TOAR Data User Guide #7

The TOAR-II Dashboard

toar-data.fz-juelich.de

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Documentation for the TOAR-II Dashboard, a web-based platform for browsing, visualizing and analyzing atmospheric ozone data from the TOAR-II database.

CHAPTER

ONE

REGISTRATION

Registering for TOAR gives you the ability to

- save your preferences,
- keep a history of your data processing requests
- process larger requests and download more data.

The TOAR data infrastructure comes along with different levels of access to the TOAR data and its services:

- **Anonymous users** have limited data downloads and analyses (e.g., max 5 time series, no gridded or statistic products).
- **Registered users** get higher limits: up to 10 time series at once, 250 per month, and access to statistics and gridded products (worth to up to 12 TBU's per month).
- **TOAR users** (scientists involved in TOAR activities) can request elevated privileges (e.g., up to 500 time series at once, 12 TBU per requests and up to 120 TBUs per month).
- **Power users** (e.g., lead authors of TOAR assessment papers) get "no limitations" on TBUs.

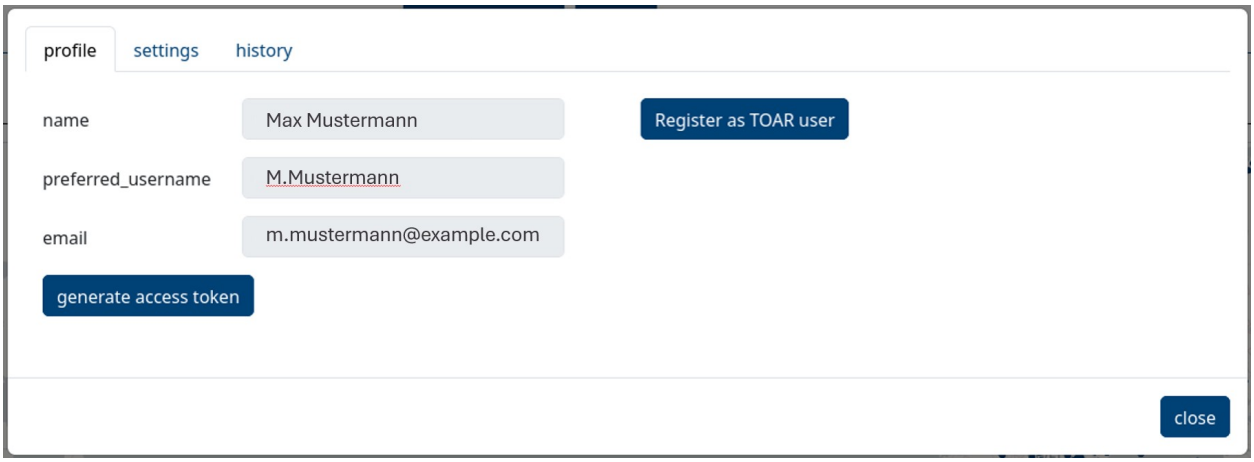
TBU are TOAR Billing units, which are used to manage the costs of a request through the duration in years and the number of requested time series.

1.1 How to register

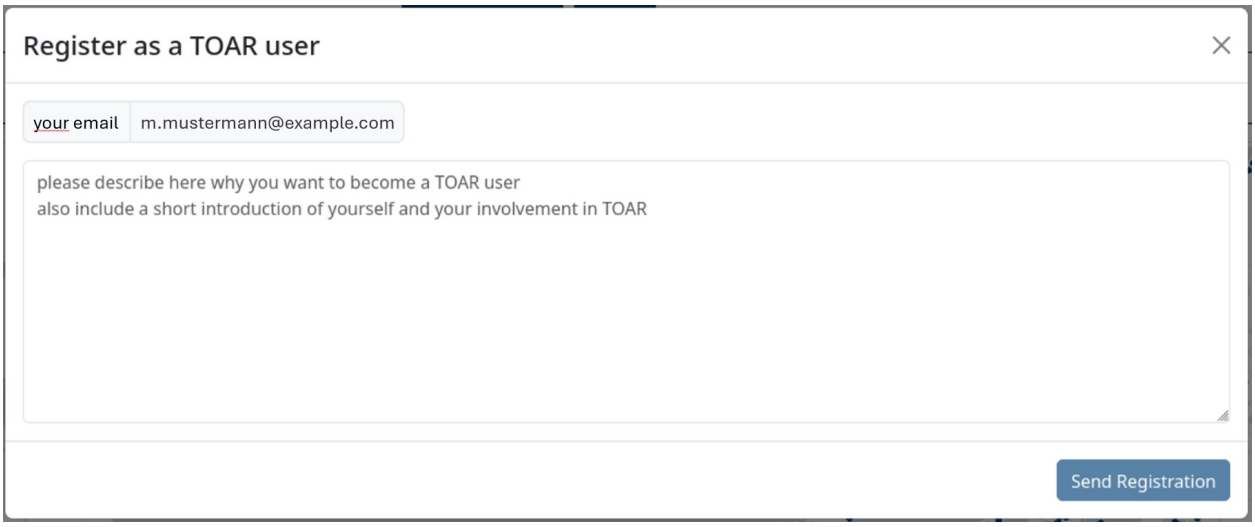
- Go to the TOAR Dashboard.
- click the Login/Register button
- Log in using Helmholtz ID with your institutional account or ORCID, Google account.

1.2 Becoming a TOAR User

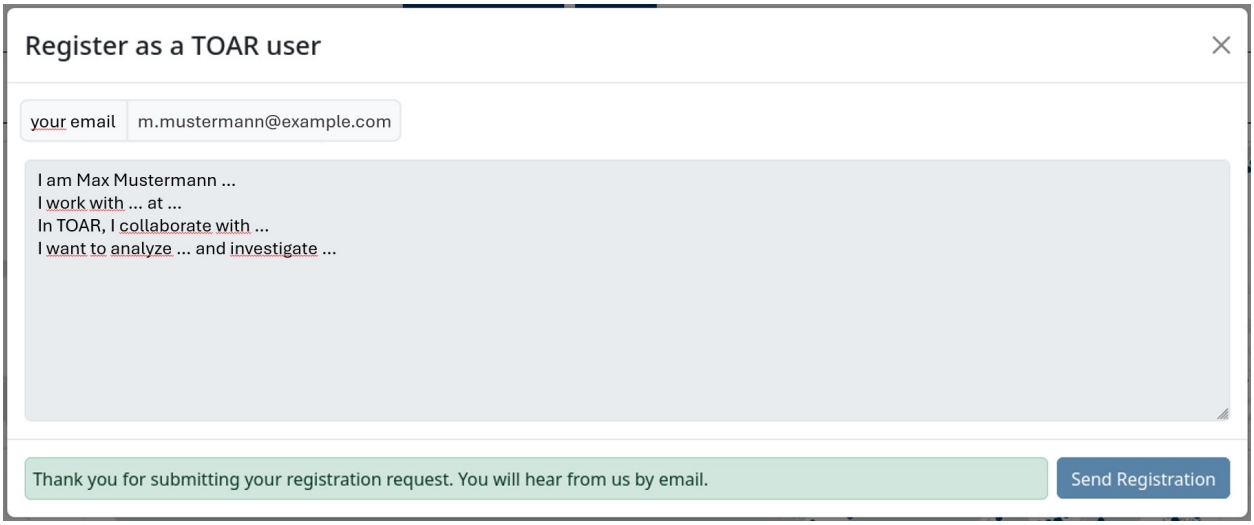
After logging in, click on "YourName's profile" (top right). Your profile window will open:



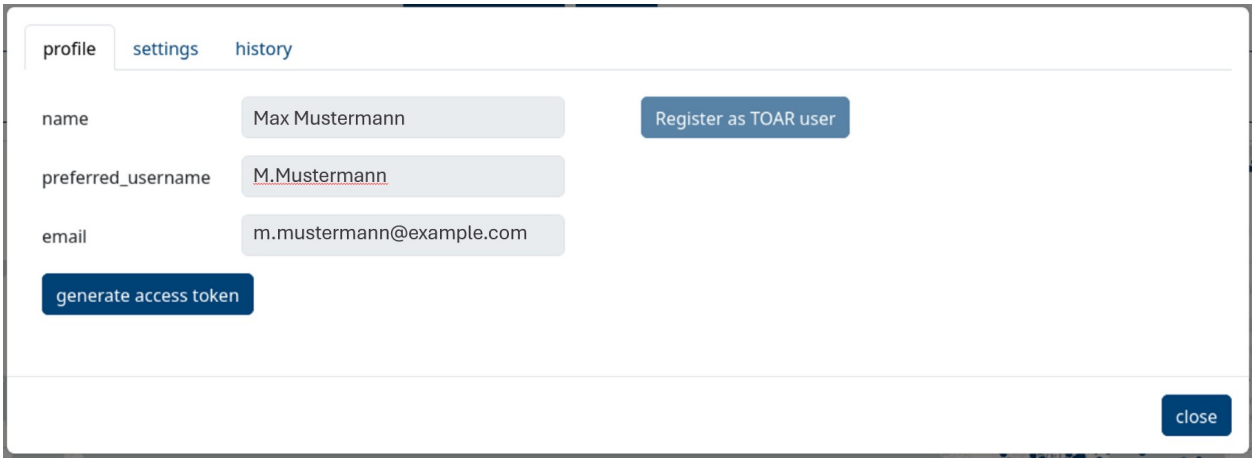
In the profile window, select the “Register as TOAR user” option. A registration form will open:



The “Send Registration” button will be deactivated as long as nothing is entered in the text box.
Please describe here why you want to become a TOAR user; also include a short introduction of yourself and your involvement in TOAR. When you are ready, click on “Send Registration”.

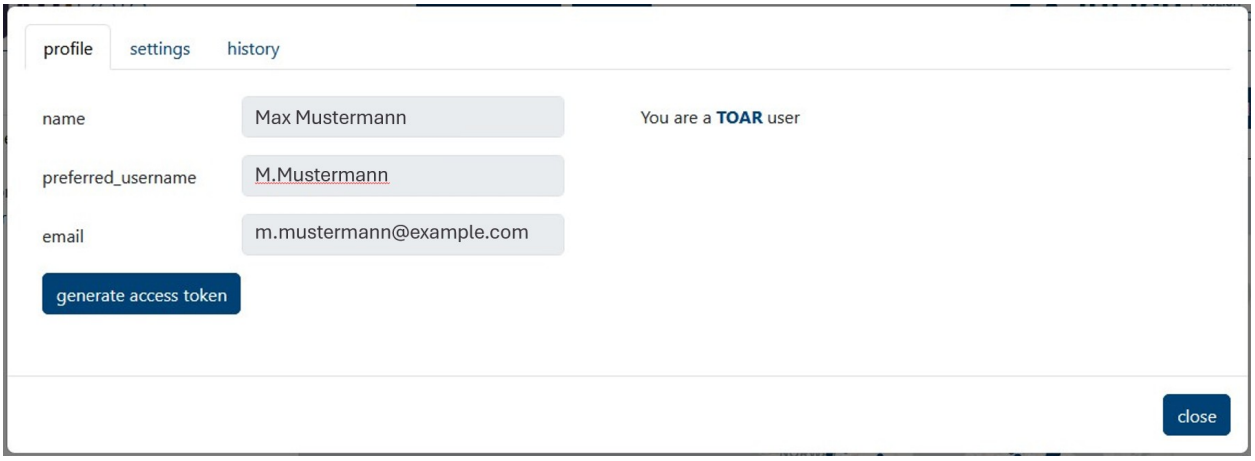


After the registration request has been successfully sent, the ‘Send Registration’ button is deactivated to prevent duplicate registrations.



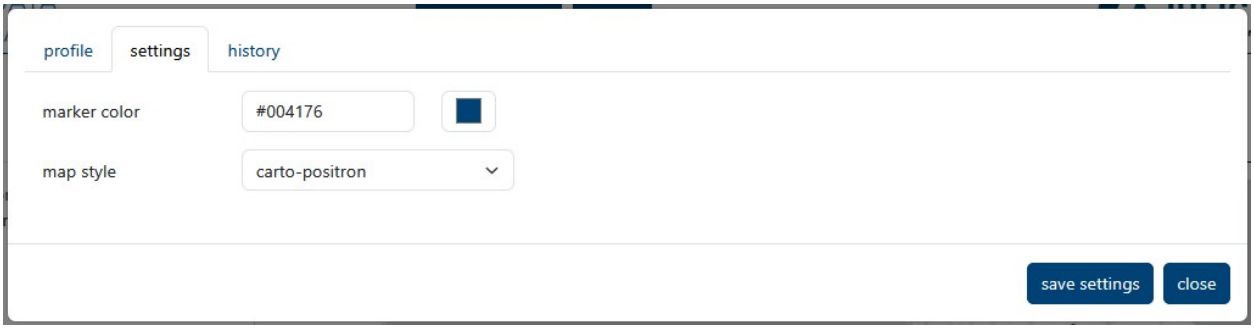
The same applies to the ‘Register as TOAR user’ button on the first tab of the user profile.

Registration is a manual process.
The application is read and the new user is added to the system. You will then receive an activation link by email. You must click on this link to complete the registration process. Once this has been done, your profile will show that you are now a TOAR user:



For more help, contact support@toar-data.org.

1.3 Settings



This modal window allows you to customize the visual appearance of the dashboard to suit your preferences or report requirements.

1.3.1 Marker Color

This setting controls the color of the station dots that appear on the map.

- **Hex Code Input**: The text box displays a hex code (e.g., #004176). You can type a specific color code here if you know the exact shade you want.
- **Color Picker**: The blue square next to the text box is a color picker. Click it to open a palette where you can visually select a new color.

