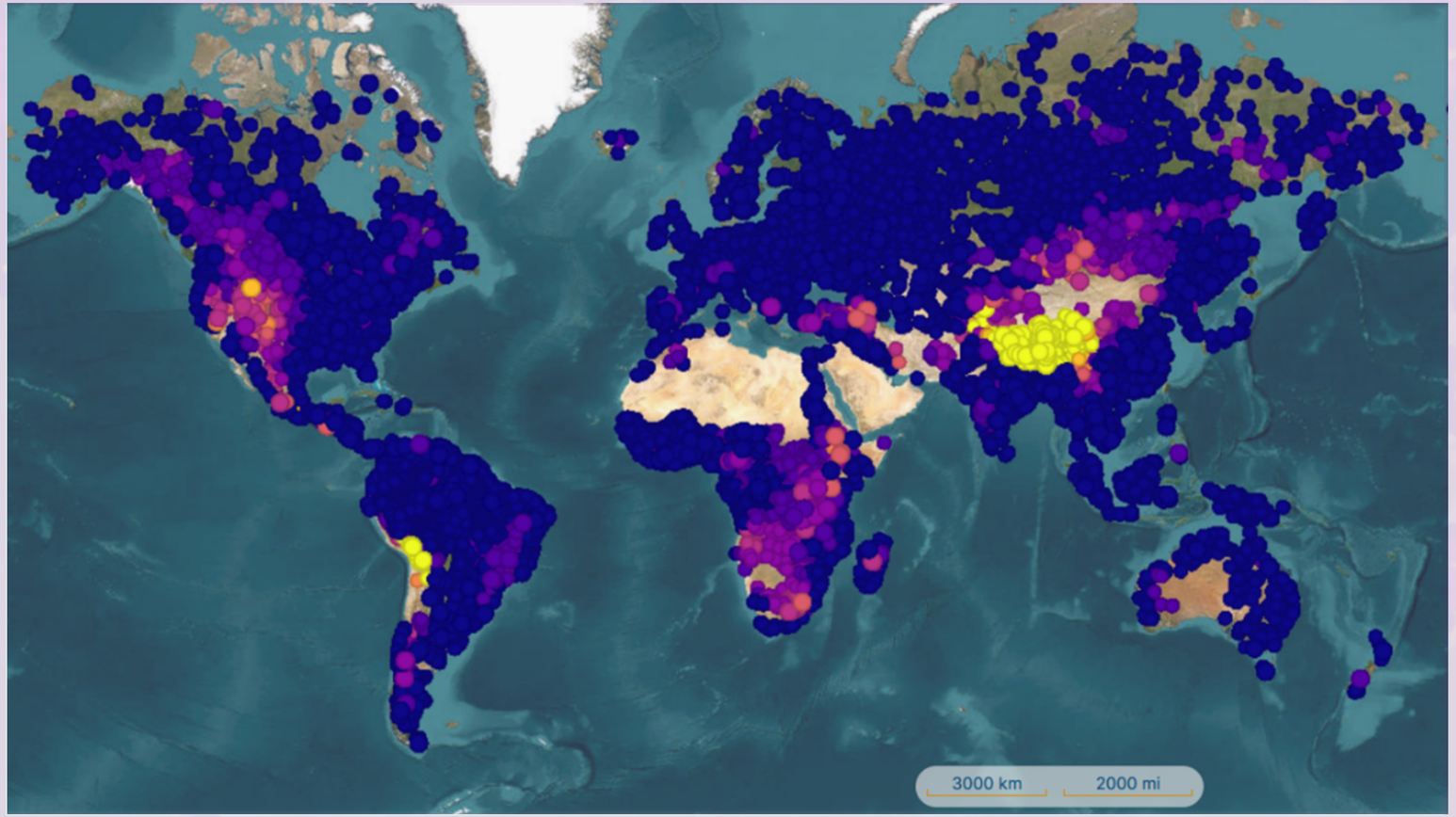
TUTORIAL:

Transition from Hydroweb to hydroweb.next

User guide



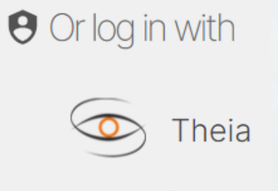
CONTENT:

1. Authentification

As on Hydroweb, **authentification is only required to download products**.
It is not necessary to view them.

- Access the authentification area by clicking on the "Log in" icon in the top right-hand corner of the application.

- You can then log in using your existing Theia/Hydroweb login by clicking on the "Or log in with Theia" icon.



