TOAR Data User Guide #2

TOAR Database Quick Start

toar-data.fz-juelich.de

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The TOAR Data Team

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INTRODUCTION

This is a quick overview of querying the TOAR database. It demonstrates how you can retrieve specific data from the TOAR database either by your web browser of choice or with a script. For further information on the available services and data extractions check User Guide[1] and you can find the FAQ here[2].

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[1] https://toar-data.fz-juelich.de/documentation/TOAR_UG_Vol03_Database.pdf
[2] https://toar-data.fz-juelich.de/sphinx/TOAR_UG_Vol04_FAQ/build/html/index.html

LEARNING OBJECTIVES

After reading, you should be able to:

- find stations, variables, time series metadata
- filter stations by region or other characteristica
- filter time series by stations or variables
- use either a web browser or script to do so

THE BASICS

The TOAR database offers a REST service to retrieve its data and metadata.
A REST API is a web service, where you can format the URL with question marks and ampersands and issue commands to a web page. These will then be processed and the result returned to you.

https://toar-data.fz-juelich.de/api/v2/ provides a description of the available REST services.
There are four core endpoints:

- stationmeta (describing the station),
- timeseries (describing the time series)
- variables (describing the variables), and
- data (describing the data).

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EXAMPLES

1. find a station

https://toar-data.fz-juelich.de/api/v2/stationmeta/?country=DE,NL&limit=None
provides all stations from Germany and The Netherlands.

2. find all variables

From the first command, we found the station Niederzier (next to Jülich Research Centre). Its station code
is DENW074. We now require all time series for this specific station that are stored in the TOAR database:
https://toar-data.fz-juelich.de/api/v2/search/?codes=DENW074
provides all timeseries of station DENW074.

3. download data

From the previous results, we choose the time series of ozone from the `resource_provider`(roles) German
Environment Agency (UBA).
Its id is 18763.
We want to download all available data in csv format:
https://toar-data.fz-juelich.de/api/v2/data/timeseries/18763?format=csv
provides all data from time series with id 18763.

4. Python example

https://toar-data.fz-juelich.de/api/v2/#python-example
gives an example of how to use the REST service with python.
Prerequisites are the packages io, json, pandas, and requests.

USAGE SCENARIOS

1. You are interested in all stations of one country

https://toar-data.fz-juelich.de/api/v2/stationmeta/?country=DE provides all stations from Germany. The country must be specified with its ISO-3166 ALPHA-2 code (DE -> Germany).

2. You are interested in time series data for variables ozone and pm1 of a specific region

https://toar-data.fz-juelich.de/api/v2/variables/o3 and https://toar-data.fz-juelich.de/api/v2/variables/pm1 will get you the variable id for ozone (5) and pm1 (4).

https://toar-data.fz-juelich.de/api/v2/search/?bounding_box=49,7,50,8&variable_id=5,4 will get you all the time series within an area between 49°N 7°E and 50°N 8°E that record ozone or pm1.

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INDICES AND TABLES

- genindex
- modindex
- search