1.3.2 Map Style

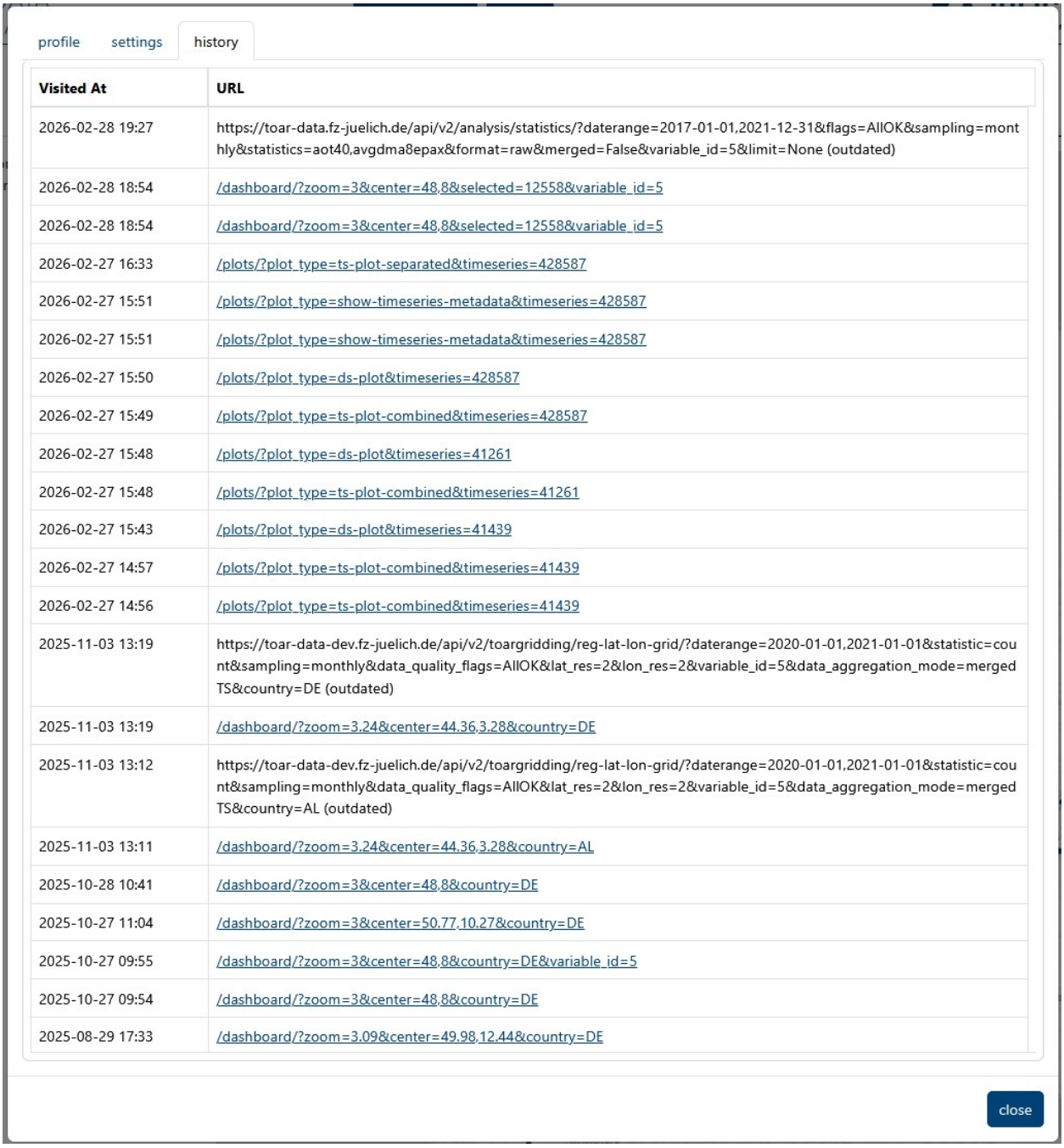
This dropdown menu controls the background look and feel of the map tiles. There are two map styles available:

- **carto-positron**: This is a popular, light-colored, minimal map style that makes the station markers pop and focuses attention on the data.
- **open-street-map**: This style provides a standard, detailed view of streets, cities, and infrastructure. This is often useful if you need to show the exact physical location of a station relative to nearby roads or landmarks.

Once you have made your changes:

- **save settings**: Click this button to apply your new color and/or map style choices immediately. The changes will also persist for your future sessions.
- **close**: Click this to exit the modal. If you haven't clicked "save settings" yet, your changes will be discarded.

1.4 History



This tab acts as an **Activity Log** or **Session History**.
It records every specific view, analysis, or data request you have made during your session. This is particularly useful for reproducibility and sharing your work with colleagues.

The table displays two main pieces of information for every action you've taken:

- **Visited At:** The date and timestamp of when you performed the action.
- **URL:** The specific web address generated by the dashboard at that moment.

1.4.1 How to Use the History Log

Reproducing a Previous View (Replay)

The primary use case for this tab is **reproducibility**. Because TOAR is a web-based tool, it can sometimes be difficult to remember exactly which filters or map zoom levels you used to find a specific station.
Clicking a URL link ending in `/dashboard?...` from the table will reload the dashboard to the exact state it was in when you clicked that link (including map center, zoom level, and selected stations).

Direct API Access

Some URLs in the list begin with `https://toar-data.fz-juelich.de/api/v2/`. These are direct links to the backend API (Analysis Service, TOARgridding).
If the link is still active, you can click it and will be directly taken to the results (or to a status page if the results are not yet available). If you look closely at the provided log, the service URLs are marked with **`(outdated)`**. This is a specific status for the **Analysis** and **Gridding** services, and it indicates the following: Both the analysis and gridding services operate asynchronously. When you submit a request, you receive a task ID. The status URL associated with this ID will automatically redirect you to the download link once processing is complete. Since the calculations are performed in real time, it may take several hours for the result to be ready. They are kept three days to be downloaded. If the processing finished more than three days ago, the result has been deleted, and the URL no longer works.

Sharing your work with colleagues

Copy any URL of your history and share it with your colleagues.

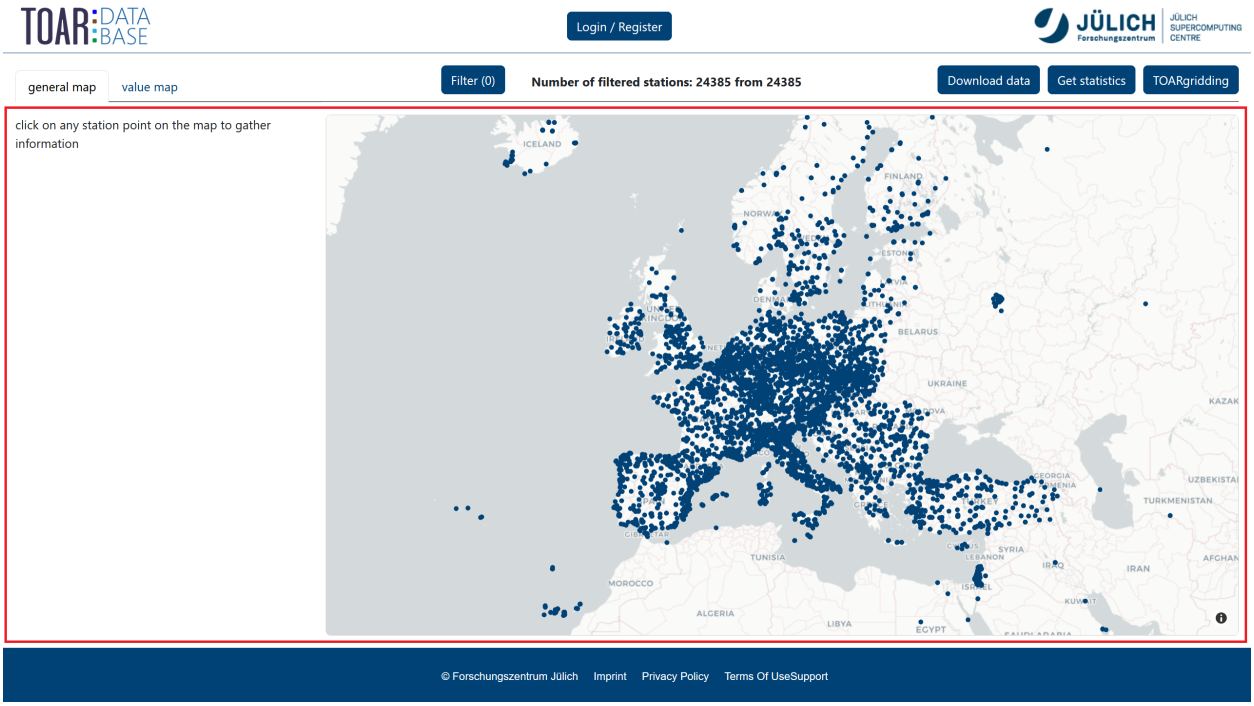
To Close: Click the blue **“close”** button at the bottom right to return to the dashboard.

CHAPTER

TWO

BROWSING THE MAP

This part of the documentation refers exclusively to the area of the dashboard outlined in red, i.e. the map and the associated functions.



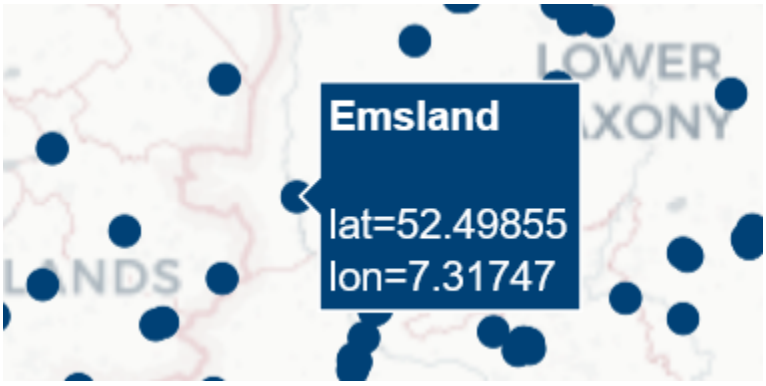
This is what the dashboard looks like when it is first opened. To browse and move the dashboard map, simply click and drag. You can also use the scroll function to zoom in or out of the map.

2.1 Select stations

The dashboard allows you to select stations for further inspection, such as plotting their time series or viewing their metadata. You can select stations using the map again.

2.1.1 Select a single station

Hovering over a station on the map will display its name and coordinates.



To select a station, simply left-click on it. The selected station will then be highlighted in orange and will remain in front of other unselected stations. Therefore, you will also see it in dense regions or when you zoom out again. If you want so select a different station you may just click on another station displayed on the map and it switches to the new selected station. You can deselect a station either by clicking the red 'x' next to its information or by clicking on it again on the map.

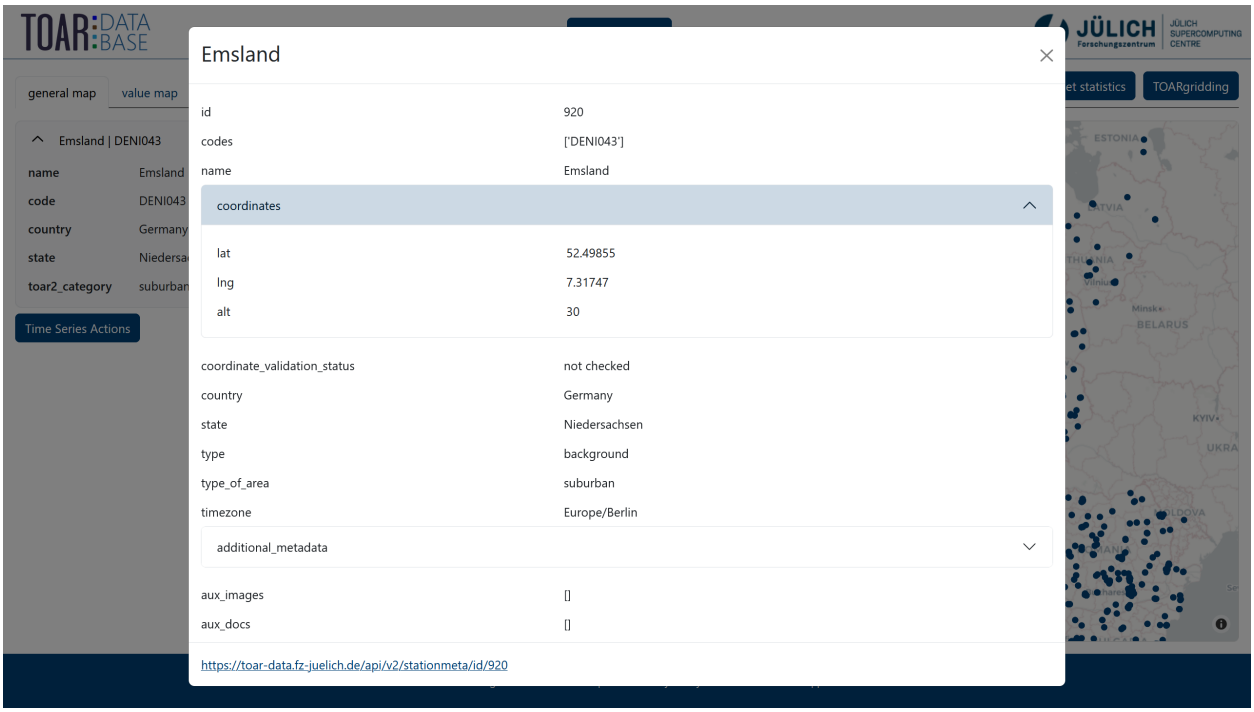
2.1.2 Inspect station metadata

Once you have selected a station, it appears on the left-hand side of the map. There, you can see the station name and the ***station codes***, which are separated by a '|' symbol.

However, you can also expand the station by clicking anywhere on its title.

There you will see more metadata about the station, such as the name, station code, country and state, as well as the ***toar2_category***. The ***toar2_category*** is a classification of the type of area of the station through a machine learning algorithm.

