

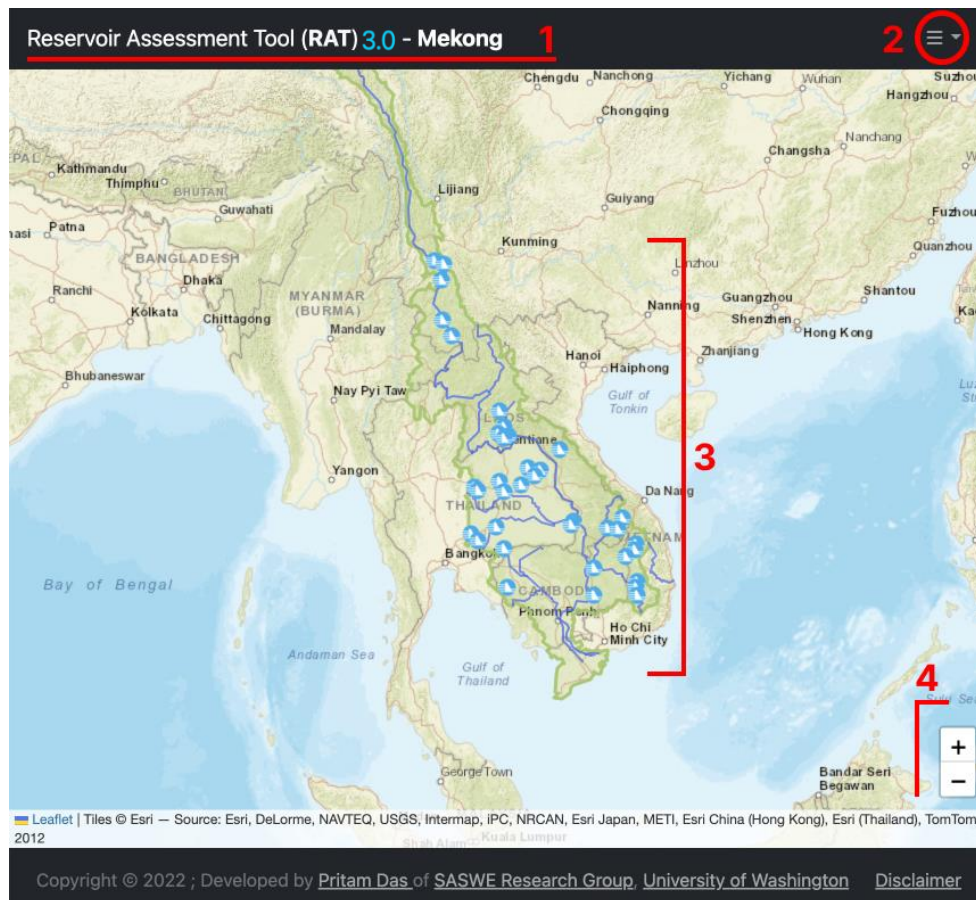
How to use RAT – 3.0

This document provides instructions on how to use the Reservoir Assessment Tool (RAT) 3.0 – Mekong interface to interact and obtain the data. For a more comprehensive documentation on how install, setup and run RAT, please visit the RAT 3.0 documentation page at ratdocs.io.

1. Landing Page

The landing page of [RAT 3.0 – Mekong](#) consists of three main sections –

- The Header – It contains the title (1) and the drop-down menu (2).
- The Map – It contains an interactive map, containing the reservoir locations (3) and a button set that can be used for zooming (4).
- The Footer – It contains the copyright information, and links related to the developers of RAT 3.0 – Mekong. It also hosts a permanent link to the disclaimer text.