2. Discover the application

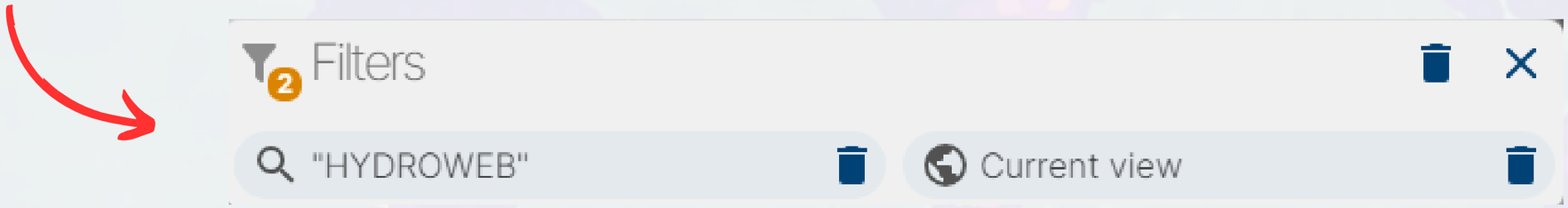
- Discover the various functions of the application by clicking on the icon « Help Manual »

- Contact support if you encounter a **problem** by clicking on the icon

Note that a default filter is already activated, "current view", used to restrict the search spatially to products contained within the map area. You can simply move the map towards your study area, or remove it by clicking on the "Remove filter" icon.

3. Find Hydroweb products

- To find Hydroweb products **directly,** you can use the **central search bar** and simply type in the keyword "Hydroweb"..
- The "Hydroweb" text filter will be added to your active filters.



- You can add a **time filter** to find only stations with measurements from a certain date, or up to a certain date, by opening the "When" panel. This offers two options:
  - Define a start/end period
  - Define a relative period (e.g. 2 months in the past until now)

- The results of your search will be displayed in the "Results" panel in two collections:
  - one for lakes
  - one for virtual river stations.
- These collections will contain a number of products (virtual stations) corresponding to your spatio-temporal search criteria.

- Some additional features are planned and will be developed to facilitate your search:
  - Search by lake, basin, river, country, etc.
  - Search by polygon (drawn or in a reference database)

4. Download

- There are **several ways to download** :
  - **ZIP** download from the portal
  - Download a **python script** from the portal, which can then be re-parameterized and run automatically or occasionally to retrieve the latest data.
  - **STAC API implementation**

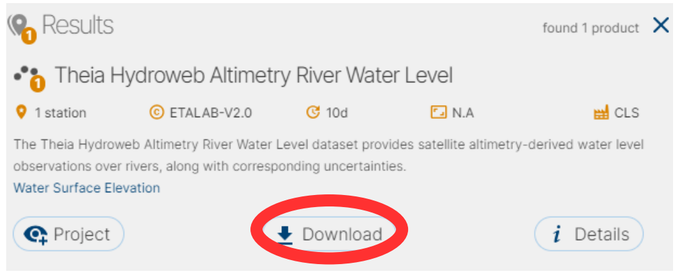
- In all cases, the format of the downloaded files **remains the same**:
  - Lakes: Standard ASCII from Hydroweb
  - Rivers: ASCII expert from Hydroweb.
- If you haven't had a chance to try it out on Hydroweb, this is the standard format, with additional columns on the right.

4.1. ZIP download from the portal

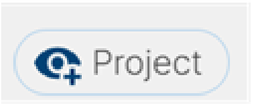
1. First you need to authentificate yourself

2. Next, there are two ways to download from the browser:

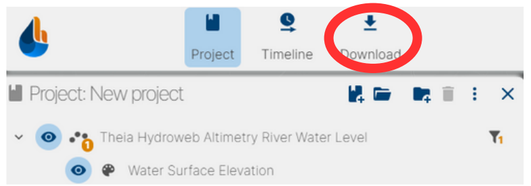
- Downloading can be done directly from the "Results" panel under each collection using the Download icon.



- Or you can add collections to a Project using the "Project" icon.

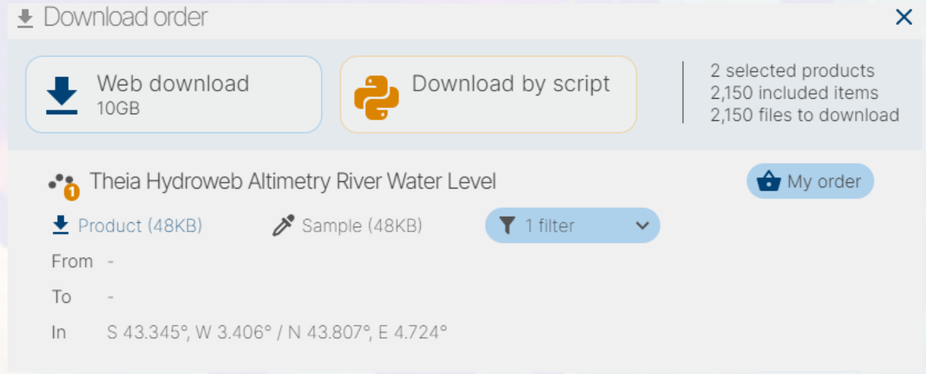


  - The project acts as a download basket and as a project containing all the collections for visualization.
  - Once you've put all the collections you're interested in into your Project, click on the Download icon next to Project.