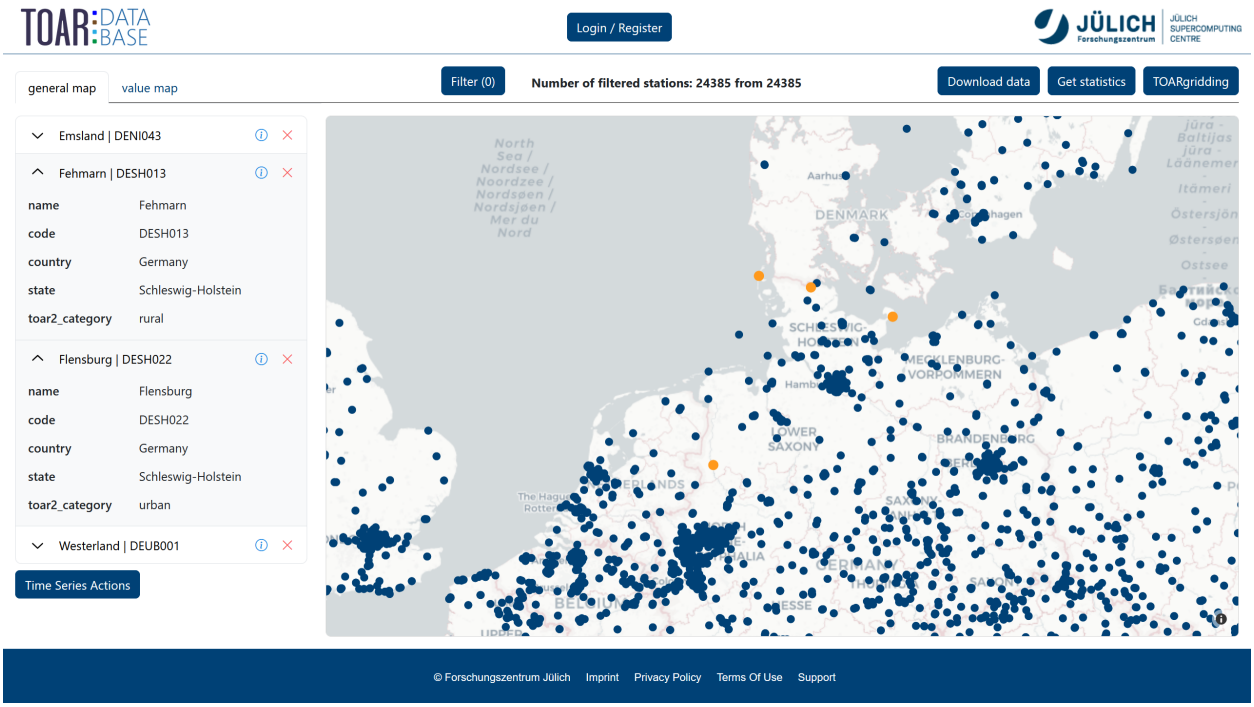
To see the full set of metadata we have for the station, click on the info icon next to the title. This opens a modal displaying the available metadata for this station.



In the bottom footer of the modal you also find a link to the API from which the metadata is received, in this case station 920: https://toar-data.fz-juelich.de/api/v2/stationmeta/id/920.

2.1.3 Select multiple stations

It is also possible to select multiple stations. To do so, press and hold the **CTRL** key on your keyboard while clicking on a dot on the map. If you do not hold down the CTRL key, you will only select the station that you have just clicked on, and any previously selected stations will be discarded. This adds stations to the left instead of replacing the previously selected ones. You can also discard a single station by clicking on the 'x'.



2.2 Save map screenshots

You will find the option to take a screenshot of the map in the top right corner of the map. Simply click on the photo icon to save the current display of the map in PNG format.


Download plot as a png

CHAPTER

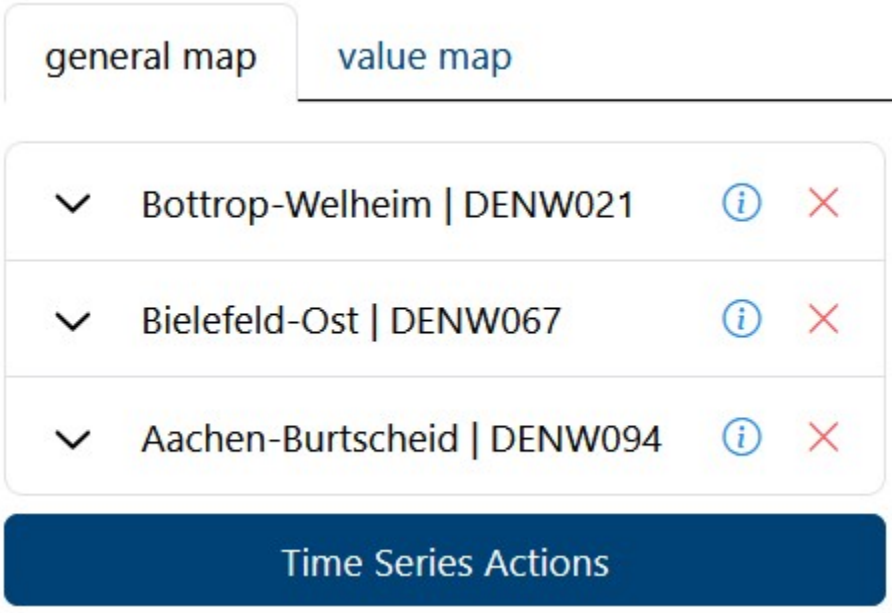
THREE

TIME SERIES ACTIONS

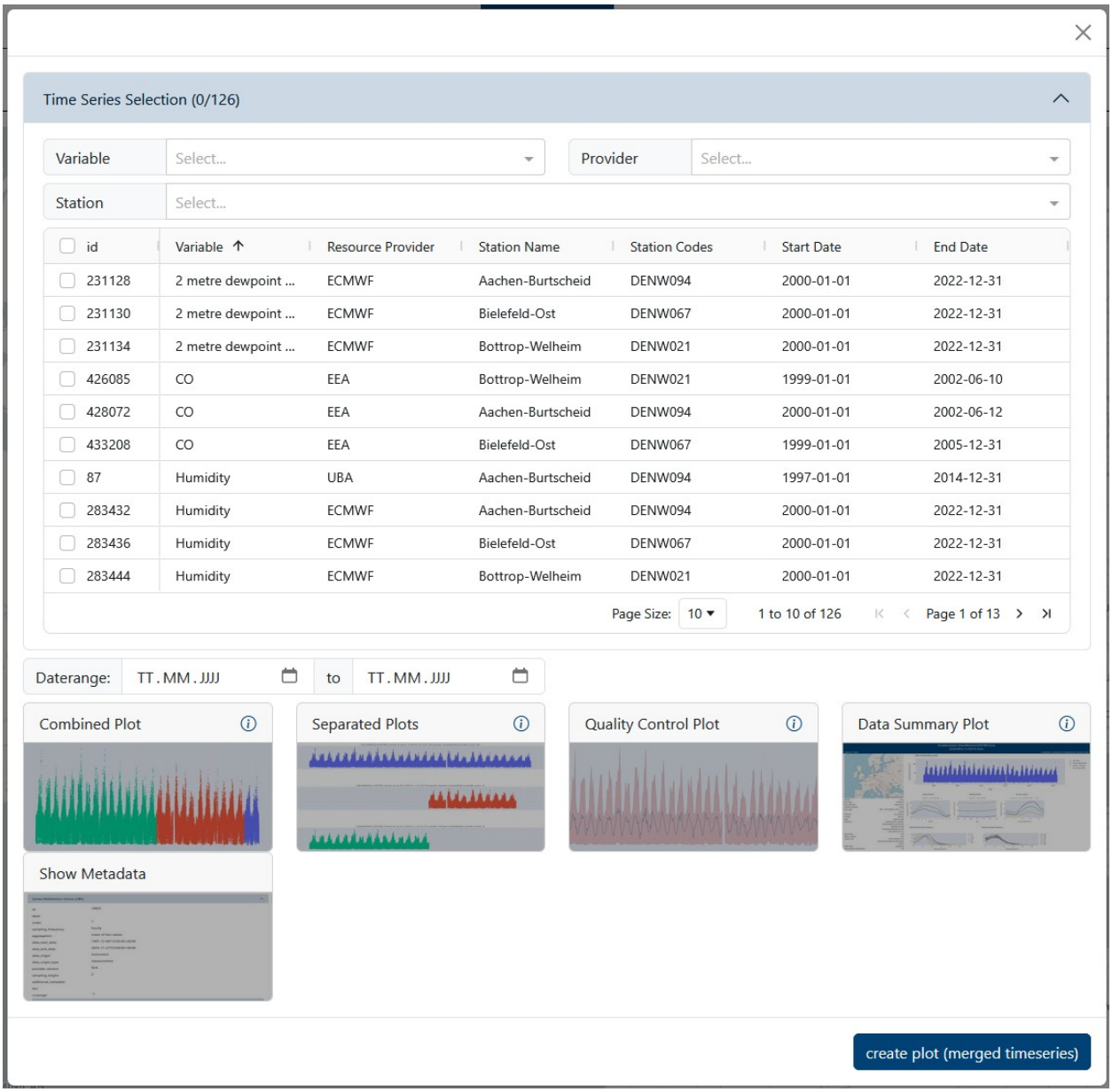
In the context of the TOAR-II dashboard, time series actions refer to operations you can perform with or on time series data, such as:

- **Plots**: display various types of data plots (e.g., ozone concentration over time).
- **Metadata**: Retrieve all information for the time series.

These actions are accessible via the dashboard's interface after you have selected specific stations (like the German stations "Bottrop-Welheim", "Bielefeld-Ost", and "Aachen-Burtscheid" shown in the next image).



After you have selected at least one station, the button "Time Series Actions" is available in the left column of the dashboard.



This window appears after you have selected specific stations and clicked “Time Series Actions.” Its purpose is to let you choose specific datasets to create a plot or retrieve their metadata.

3.1 The Data Table (Selection Area)

The main part of this popup is a table listing available data records for the stations you previously selected.

- **Checkboxes**: On the far left, there are checkboxes. You can click these to select specific datasets to include in your final graph.
- **Columns**:
  - **Variable**: Shows what is being measured (e.g., “2 metre dewpoint,” “CO” for Carbon Monoxide, “Humidity”). Note: While TOAR focuses on ozone, it aggregates various air quality and meteorological variables.

- **Resource Provider**: Shows where the data came from (e.g., ECMWF - European Centre for Medium-Range Weather Forecasts, EEA - European Environment Agency, UBA - German Environment Agency).
- **Station Name/Code**: Confirms the location of the data.
- **Start Date / End Date**: Shows the range of data availability for that specific record.

3.2 Top Filters

If there are too many rows (in the example, there are 126 total, but this page shows 10; you can browse through the pages with the arrow buttons), you can narrow down the list using the dropdowns at the top:

- **Variable**: Filter to show only specific pollutants (e.g., only “Ozone” or only “CO”).
- **Provider**: Filter to show data from a specific organization.
- **Station**: Filter to focus on a specific location if you want to ignore the others.

3.3 Daterange Filter

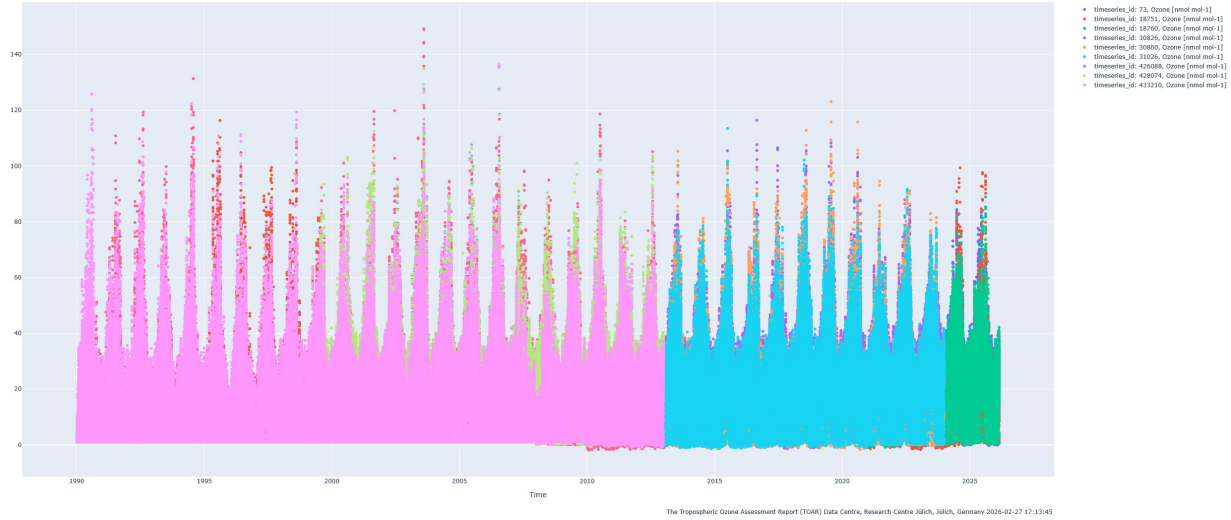
Below the table, there is a Daterange selector (Start date to End date).
This allows you to cut off the daterange. For example, if you only want to analyze data from 2020 to 2022, you would set those dates here.

3.4 Visualization Options (The “Plots”)

Below the date range, you see four preview thumbnails. These represent the different ways you can visualize the data.

3.4.1 Combined Plot

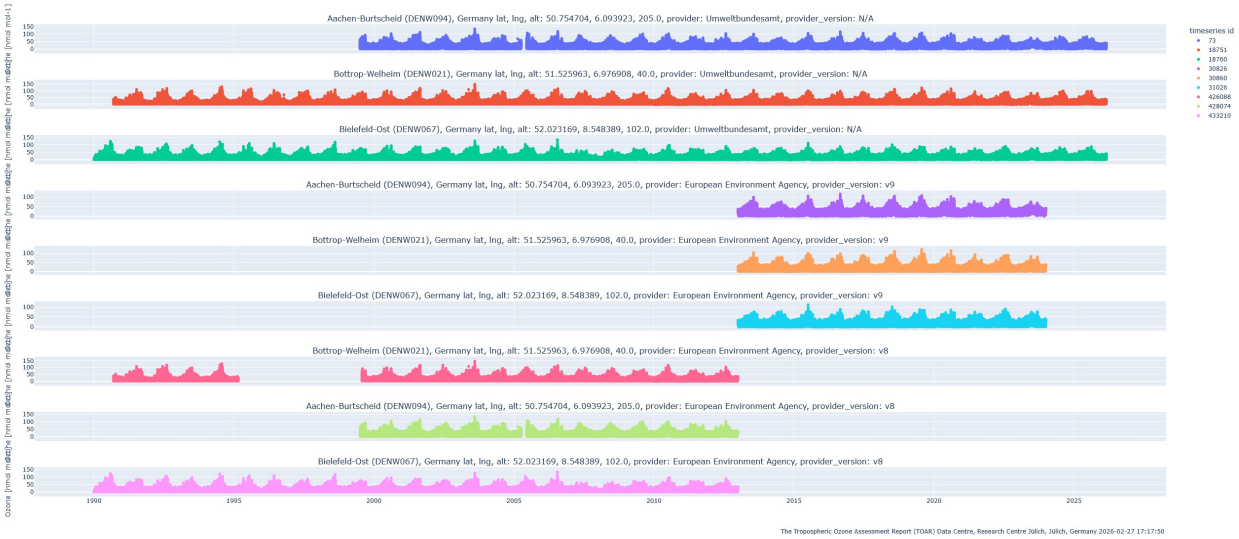
This overlays all selected data series on a single graph (good for comparing trends directly).