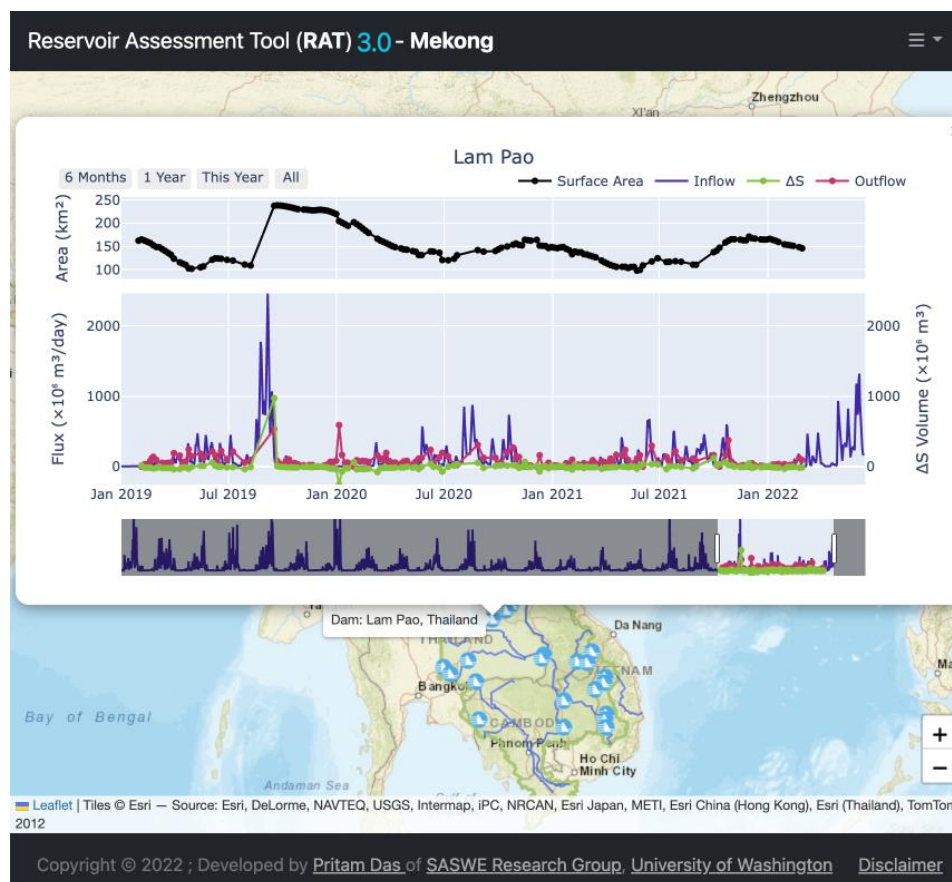


The important components of the landing page are marked in red, and their corresponding descriptions are as follows:

1. The title “Reservoir Assessment Tool (**RAT**) 3.0 – Mekong” describes the version of the RAT framework in use (in case of this page, it is RAT 3.0) and the region for which the RAT framework has been currently set up (in this case, The Mekong basin).

2. The drop-down menu can be clicked to get the following links –
 - a. Home – The landing page which also contains the map.
 - b. About RAT – Contains information on the development of version 2 of the RAT framework.
 - c. How to use RAT – Opens this page.
 - d. How to cite RAT – Provides links to additional documentation in the form of related papers and a link to the GitHub repository of the latest RAT - [RAT 3.0](#).
 - e. Acknowledgements
 - f. Disclaimer
 - g. SASWE Homepage – Link to the SASWE homepage at saswe.net/.
3. **The Map** – The main map showing (a) the location of each reservoir as blue and white markers, (b) The Mekong River network as a solid blue line, and (c) the Mekong Basin's boundary in green. Each of the reservoirs can be clicked to visualize the inflow, outflow, storage change, and surface areas. Further description of the chart can be found below.
4. Zoom Controls – The +/- buttons can be used to zoom in and out of the map.

