TOAR Frequently Asked Questions
updated, April 23, 2018

1. Where can I find the published assessment report?

The TOAR assessment report is a series of peer-reviewed manuscripts published in a Special Feature of the open-access journal, *Elementa: Science of the Anthropocene*:
https://collections.elementascience.org/toar

2. How can I contribute to TOAR?

The TOAR community is always happy to welcome new members. The first phase of TOAR is coming to an end, and the assessment report is being published as a series of peer-reviewed manuscripts (see question 1). We plan to initiate TOAR-II next year (2019) if the IGAC Scientific Steering Committee approves of the second phase. If you would like to participate in the data analysis for TOAR-II then please join one of the working groups once IGAC makes the announcement in 2019. Feel free to contact Owen Cooper (owen.r.cooper@noaa.gov) to have your name added to the email distribution list.

Another important way to contribute to TOAR is to send your data to Martin Schultz (m.schultz@fz-juelich.de), who has built the surface ozone database and has already begun to expand it in preparation for TOAR-II. While Martin's efforts focus on in-situ surface observations, he will also be able to re-direct you to appropriate contacts should you wish to supply TOAR with other types of data. Please note that TOAR-II will extend beyond the analysis of ozone itself and include studies on ozone precursors (NO, NO_2, CO, and selected VOC species) and the relation of ozone to meteorological variables. Of course, we will need data to support these analyses. A call for data will be made when TOAR-II begins, but we also welcome your contributions at an earlier stage.

3. How can I get TOAR data for my own analyses?

TOAR operates on an open data policy and TOAR data and data products are shared as openly as possible. The TOAR database on surface ozone observations can be accessed through the web interface https://join.fz-juelich.de – a simple registration procedure is required. Once you are logged in, you will see a data access page, which explains what is available and how you should cite the TOAR surface ozone observations. Please note that these observations don't belong to TOAR, but have been contributed by many different partner organisations – so please make sure to give appropriate credit to the data providers. Please allow cookies and the opening of new tabs to make the web interface work correctly.

The JOIN web interface also comes with a REST interface for users who want to query the database or download data programmatically. For details, please see the documentation at:

https://join.fz-juelich.de/services/rest/surfacedata

Pre-compiled TOAR surface ozone data products are available from the geodata repository at:

https://doi.org/10.1594/PANGAEA.876108

These products form the basis of the analyses in the published assessment report. They should be your first choice of data if you want to relate your analyses to the TOAR report. These pre-compiled data sets include various carefully designed filter criteria to maximize robustness and comparability of the analysis.

Presently, there is no centralized portal for free tropospheric ozone data sets from TOAR. If you wish access to one of the free tropospheric data sets (aircraft, satellite, ground-based remote sensing) shown in *TOAR-Climate*, please consult the data access information listed in Table 6 of *Gaudel et al.*, (2018):   https://collections.elementascience.org/toar

4. Why is it not possible to download the hourly data sets from the TOAR database?

The TOAR database is not a primary data center and has no mandate to collect, curate, and distribute air quality observations from anyone. The purpose of the database is to provide a single portal to all available ozone observations and allow the derivation of many different ozone metrics in a consistent way throughout the world. To avoid inconsistencies between analyses relying on hourly data from TOAR versus hourly data from the original data source, we decided not to provide open access to hourly data from the database. Some of the datasets would not have been made available to us without this restriction. However, we recognize the need for such a data service and we have begun negotiations with the data providers to allow us to deliver their hourly values as well. We hope that this will be possible (at least for the majority of sites) when TOAR-II is under way, and this FAQ will be updated as progress is made.

5. Can I calculate the TOAR ozone metrics for my own data?

If your data have been included in the TOAR database, you can calculate a large variety of metrics through the graphical web interface at https://join.fz-juelich.de, or with the REST service at https://join.fz-juelich.de/services/rest/surfacedata. The program code (python) that is used by the web interface has also been made available:

https://doi.pangaea.de/10.1594/PANGAEA.876640

(click on "Download dataset" at the bottom of the page).

6. Where are the gridded netcdf files in the PANGAEA archive?

At the bottom of the main link to the TOAR data collection on PANGAEA (https://doi.org/10.1594/PANGAEA.876108) you will see a list of dataset groups. If you follow the link to "Pre-compiled metrics datasets, links to gridded files …", it will take you to the web page at https://doi.pangaea.de/10.1594/PANGAEA.880506. Near the bottom you will find a link to "View dataset as HTML". If you click here, a list with all netCDF files will appear, and you will be able to download individual files. You can also obtain a zip file with all netCDF files if you click on "All pre-compiled gridded files in one zip archive".

7. What do all those column headers in a TOAR csv file mean?

The csv file header contains a brief description of each variable in the file. For more detailed information, please consult the supplement 1 of Schultz et al., 2018:

https://doi.org/10.1525/elementa.244.s1

Please don't hesitate to ask Martin Schultz (m.schultz@fz-juelich.de) if you are unsure about the meaning of a specific variable, after reading the documentation and this FAQ.

One point which has caused some confusion concerns the quantity DMA8xxx (xxx = EPA, EPAx, or EU). In all but the daily files, this metric (maximum daily 8-hour average mixing ratio) is aggregated

according to either US or EU regulations, i.e. DMA8EPA and DMA8EPAx evaluate the 4th highest DMA8 value, while DMA8EU evaluates the 26th highest value. If you wish to know mean DMA8 values over a given period, please use the metric AVGDMA8xxx.