This plot is an interactive plot, which means that you can zoom in or watch the exact data values by hovering over a data point.

3.4.2 Separated Plots

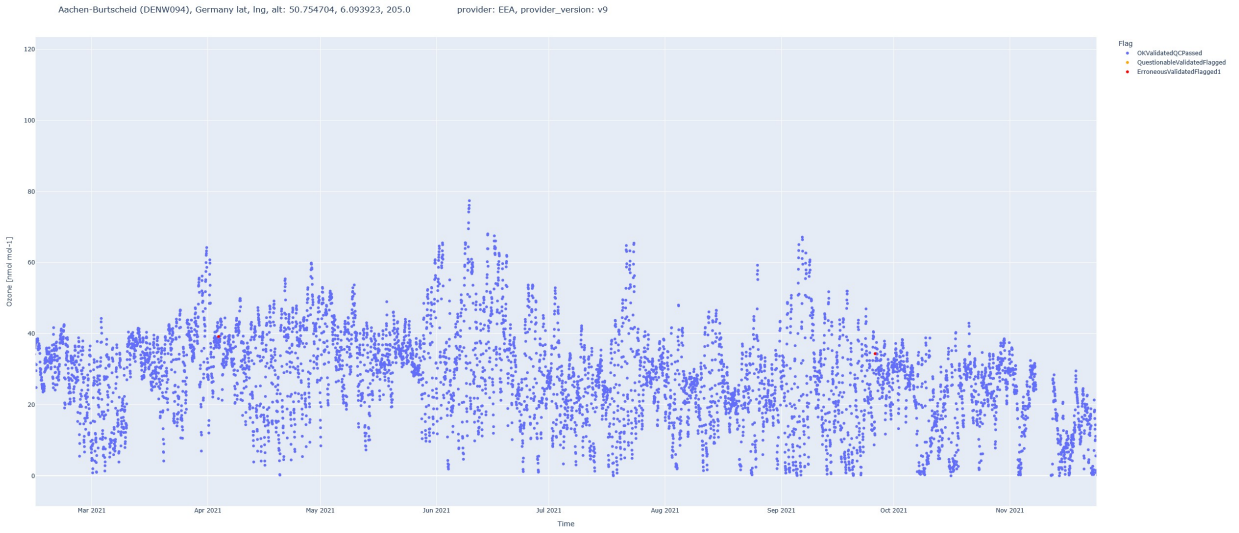
This stacks the data into separate horizontal rows (good if the values vary wildly in scale).



This plot is an interactive plot, which means that you can zoom in or watch the exact data values by hovering over a data point.

3.4.3 Quality Control Plot

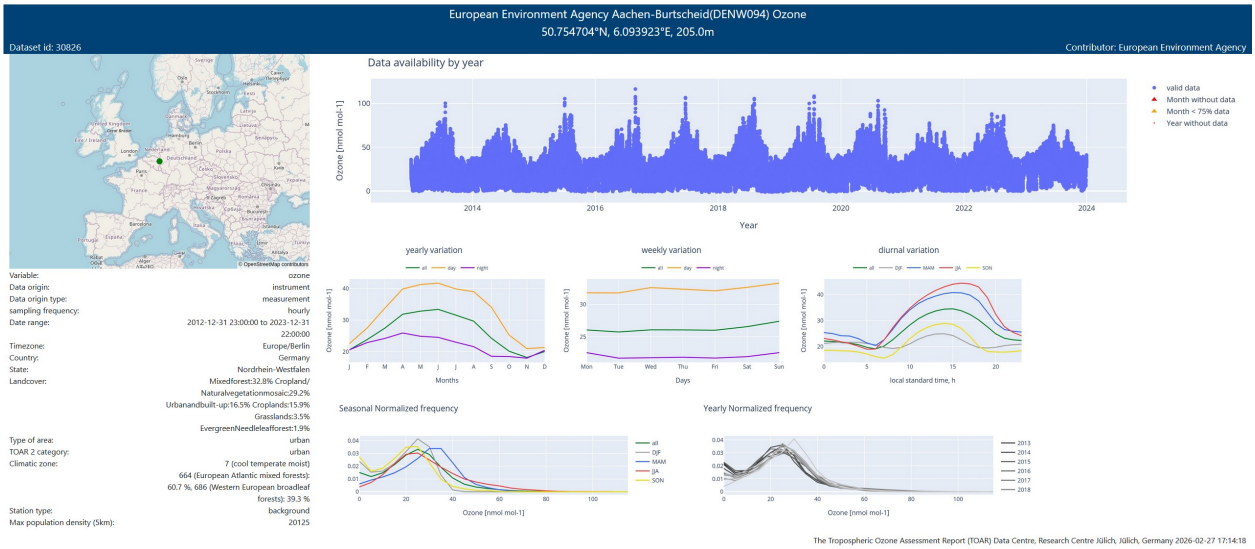
This visualizes the data accompagnied with its data quality flags (useful for checking if the data is reliable).



This plot is an interactive plot, which means that you can zoom in or watch the exact data values by hovering over a data point.

3.4.4 Data Summary Plot

This is a summary view, including a map and a statistical overview.



3.5 Special Action: Plot merged timeseries

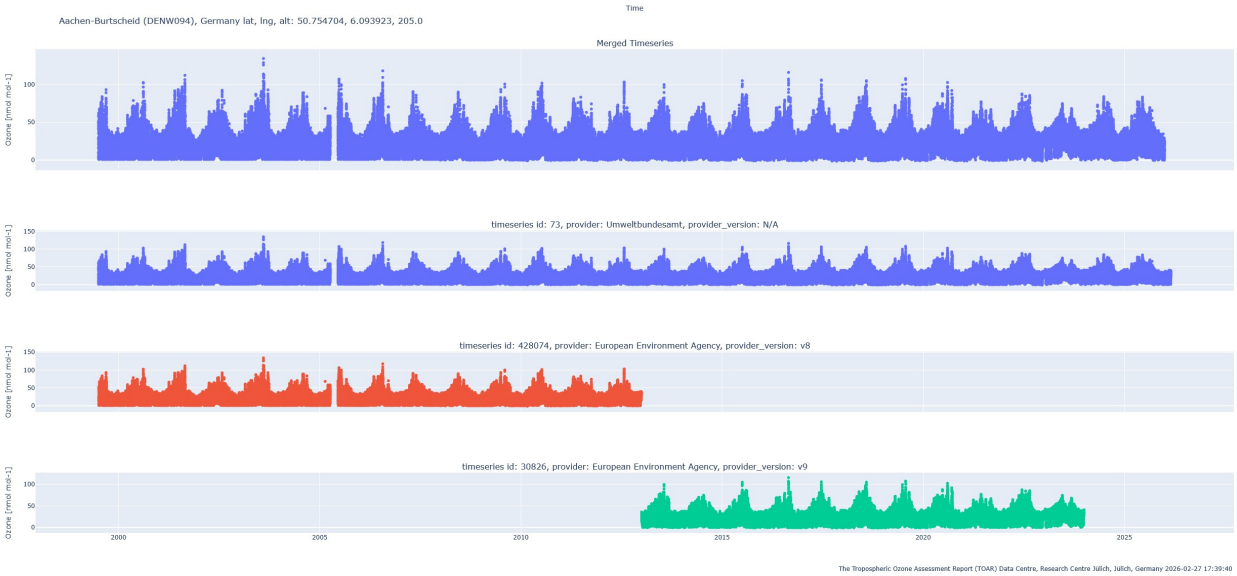
A merged time series is a composite time series generated from yearly statistics stored in a separate table of the database. It combines data from different providers at the same station to address gaps where no single provider offers continuous coverage.

The merging process follows these rules sequentially for each year:

1. Start with the provider having the highest order. If its coverage is 75%, use it.
2. If coverage is < 75%, check the next provider. If its coverage is at least 20% higher than the first, use the second provider.
3. Continue until a provider satisfies the condition or all are checked.

Note: The merging is only done on measured data. There will be no mix of measured and modelled data.

The result of the merging process can be visualized by the action button “create plot (merged timeseries)”.


Time
Aachen-Burtscheid (DENW094), Germany lat, lng, alt: 50.754704, 6.093923, 205.0
Merged Timeseries
Ozone [nmol mol-1]
timeseries id: 73, provider: Umweltbundesamt, provider_version: N/A
timeseries id: 428074, provider: European Environment Agency, provider_version: v8
timeseries id: 30826, provider: European Environment Agency, provider_version: v9
2000
2005
2010
2015
2020
2025
The Tropospheric Ozone Assessment Report (TOAR) Data Centre, Research Centre Jülich, Jülich, Germany 2026-02-27 17:39:40

CHAPTER

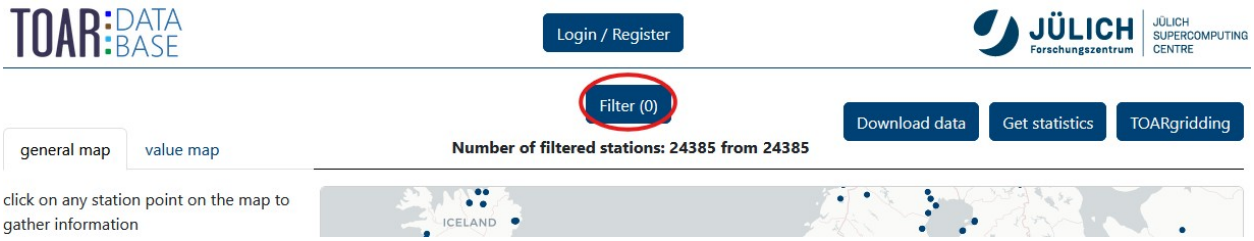
FOUR

FILTERING

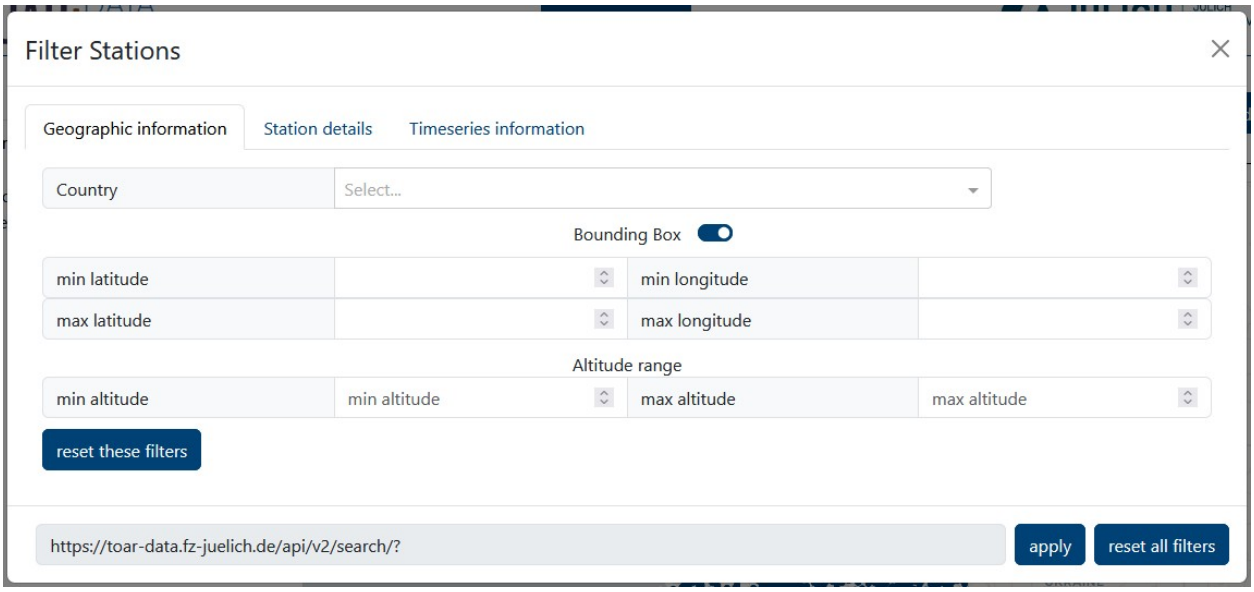
The TOAR-II dashboard is the easiest way to access TOAR data. It offers a powerful and comfortable graphical user interface with rich filtering. Filtering is helpful for the following reasons:

- **Retrieving Specific Data**: It allows users to retrieve specific data from the TOAR database rather than processing the entire dataset (e.g., filtering by country, region, or variables).
- **Resource Management**: Accessing TOAR services consumes considerable resources. Filtering reduces the number of timeseries processed in one request and allows them to fit within he boundaries of the TOAR User Concept.

To filter the data shown in the dashboard, click on the “Filter(0)” button in the centre top of the dashboard



The number of filters currently in use is indicated in brackets after the word ‘Filters’. All filter functions are also available via the pop-ups ‘Download data’, ‘Get statistics’ and ‘TOARgridding’, since different user roles (anonymous user, registered user, TOAR user and power user) are associated with different restrictions and permissions (see ‘Registration’), and some calculations should be divided into smaller subtasks for performance reasons.



You can filter in the TOAR-II Dashboard using

- **Geographic information**
- **Station details**
- **Timeseries information**

With the tabs of the filter modal, the user can switch between three different categories of filters.