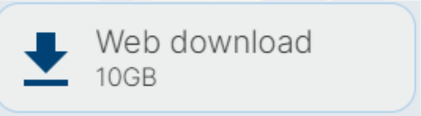


4.1. ZIP download from the portal

- Click on the Download icon to access the corresponding panel.



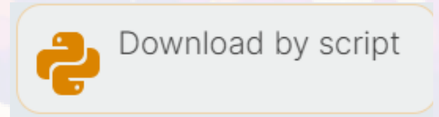
- Clicking on "Web Download" will download a zip file into your browser containing all the virtual station files.



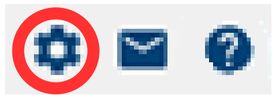
4.2. Download by python script

- Follow steps 1 and 2 in the previous section (4.1.)

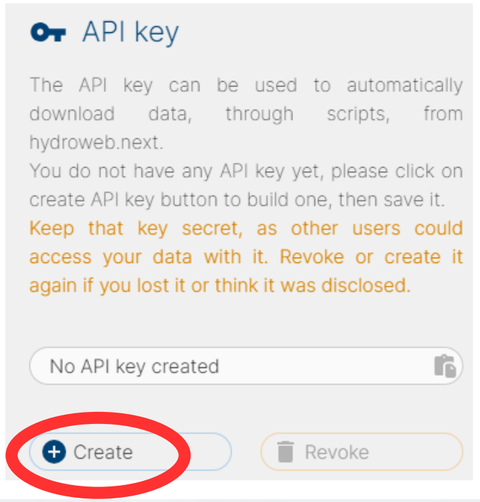
- In the last step, click on "Download by Script".



- Then follow the instructions in the script, which will ask you to create an **API-Key** beforehand.
  - To do this, click on "settings".



  - In the "API Key" section, click on Create after reading the instructions.
  - This API Key will act as a login/password for all API use (via the python script or the API described in the next section).



4.3. Download by API

- The hydroweb.next catalog is based on the STAC (Spatio Temporal Asset Catalog) standard, widely used today and fully documented (https://stacspec.org/en).
- It comes with an API that can be used with different libraries in different languages, see: https://stacspec.org/en/about/tools-resources

- In the next 2 slides you'll find a simple bash script giving you the information you need to implement the STAC API in the way you want.

The main difficulty lies in implementing authentication with API-Key
(see section 4.2. for API Key generation), which complies with the OAuth2 protocol.

4.3. Download by API

```
# generate API Key from settings in hydroweb.next and store carefully
API_KEY=XXXXXXXXX_API-Key_generated_on_hydroweb_next_in_settings_XXXXXXXXX

# API base
STAC_API=https://hydroweb.next.theia-land.fr/api/v1/rs-catalog/stac/search
USER_AGENT_HEADER_VALUE="Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/119.0"

# Payload
FILTERS=stac_filters.json

# Search
curl -X POST --data-binary @${FILTERS} -H "User-Agent:${USER_AGENT_HEADER_VALUE}" -H "X-API-Key: ${API_KEY}" -H 'Accept: application/json' -H "Content-Type: application/json"
"${STAC_API}"

# This will return all assets (=virtual station) corresponding to your criteria.
# For each asset (=virtual station),
# - get href without token (that will be automatically replaced by your API Key)
# - get collection title for output filename
# Then constitute your download request for each asset. For Example:
curl -H "User-Agent: ${USER_AGENT_HEADER_VALUE}" -H "X-API-Key: ${API_KEY}" https://hydroweb.next.theia-land.fr/api/v1/rs-
catalog/downloads/URN:FEATURE:DATA:hysope2:fef1925b-e7bf-324e-b896-741b3caf29da:V1/files/f2adbe76e5c7de545d0212134478c927 --output hydroprd_R_MISSISSIPPI_SMOKY-
HILL_KM2793_exp.txt
```

4.3. Download by API

With the file stac_filters.json in the following format :

```
// stac_filters.json
{
 "collections": [
 "HYDROWEB_RIVERS"
  ],
 // "bbox": [
 //   0.24745,
 //   0.1098,
 //   30.70522,
 //   63.04882
 // ],
  "geometry": {
   "type": "Polygon",
   "coordinates": [
    [
     [
      172.91173669923782,
      1.3438851951615003
     ],
     [
      172.95469614953714,
      1.3438851951615003
     ],
```

next :

```
     [
      172.95469614953714,
      1.3690476620161975
     ],
     [
      172.91173669923782,
      1.3690476620161975
     ],
     [
      172.91173669923782,
      1.3438851951615003
     ]
    ]
   ]
  },
  "query": {
   "end_datetime": {
    "gte": "2023-07-12T22:00:00.000Z"
   }
  }
}
```