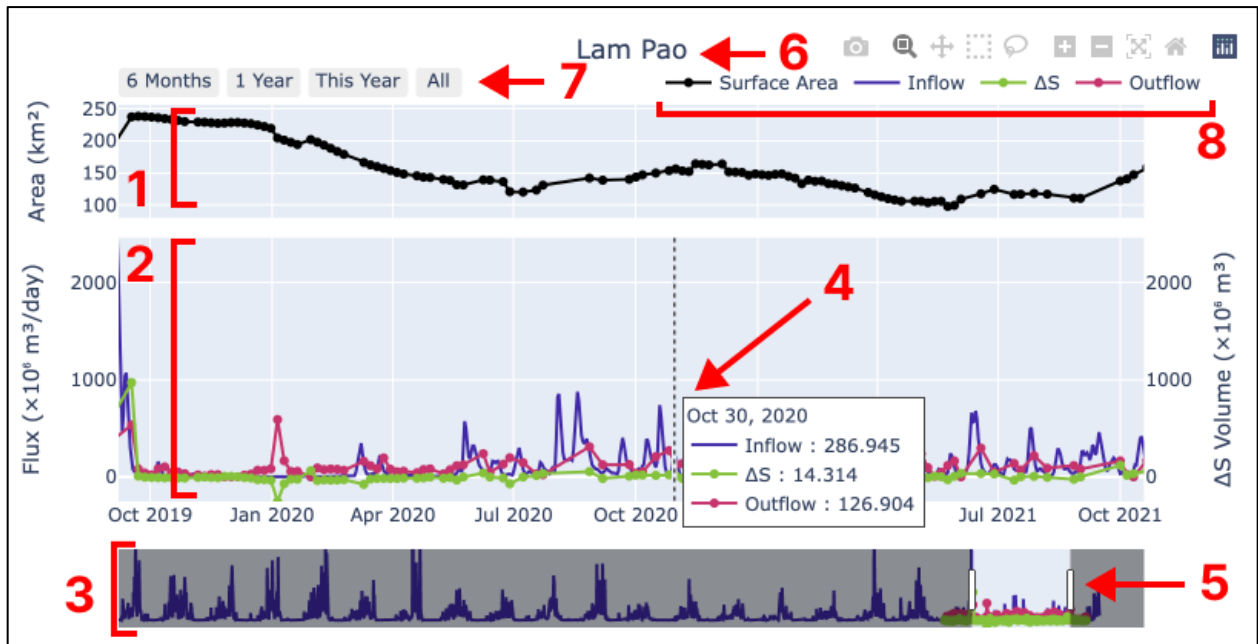
2. The Map Controls



The icons represent the locations of the mapped reservoirs. The following actions can be performed with the icons –

- a. *Hovering* over the icons displays brief information, such as the name of the reservoirs. For example, “Lam Pao, Thailand”.
- b. *Clicking* on the icons pulls up the chart showing the Surface Areas, inflow, outflow and storage change.

3. The Chart Controls



The chart plots the model outputs in an interactive window. The various components of the chart are as follows –

1. **The top chart area** – Displays the surface area of the reservoirs using the TMS-OS approach. The actions that can be performed on the chart -
 - a. By *dragging* the cursor on the chart, the user can zoom in.
 - b. By *double-clicking* the view resets to the original view.
 - c. *Hovering* over each point shows the surface area value of the temporally nearest observation.
2. **The bottom chart area** – Displays the inflow, outflow and storage change values estimated by RAT 3.0. The units of inflow and outflow rates are displayed in *Million m³/day*. The storage change is displayed in terms of volume, with the units of *Million m³*, which pertain to the estimated volume change in the 1-5-day window between two consecutive observations. The following actions can be performed on the chart –
 - a. By *dragging* the cursor on the chart, the user can zoom in.
 - b. By *double-clicking* the view resets to the original view.
 - c. *Hovering* over each point shows the inflow and outflow rates, and the storage change value for that day (or nearest observation).
3. **Condensed view of the entire chart** – A static view of the entire chart, which can be used to scroll through the time-series, by clicking and dragging.