4.1 General use

4.1.1 The API URL

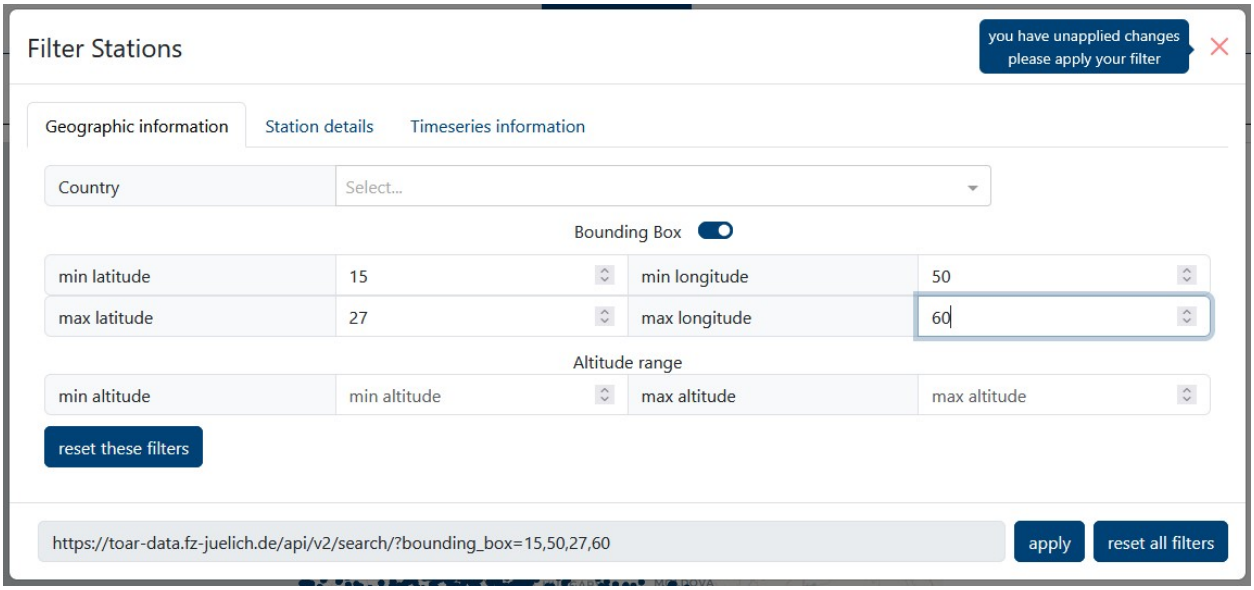
At the very bottom left, there is a text field displaying a URL: https://toar-data.fz-juelich.de/api/v2/search/? This indicates that the dashboard is built on a web API. As you change the filters, this URL updates in real-time to reflect the search query. This is useful for developers who want to programmatically access the data rather than just using the visual interface.

4.1.2 Action Buttons

- **reset these filters**: Clears the current settings in this specific tab.
- **apply**: This is the primary button to submit your search. Clicking this updates the main map to show only the stations matching the filter criteria.
- **reset all filters**: A global button to clear every filter in the entire dashboard session.

You cannot close the popup, if you have unapplied changes to the filters. To be able to close the popup, either apply your changes or go back to the previous filtering step.

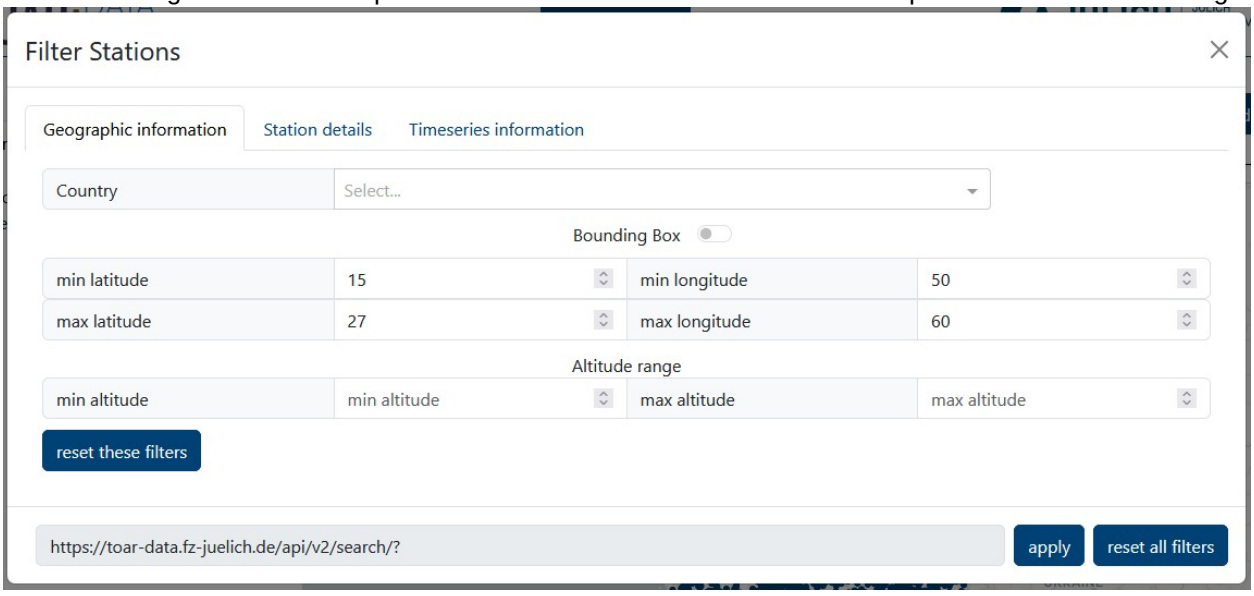
4.2 Geographic information



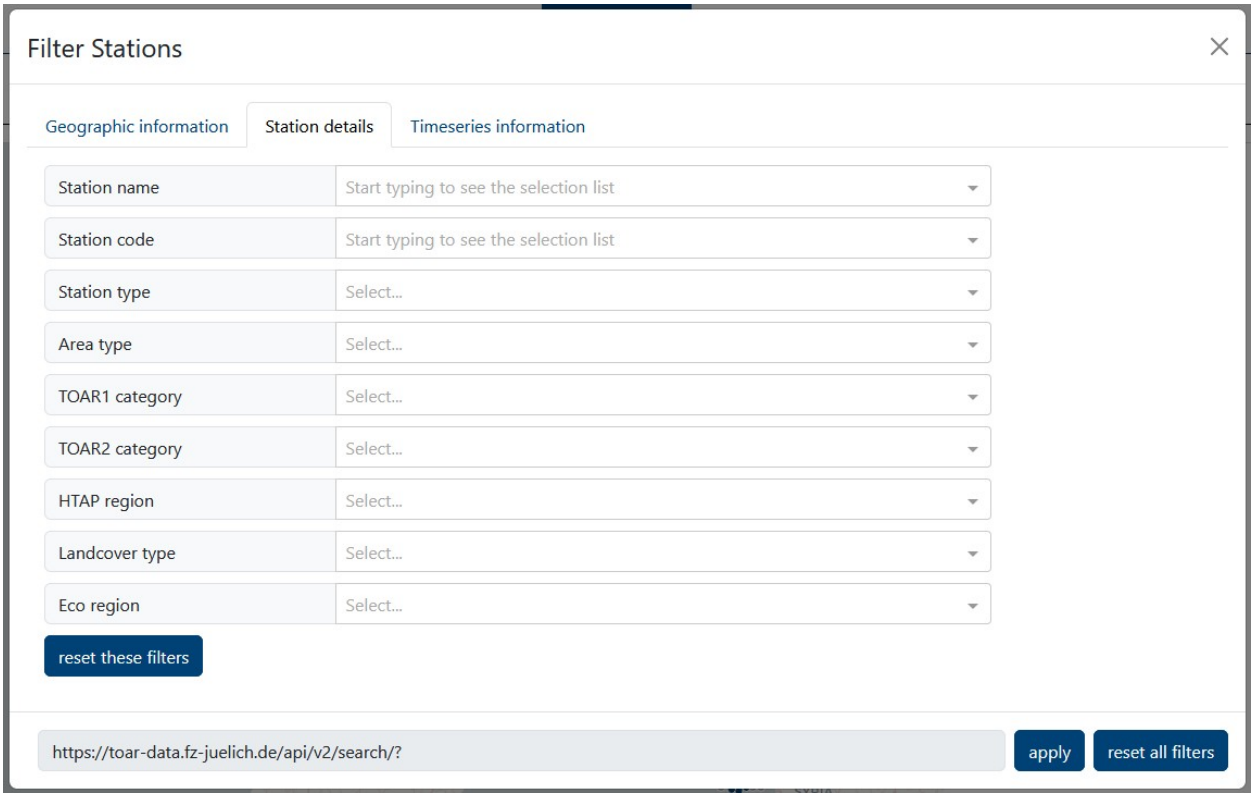
There are three main ways to define a location:

- **Country**: A dropdown menu to select a specific country (currently showing “Select. . . ” as no countries have been selected).
- **Bounding Box**: This defines a rectangular area on the map using coordinates. In the screenshot, specific numbers are entered: min latitude (15) to max latitude (27): This covers roughly a 12 degree corridor up to the Persian Gulf. min longitude (50) to max longitude (60): This covers a band across the Middle East.
- **Altitude range**: This allows filtering stations by elevation

The bounding box switch allows to deactivate the “Bounding Box” for the filtering but keep the inserted values for possible later usage:



4.3 Station details



This tab allows you to filter the database based on specific characteristics of the monitoring sites rather than their location.

4.3.1 Search by Specific Identity

If you are looking for a specific station you already know about, start at the top:

- **Station name**: Type the name of the city or facility into the box. A dropdown list will appear as you type ("Start typing to see the selection list").
- **Station code**: Enter the specific alphanumeric code assigned to the station (e.g., a GAW or EMEP code).

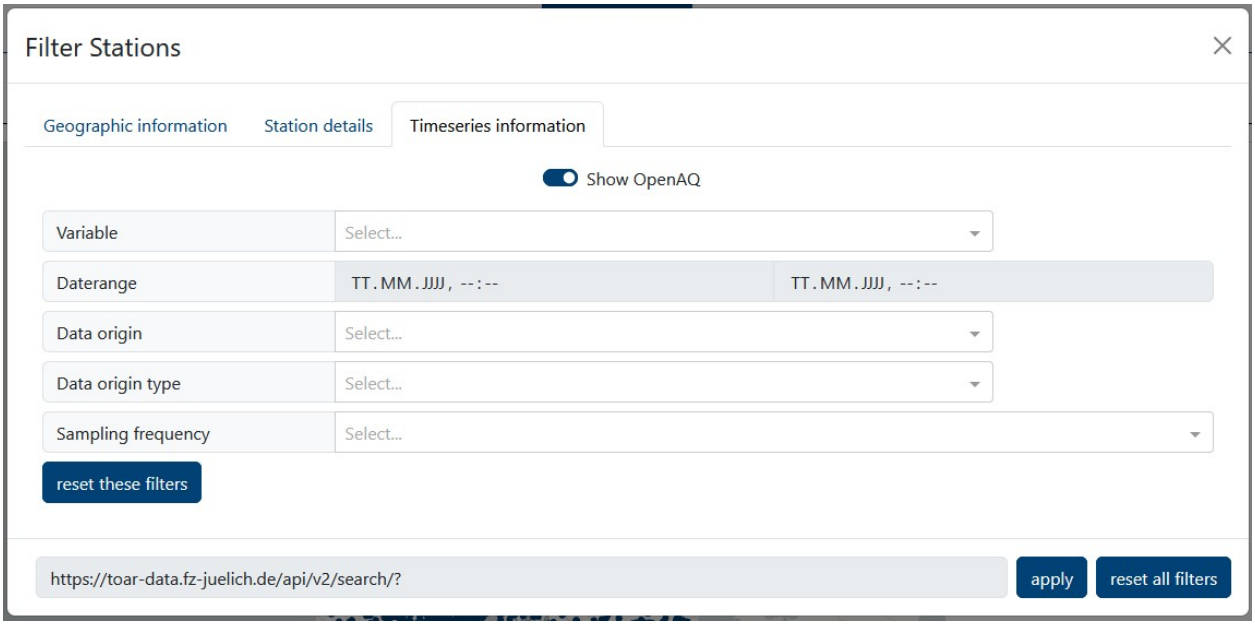
4.3.2 Filter by General Characteristics

If you are looking for general types of data, scroll down and use these dropdown menus:

- **Station type**: Select the general classification of the station (e.g., Background, industrial, traffic).
- **Area type**: Further refine the location context (e.g., rural, urban) as classified by the data provider. This has a limited availability.
- **TOAR1 category**: historical category from TOAR phase 1. Only available for some stations (urban, suburban or rural)
- **TOAR2 category**: categorization of stations based on a machine learning algorithm (urban, suburban or rural)

- **HTAP region**: Geographical region according to the Hemispheric Transport of Air Pollution
- **Landcover type**: Filter based on the surrounding land usage (e.g., Forest, Grassland, Urban).
- **Eco region**: Select a specific ecological region to find stations within that biome.

4.4 Timeseries information



This tab allows you to filter the database based on the data content itself—specifically, what is being measured, when it was measured, and how it was collected—rather than where the station is located or what its name is.

4.4.1 Toggle OpenAQ Data

At the very top, there is a toggle switch labeled “Show OpenAQ”. Click this switch to include or exclude data from the OpenAQ network (a global open database of air quality data). If you turn it off, the search will only look at TOAR’s curated data; if it is on, it will also include the OpenAQ dataset.

4.4.2 Select the Variable

Variable: Use this dropdown to select the specific pollutant or gas you are interested in (e.g., Ozone, Carbon Monoxide, Nitrogen Dioxide) or meterological quantity like wind speed or direction.

4.4.3 Set the Time Period

Daterange: This section allows you to filter for specific timeframes. You see two input fields (indicated by the placeholder text TT.MM.JJJJ).
Click the first box to set a Start Date.
Click the second box to set an End Date.
Only stations that have data covering this specific period will appear in your results.

4.4.4 Filter by Data Source

Data origin: Select the name of the numerical model or instrument ('Instrument' (for all kinds of measurements), 'COSMOREA6', and 'ERA5')
Data origin type: Select the type of data origin (measurement vs. model). By default both type are served.

