen transported with water into reach
- ORGN_OUT(kg): Organic nitrogen transported with water out of reach
- ORGP_IN(kg): Organic phosphorus transported with water into reach
- ORGP_OUT(kg): Organic phosphorus transported with water out of reach
- NO3_IN(kg): Nitrate transported with water into reach
- NO3_OUT(kg): Nitrate phosphorus transported with water out of reach
- NH4_IN(kg): Ammonium transported with water into reach
- NH4_OUT(kg): Ammonium transported with water out of reach

FLOW_OUT(cms): Average daily streamflow out of reach



EVAP(cms): Average daily rate of water loss by evaporation



SED_OUT(tons): Sediment transported with water out of reach



Step 3: Set data range

Date range

1 / 1 / 2009 ~ 12 / 31 / 2009
mm dd yyyy mm dd yyyy

Draw Plots

Download Data

Close

Spatio-Temporal Visualization

Step 1 : Select a model to visualize

1. Model Name

CedarShort2

2. Simulation Period

2009 ~ 2009

3. Warm-up Period

0

4. Modeling Time-step

Daily

5. Visualization Time-step

Monthly

6. Visualization Type

Spatial

7. Output File

Spatial

Temporal

Next

Spatio-temporal visualization

View Upload Edit Run Visualization

Model Name: CedarShort2 Simulation Period: 2009 ~ 2009 Modeling Time-Step: Daily Visualization Time-Step: Monthly Visualization Type: Spatial Output File: output.sub

Step 2: Select variables

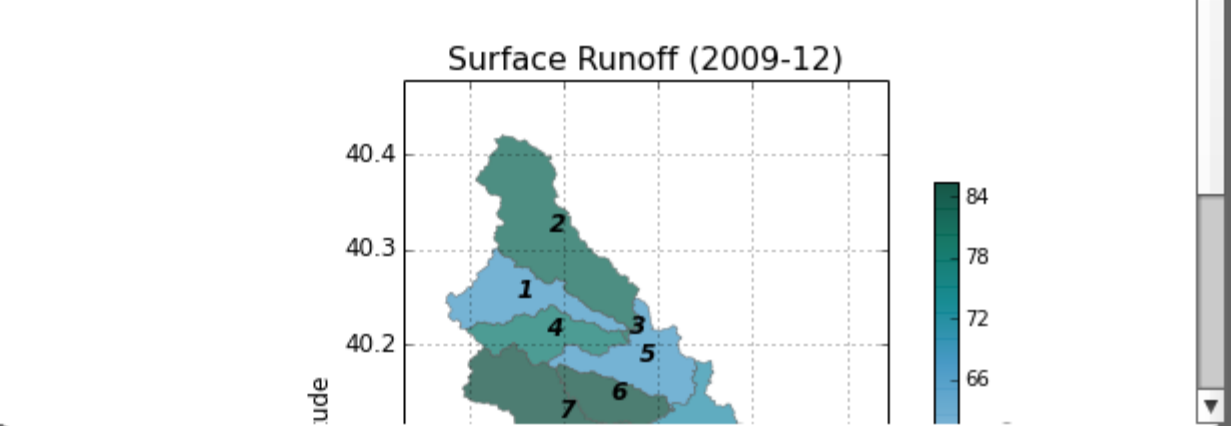
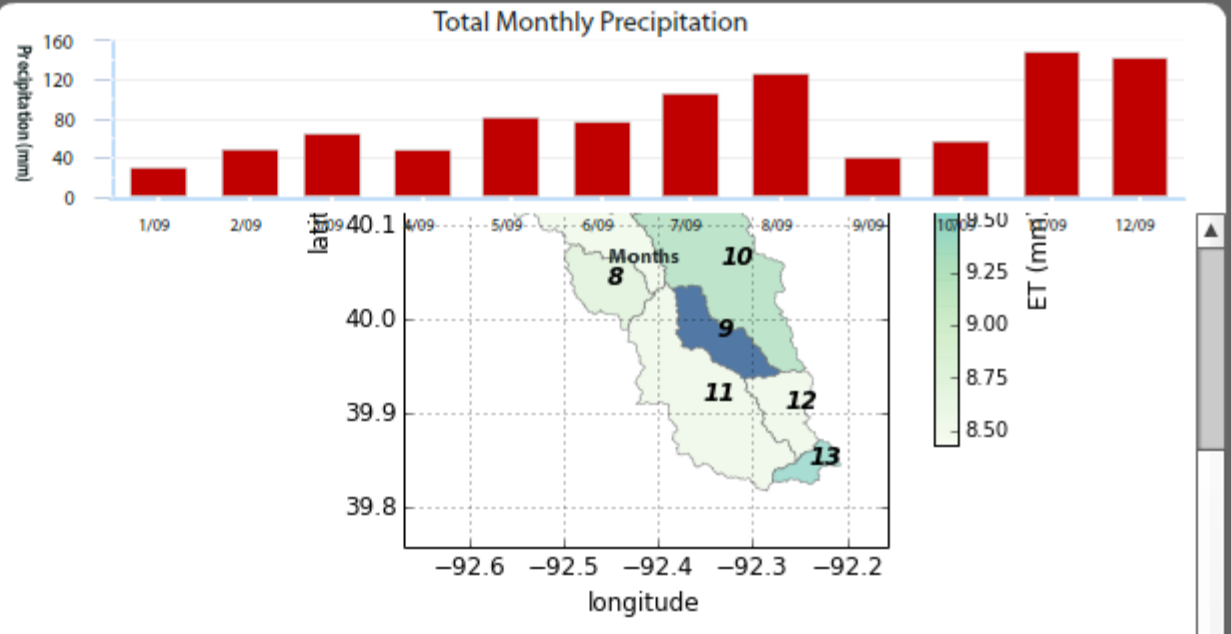
- Output variables
- PRECIP(mm): Precipitation
 - SNOMELT(mm): Snow or ice melt
 - PET(mm): Potential evapotranspiration
 - ET(mm): Actual evapotranspiration
 - SW(mm): Soil water content
 - PERC(mm): Water that percolates past the root zone
 - SURQ(mm): Surface runoff contribution to streamflow
 - GW_Q(mm): Groundwater contribution to streamflow
 - WYLD(mm): Water yield
 - SYLD(t/ha): Sediment yield
 - ORGN(kg/ha): Organic N yield
 - ORGP(kg/ha): Organic P yield
 - NSURQ(kg/ha): Nitrate transported by the surface
 - SOLP(kg/ha): Soluble P yield
 - SEDP(kg/ha): Mineral P yield

Step 3: Set data range

Date range

1 / / 2009 ~ 12 / / 2009
mm dd yyyy mm dd yyyy

Draw Plots



Thank you!

www.water-hub.org/swatshare

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