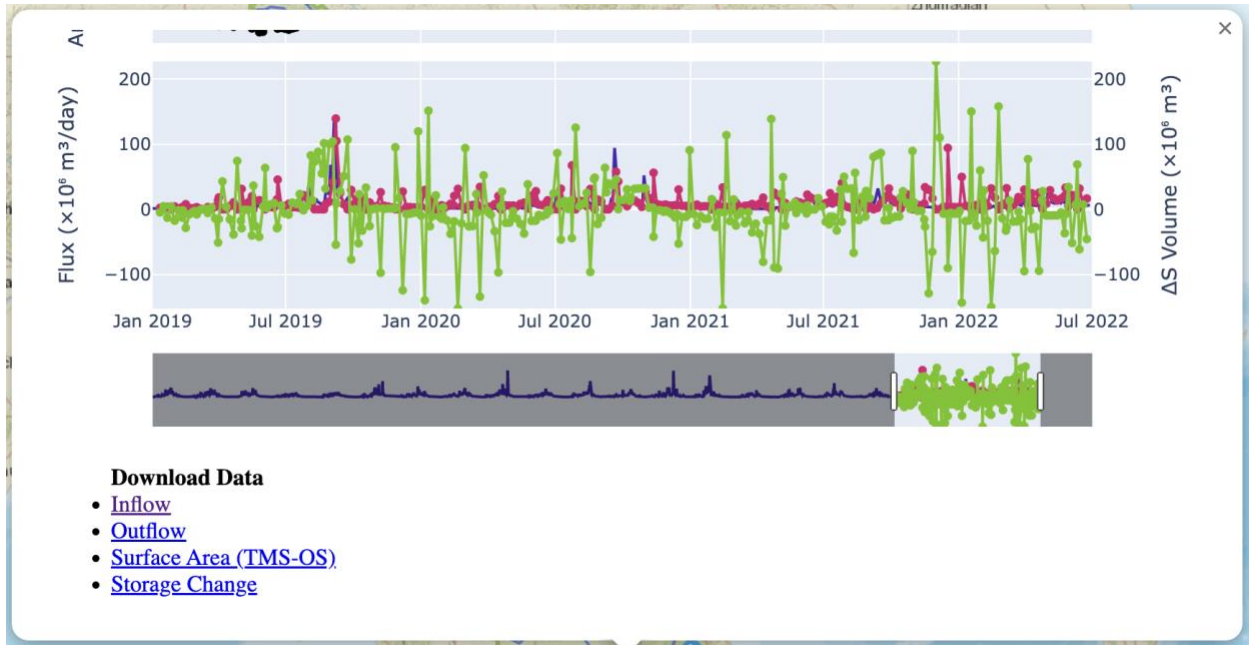
4. **Tooltip by hovering over the time-series** – As described in 2.c, hovering over the time-series displays a tooltip which shows the Inflow, ΔS and Outflow values for the date nearest to the cursor position.
5. **Controls of the condensed chart** – The region of the time-series that is not being viewed in the Top (1) and Bottom (2) charts is greyed out in the condensed chart, and *vice versa*. The white bars on either side of the active region can be clicked and dragged to zoom in/out of the chart, which also zooms to the corresponding region in the Top (1) and Bottom (2) charts.
6. **Name of the Reservoirs**
7. **Buttons to quickly view data for a pre-determined time-period** – The Buttons can be clicked to isolate the data being visualized to the corresponding time-periods. For example, clicking on the “1 Year” button will zoom into the chart such that data for a year is visible at a time in the chart. The user can keep interacting with the chart further as per their requirements according to the actions described in #2 above.
8. **Legend** – The legend displaying the markers corresponding to each type of data being displayed. Individual markers and text can be clicked to toggle the time-series of the data on/off.

4. TMS-OS Behavior

Since TMS-OS uses multiple satellites to estimate surface areas, there can be scenarios where latest data from one (or several) sensor(s) don't get generated. This can occur due to various reasons, especially if the GEE code fails, due to “too many concurrent aggregations” or similar errors, or unavailability of data in GEE during processing. In such cases, the following behavior should be expected–

1. **Case 1: Sentinel-1: Available, Sentinel-2: Available, Landsat-8: Available**
TMS-OS will run as usual. If both Sentinel-2 and Landsat-8 observations are available for the same day, Sentinel-2 data is used.
2. **Case 2: Sentinel-1: Available, Sentinel-2: Available, Landsat-8: Not Available**
TMS-OS will use only Sentinel-1 and Sentinel-2 data to generate the surface area data.
3. **Case 3: Sentinel-1: Available, Sentinel-2: Not Available, Landsat-8: Available**
TMS-OS will use only Sentinel-1 and Landsat-8 data to generate the surface area data.
4. **Case 4: Sentinel-1: Not Available, Sentinel-2 or Landsat-8: Available**
If Sentinel-1 data for the latest date is not available, but data from either of the optical sensors (Sentinel-2 or Landsat-8) are available, then the raw data from the optical sensors are displayed (*this data can be noisy*).
5. **Case 4: Sentinel-1: Available, Sentinel-2: Not Available, Landsat-8: Not Available**
Since TMS-OS uses Sentinel-1 data only for trend correction, in case no optically sensed data is available, the surface areas won't be updated.

5. Downloading data



The individual model outputs – Inflow, Outflow, Surface Area and Storage Change – can be downloaded as follows:

1. After opening a plot of a reservoir's fluxes, *hover over the plot* and *scroll down*.
2. This will reveal links pertaining to model outputs for the particular reservoir.
3. Right click on the required data, and choose the option to download ("*save link as...*", "*download linked file*") the linked file.

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