4.4.5 Filter by Sampling Frequency

Sampling frequency: This dropdown allows you to choose how often the measurements are taken. You might select options like "Hourly," "Daily," or "Weekly". The TOAR data commonly used in publications are hourly values.

4.5 Restoring a filtering

For logged in users, the history of applied filters can be found in the *profile*.

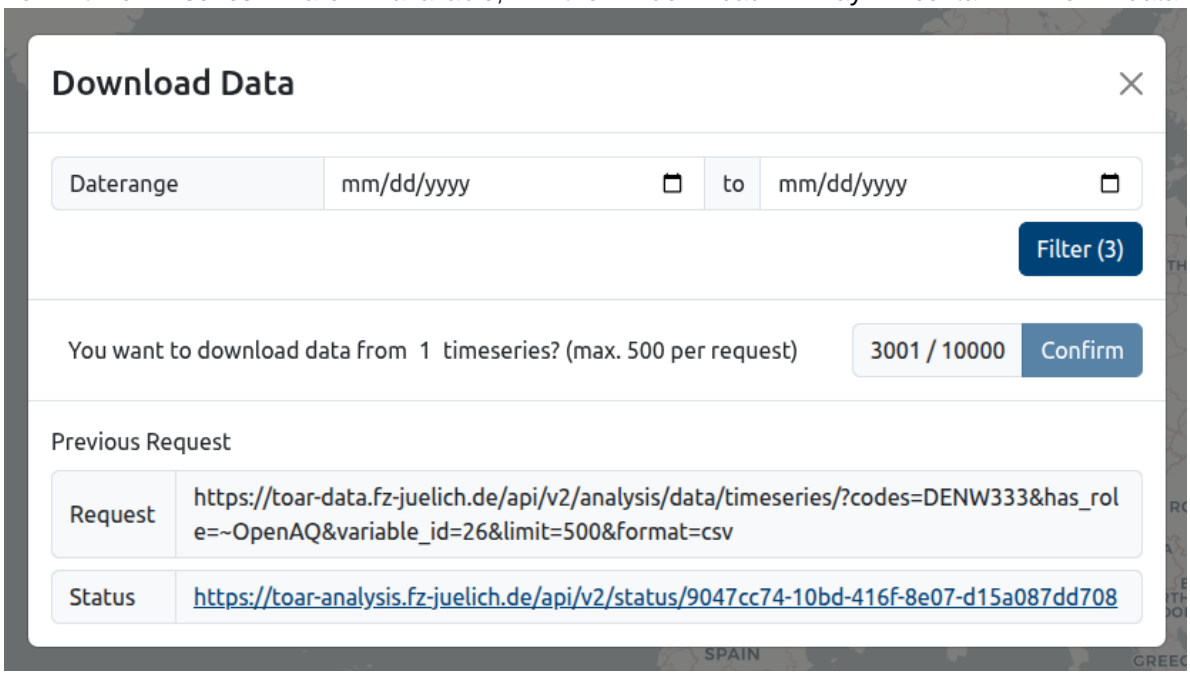
CHAPTER

FIVE

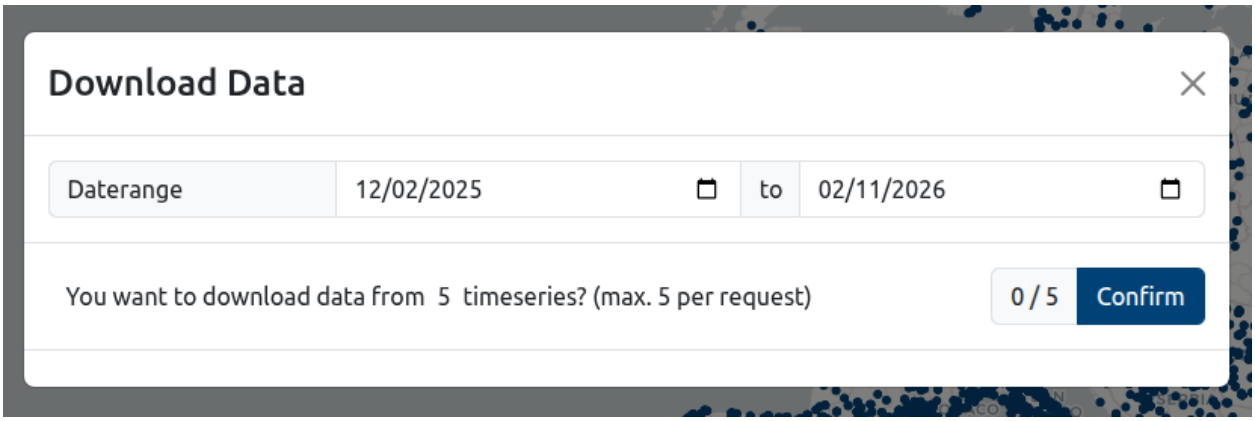
DOWNLOAD DATA

To download data using the TOAR Dashboard:

1. Use the filter options to select your desired stations, variables.
2. Click “apply” to display matching stations and close the window. A number is added to the filter button to indicate how many filter options have been selected.
3. Open the download modal by clicking on “Download data”.
4. Select a date range (optional, but recommended) and then press ‘Confirm’ if you are sure about the request. The link next to “Status” will be updated according to your most recent request.
5. Click the status link to save a ZIP file to your local machine. If no time series are available, the download may contain no data.



Note: Anonymous users are limited to 5 time series per download. If there are more than 5 time series available, the 5 time series are chosen randomly. Registered users get higher limits (see “Data Access” section for user roles). To register and increase your download limit, please follow the steps described here: https://toar-data.fz-juelich.de/sphinx/TOAR_UG_Vol07_Dashboard_Guide/build/html/registration.html



For larger/bulk downloads, use the REST API instead (e.g., https://toar-data.fz-juelich.de/api/v2/data/timeseries/18763?format=csv).

CHAPTER

SIX

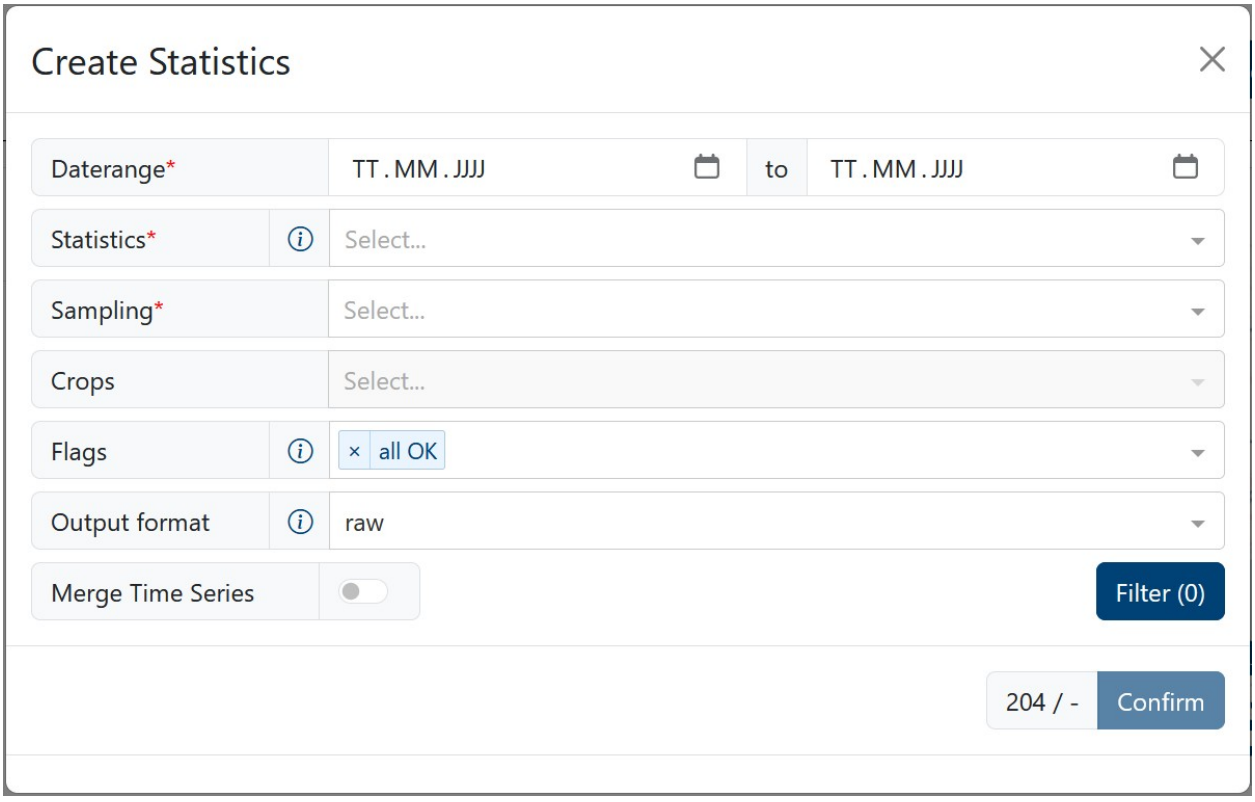
ANALYSIS SERVICE (GET STATISTICS)

6.1 Access for anonymous users

Anonymous user can only download an example dataset.

6.2 Using the Analysis Service

Clicking on ‘Get statistics’ shows the following window for a logged in user (role: power user):



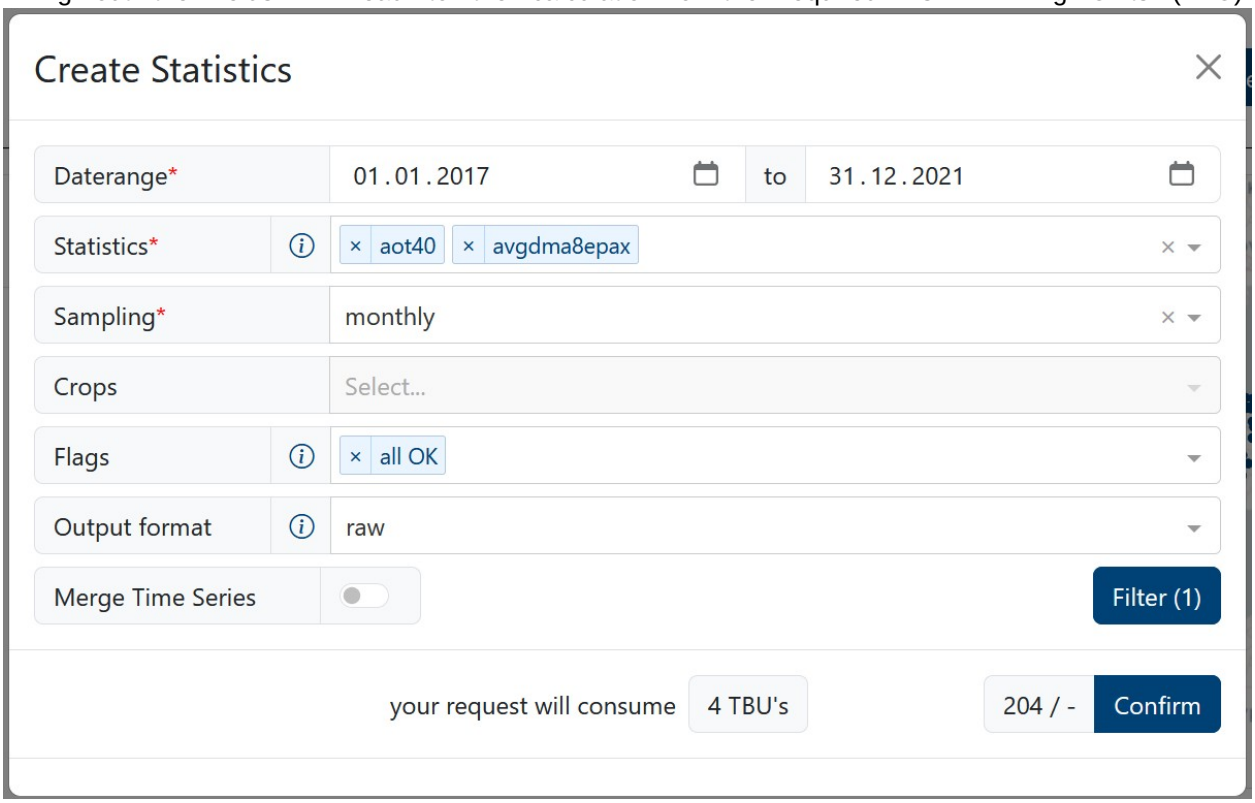
Here, you need to select the required parameters. Starting with the **Daterange** by providing start and end day, a **Statistics** for the analysis and a **Sampling** strategy (e. g. daily, monthly, yearly). For more details on the possible statistical analysis click the little ‘i’ to be redirected to the documentation.
The **Crops** field will only be active, if the **Sampling** ‘vegseason’ has been chosen.

There are also optional parameters.
The **Flags** field refers to the data quality flags. We use 'all OK' as a default value, which request our internal quality checks to be passed for each value. For more details you can simply click the little 'i' to open the documentation in a separate tab of your browser. Different output formats are available for the users' convenience. You can choose between 'raw' and 'by_statistic' by selecting this from the dropdown of **Output format**. The default is 'raw'. For more details on the possible output formats click the little 'i' to be redirected to the documentation.

The ***Merge Time Series*** option: The timeseries at a single station are merged into a single timeseries before the statistical analysis is done.
As described in the technical guide on data processing Chapter Three: The TOAR data processing workflow[1], a station can have several timeseries, including two or more timeseries for the same variable. This can be the case for different instruments measuring the same variables or through a timeseries being distributed over different networks, like national and European institutions.

To filter the data used in the calculation, click on the 'Filter (0)' button. This opens the same 'Filter' modal as if it had been invoked from the centre of the top of the dashboard (see *Filtering*). The number of currently active filters is indicated in brackets after the word 'Filters'. Filtering is useful for limiting the amount of data used in the analysis, since different user roles (anonymous user, registered user, TOAR user and power user) are associated with different restrictions and permissions (see *Registration*), and some calculations should be divided into smaller subtasks for performance reasons.