5. Visualization

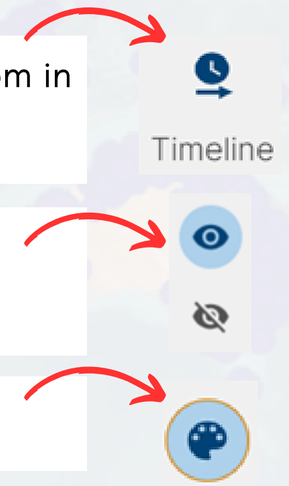
5.1. Map visualization

- By adding a Hydroweb collection to the project, station positions are displayed on the map with a color corresponding to the value of the active variable over a **given period**.
- By default, when adding to the project, the first available day of the entire station collection is active. So you'll probably see very few stations displayed, so no worries.

◦ Open the timeline with the "Timeline" icon to change the period displayed on the map. You can zoom in to show just one day, move around, or select a longer period.

◦ In Project, use the "Eye" icon to show/hide a variable or collection. Some lakes contain several variables. This is not the case for SV rivers.

◦ For a variable (or layer), use the "paint" icon to display the legend corresponding to the point color.



5.2. Time series visualization

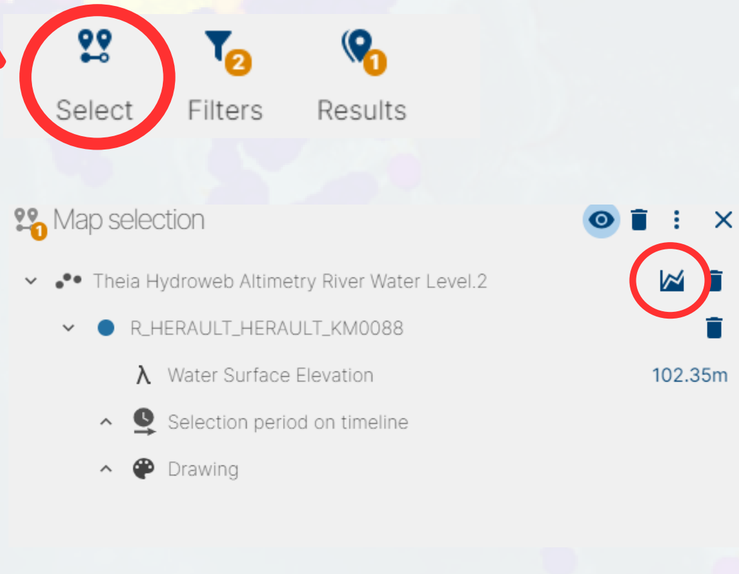
- As with Hydroweb, it is possible to view the graph corresponding to the time series of the virtual station or lake.
- To do this, the variable of interest (e.g. "water surface elevation") must be activated and visible on the map. The selected period is irrelevant. Next :

◦ Click on the "Select" icon to open the "Map Selection" panel.

◦ Click on the station(s) you wish to view on the map.

◦ When you click, the "Map Selection" panel lists the stations and gives the value of the variable(s) displayed corresponding to the timeline.

◦ Once you've finalized your selection, click on the graph display icon



5.2. Time series visualization

- The graph is displayed with different functions.
- If you have selected several variables (mainly for lakes), you can adapt the y-axis to the different variables represented together.
- It is possible to export directly a CSV file corresponding to the zoom displayed. This file is not in the standard Hydroweb format.
- You can change the name of the chart.
- Additional features are under development:
  - Customize graphics (colors, etc.)
  - Export graphic as PNG
- All graphics are automatically saved in the current project and can be re-opened later.

6. Hydroweb unrenewed features

(or not yet)

hydroweb.next offers a wide range of hydrological products, and it has not always been possible to reproduce Hydroweb's specific functionalities. Including:

- It is not possible to filter search and operational stations directly in the HMI (but this information is available as file metadata)..
  - In the future, we will separate the virtual stations and the "research" lakes into 2 other collections, which you will find apart in the "Results" panel.
- Display satellite altimeter tracks on the map: **this is not currently planned**.
- Display watersheds catchment : **not yet possible but planned**.

- APIs :
  - API for downloading png graphics: **not yet possible and not planned.**
  - Retrieve the kml station position file: **planned**, the download link will be available in the "Details" panel of the collections.
  - Download a temporal portion of a station: **not possible** by API

CONTACTS

If you have any questions
or encounter any difficulties, please
do not hesitate to contact us at the following address :
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