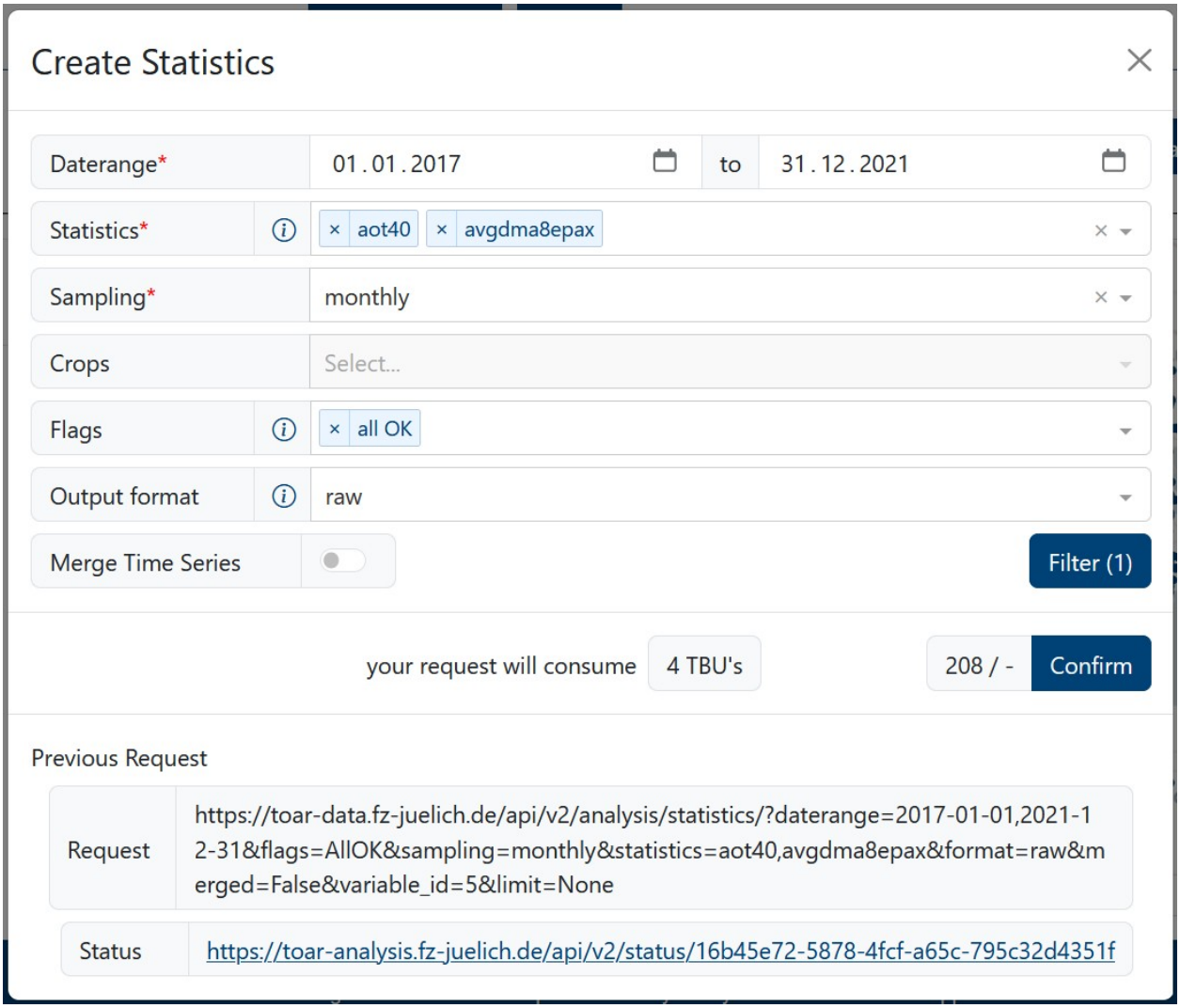
Filling out the fields will lead to the calculation of the required TOAR Billing Units (TBU):



The bottom row gives an information on the size of this request, the monthly limits and the ***Confirm*** button to submit the request. The TBU fields have mouse over tool tips providing more details on the billing.

After submitting the request, the query for the request will be displayed in an extension of the previous win-

[1] https://toar-data.fz-juelich.de/sphinx/TOAR_TG_Vol02_Data_Processing/build/latex/toardataprocessing--technicalguide.pdf



dow.

The request can be used by developers who want to programmatically access the data rather than just using the visual interface. The results of the request can be accessed through the clickable status link. This link is also stored in the user profile of the dashboard.

The status is the result of the underling service and served in JSON format. Opening the link will display the content and give information on the status of the job. As soon as the processing is finished, it will redirect to the download of the results.


```
{"task_id":"16b45e72-5878-4fcf-a65c-795c32d4351f",
 "status":"https://toar-analysis.fz-juelich.de/api/v2/status/16b45e72-5878-4fcf-a65c-795c32d4351f"}
```

6.3 Filtering for the Analysis Service

The details on the filtering have been described in a *previous section*. We pass all filters as additional metadata.

6.4 Resulting datasets

The resulting datasets are provided as an zip-archive containing csv-files. The metadata of the dataset include a large number of information, including the used requests and filtered metadata.

6.5 Additional Resource:

We offer toarstats as a project on our gitlab[2]. It can be used as an offline package.

[2] https://gitlab.jsc.fz-juelich.de/esde/toar-public/toarstats

CHAPTER

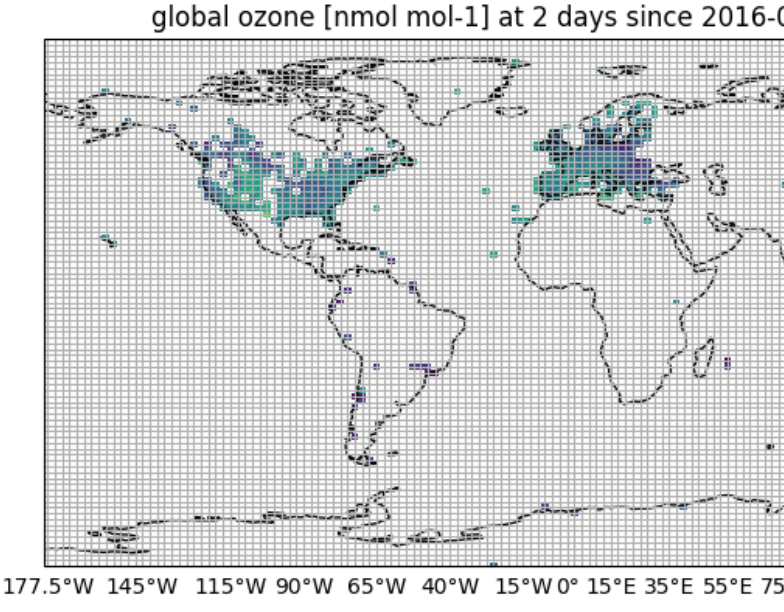
SEVEN

TOARGRIDDING

The TOARgridding projects data from the TOAR-II database[3] onto a grid. The user can select the

- variable,
- statistical aggregation,
- time period,
- rectangular lat-lon grid of custom resolution,
- and (optional) filtering according to the station metadata. The results of the gridding are provided in netCDF format and easy to use for example with python's xarray[4] for subsequent processing and visualization by the user.

A possible visualization of a time point can look like this:



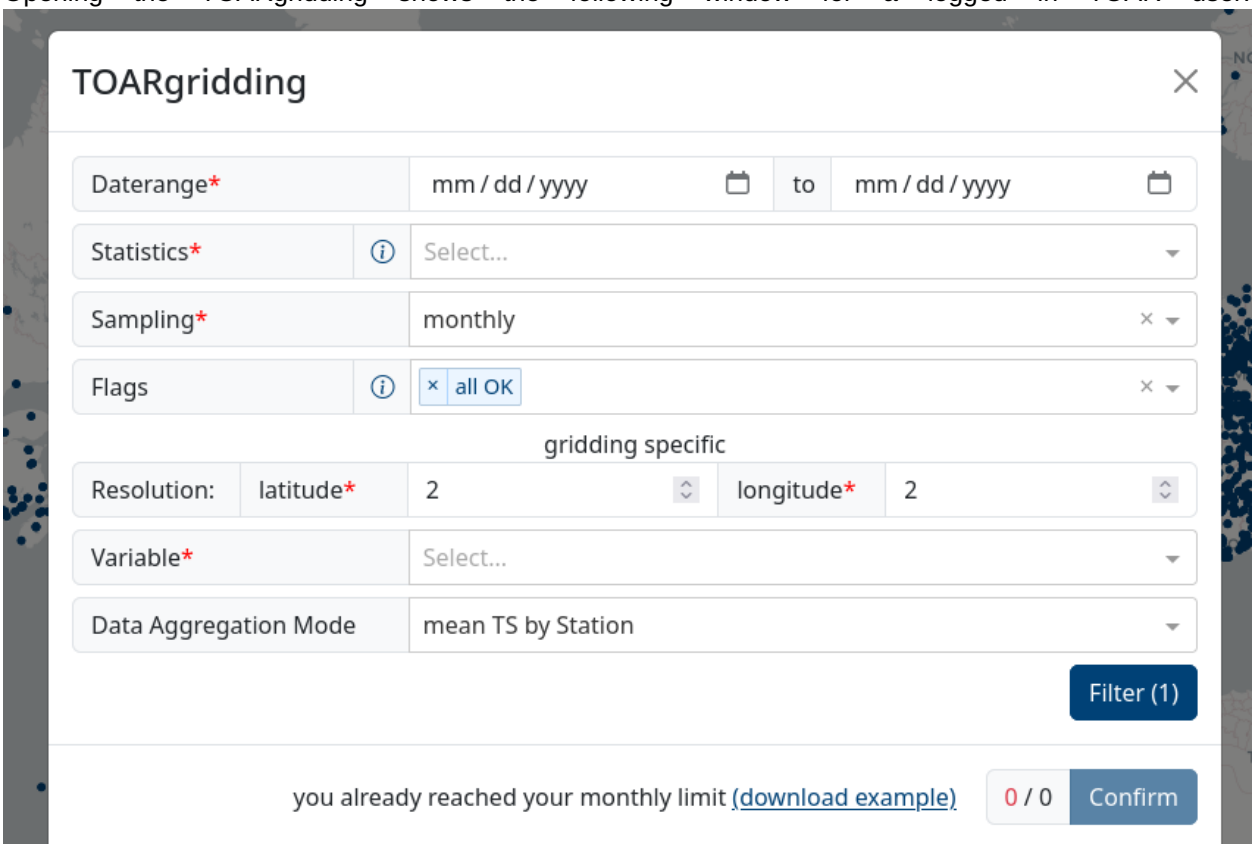
[3] https://toar-data.fz-juelich.de/
[4] https://docs.xarray.dev/en/stable/generated/xarray.Dataset.html

7.1 Access for anonymous users

Anonymous user can only download an example dataset.

7.2 Using TOARgridding

Opening the TOARgridding shows the following window for a logged in TOAR user:



Here, you need to select the required parameters. Starting with the **daterange** by providing start and end day, a **statistics** for the analysis and one of the three **sampling** strategies (daily, monthly, yearly). For more details on the possible statistical analysis click the little “i” to be redirected to the documentation.

The **Flags** field refers to the data quality flags. We use “all OK” as a default value, which request our internal quality checks to be passed for each value. For more details you can simply click the little “i” to open the documentation in a separate tab of your browser.

The gridded products always cover the full Earth divided by regular lat-lon grid. You can select the **resolution for latitude and longitude** in floating point numbers. The little arrows at the fields allow to change the resolutions in 1° steps. Typing allows the selection of floating point numbers. The gridding might afterwards slightly change the resolution to achieve equidistant grid cell sizes in both directions. For example a resolution of 1.9° for the latitude will create 95 cells with a resolution of about 1.89°.

The **variable** allows to select any of the variables stored within the TOAR-II database. Please be reminded that not all stations have a timeseries for each variable.

The **data aggregation mode** offers three choices for the processing of the timeseries data at a single station before creating the gridded product:

- no aggregation

- mean TS by station
- merged TS

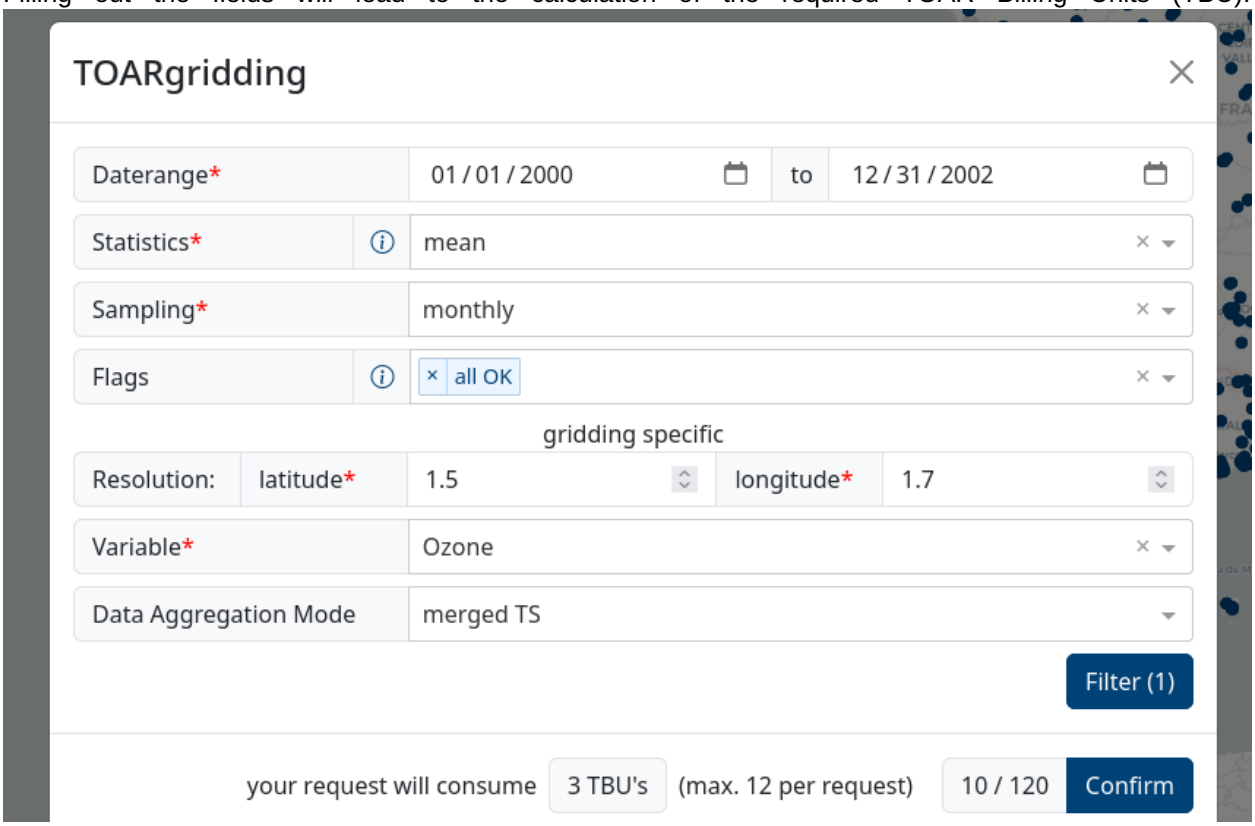
As described in the technical guide on data processing Chapter Three: The TOAR data processing workflow[5], a station can have several timeseries, include two or more timeseries for the same variable. This can be the case for different instruments measuring the same variables or through a timeseries being distributed over different networks, like national and European institutions.

The gridding always calculates the mean for all values within a grid cell. Having more than one timeseries located at a station can lead to an imbalance in the statistical weights. The option ***mean TS by station*** takes the results of the analysis service and calculates the mean value for all time series at a single station. The ***merged TS*** option does it the other way around: The timeseries at a single station are merged into a single timeseries before the statistical analysis is done.

Please be aware, that not all combinations of sampling, statistics and data aggregation mode create useful quantities.

To filter the data used in the calculation, click on the 'Filter (1)' button.
This opens the same 'Filter' modal as if it had been invoked from the centre of the top of the dashboard (see 'Filtering').
The number of currently active filters is indicated in brackets after the word 'Filters'. Filtering is useful for limiting the amount of data used in gridding, since different user roles (anonymous user, registered user, TOAR user and power user) are associated with different restrictions and permissions (see 'Registration'), and some calculations should be divided into smaller subtasks for performance reasons.

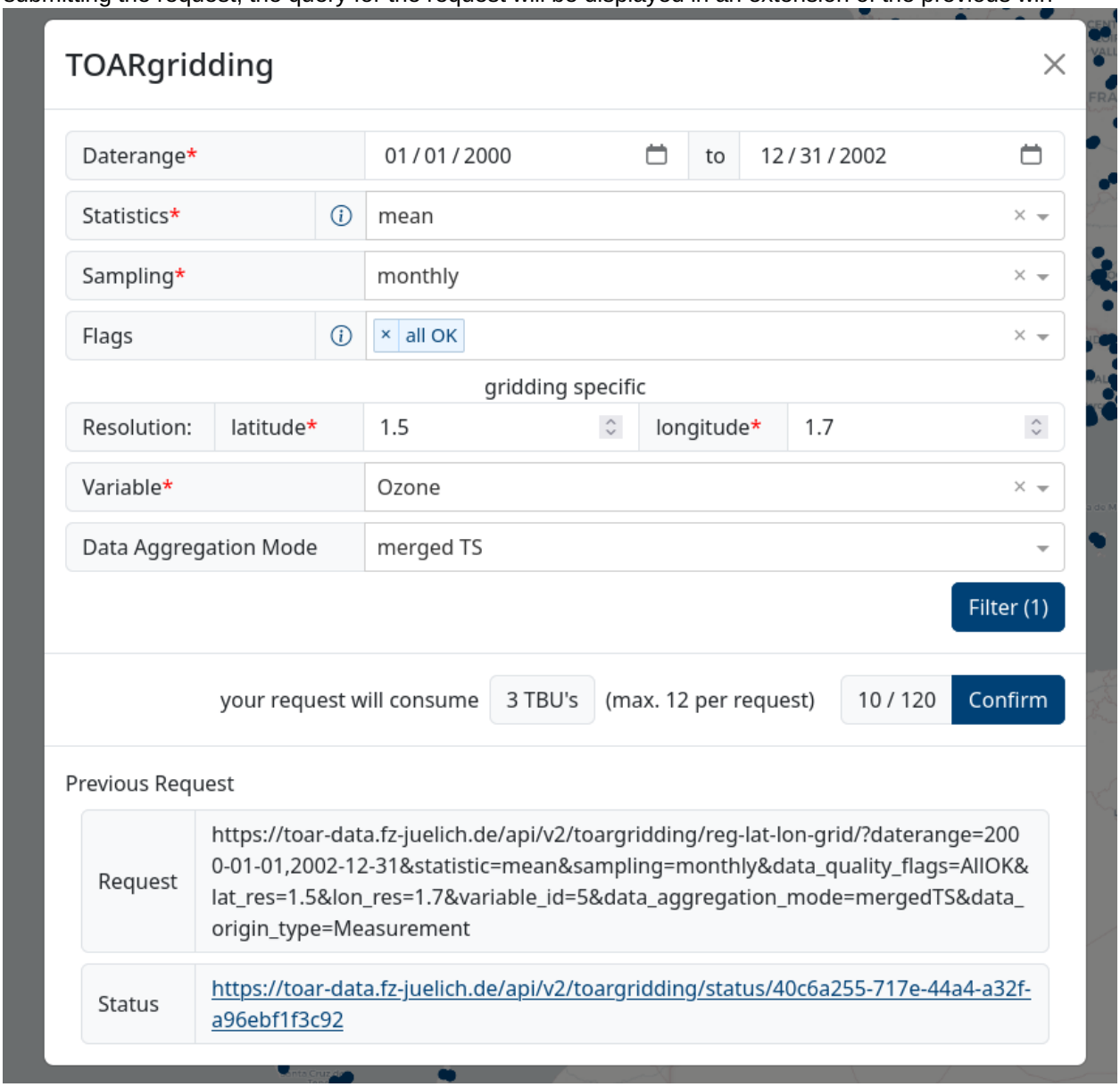
Filling out the fields will lead to the calculation of the required TOAR Billing Units (TBU):



The bottom row gives an information on the size of this request, the monthly limits and the ***confirm*** button to submit the request. The TBU fields have mouse over tool tips providing more details on the billing.

[5] https://toar-data.fz-juelich.de/sphinx/TOAR_TG_Vol02_Data_Processing/build/latex/toardataprocessing--technicalguide.pdf

After submitting the request, the query for the request will be displayed in an extension of the previous window.



The request can be used by developers who want to programmatically access the data rather than just using the visual interface. The results of the request can be accessed through the clickable status link. This link is also stored in the user profile of the dashboard.

The status is the result of the underling service and served in JSON format. Opening the link will display the content and give information on the status of the job. As soon as the processing is finished, it will redirect to the download of the results.

```
task_id:      "21eec253-e633-4e9b-8dce-4572933e5601"
status:       "https://toar-data.fz-juelich.de/api/v2/toargridding/status/21eec253-e633-4e9b-8dce-4572933e5601"
task_status:  "RUNNING"
▼ info:
    info:     "try: 4, wait_time: 60"
help:         "Please wait a moment and call the status link (update interval: 1min). It will redirect to the download as soon as the job is finished. See info for progress on data retrieval from analysis service."
```


7.3 Filtering for TOARGridding

The details on the filtering have been described in a *previous section*. We pass all filters as additional metadata. It is important to note, that TOARgridding ignores filters that conflict with its own required parameters, e.g. selecting variables in the “filter stations” is ignored. The same is true for the daterange.

One important filter we wish to highlight is the ***data origin type***, which can be either model, measurement or both. The default value is both. There is also a limited number of timeseries that provide modeled TROPESS[6] values for ozone. On the other hand other timeseries contain ERA5 data. We strongly recommend to explicitly set this filter.

7.4 Resulting datasets

The resulting datasets are provided in netCDF following the CF-convention. The metadata of the dataset include a large number of information, including the used requests and filtered metadata.

One important point are the contributors, which are provided through a link. This contains a list of all programs, institutions and persons contributing to this data product.

7.5 Additional Resource:

We offer TOARgridding as a project on our gitlab[7]. It can be used as an offline package. This still requires access to the TOAR database for downloading the required statistical aggregates through the analysis service.

The documentation of the REST interface can be found at here[8].

[6] https://disc.gsfc.nasa.gov/datasets/TRPSCRO32H2D_1/summary
[7] https://gitlab.jsc.fz-juelich.de/esde/toar-public/toargridding
[8] https://toar-data.fz-juelich.de/api/v2/toargridding/

CHAPTER

EIGHT

SUPPORT WITH AI

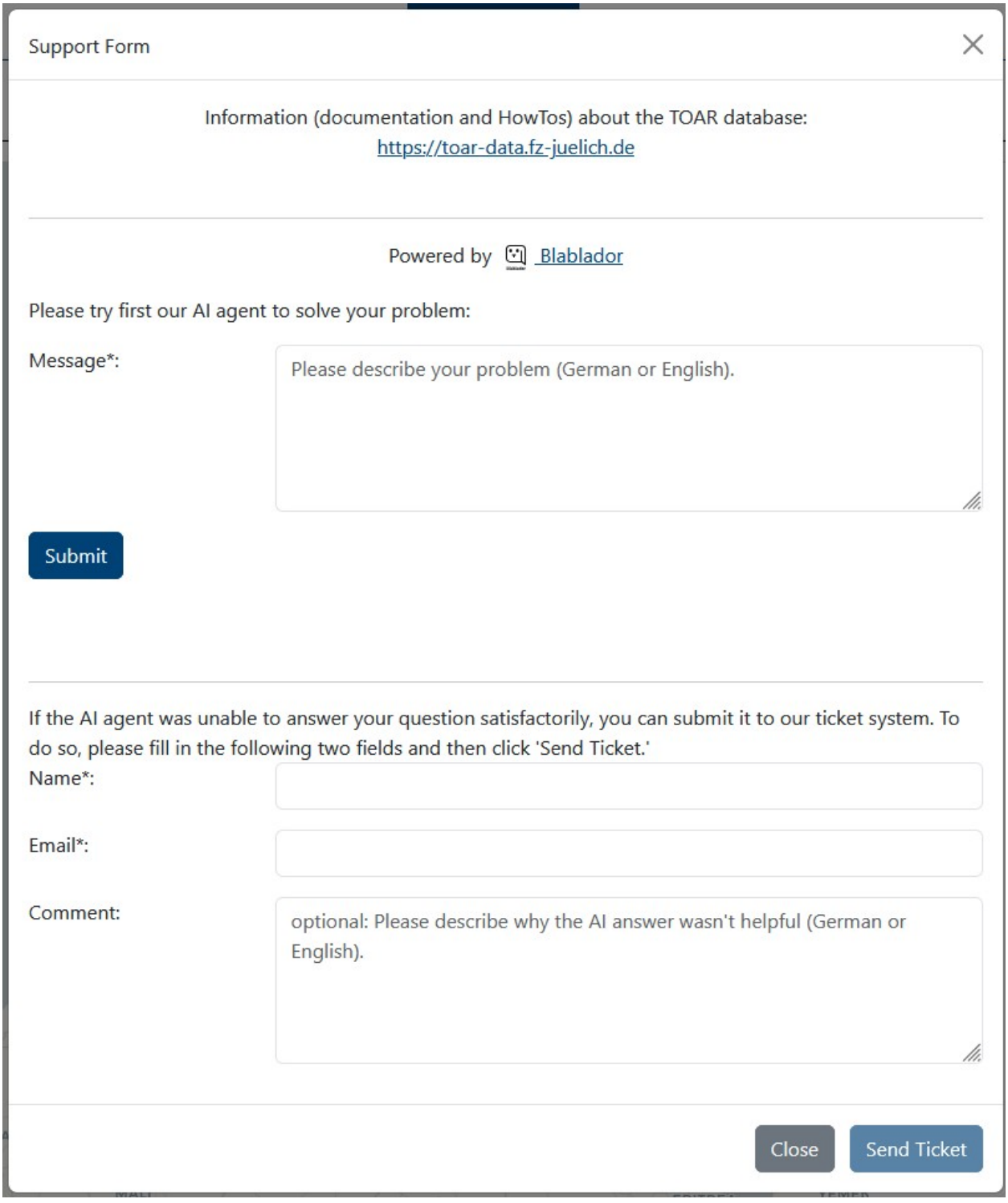
8.1 Overview

Welcome to the **next generation of user support** within the TOAR Data Dashboard. We've transformed the traditional "contact us" experience into a seamless, intelligent, and efficient interaction flow. Integrated directly into the dashboard footer, our **Smart Support Modal** ensures that help is always just one click away—without ever disrupting your workflow.

8.2 How to Use It

The support workflow is designed for speed and clarity. It guides users through a logical progression: **AI Assistance** → **Ticket Submission**.

1. **Access Support**:
    - Look at the dashboard footer. Click the **"Support"** link to instantly open the modal overlay.



2. **AI-Powered Inquiry (Step 1)**:
    - Enter your question in the **Message** field.
    - Click the **“Submit”** button.
    - *The Blablador AI agent processes your request instantly.*
    - The response appears in a **rich text Markdown format**, allowing for clear, formatted instructions.

3. **Ticket Submission (Step 2)**:
    - If the AI solution doesn't fully resolve your issue, simply fill in your **Name** and **Email** address.
    - Optionally, you can also fill the **Comment** field and explain, why the AI answer wasn't helpful.
    - Click **"Send Ticket"**.
    - *The system securely emails your query, the AI's response, and your contact details to the support team.*
4. **Feedback Loop**:
    - Success or error messages appear in real-time.
    - The modal resets automatically upon closing, ready for your next question.

8.3 Built for Users, Loved by Administrators

> *"The best support is support that resolves the issue before it becomes a ticket."*

This isn't just a contact form; it's an **automated support assistant** wrapped in a beautiful interface. By this approach, we've reduced support load times and improved user satisfaction.

Try it today.

CHAPTER

NINE

INDICES AND TABLES

- genindex
- modindex
- search