



TOAR Workshop 2.01

Held globally in virtual format, January-February 2021

TOAR-II Kick-Off

Meeting summary and agenda

Purpose: *TOAR-II Kick-Off* was the first TOAR-II workshop, designed to gather the community and develop the working groups that will produce the papers for the TOAR-II Community Special Issue (the first step of the second Tropospheric Ozone Assessment Report), as well as identify new datasets for the assessment of tropospheric ozone and its impact on climate, health and vegetation.

Dates and times: The workshop took place over 4 days, 2 hours max. per day to allow for wide international participation.

Day 1: Monday, January 25, 2021, 13:00-15:00 UTC

Day 2: Wednesday, January 27, 2021, 13:00-15:00 UTC

Day 3: Thursday, January 28, 2021, 13:00-15:00 UTC

Day 4: Wednesday, February 3, 2021, 13:00-14:30 UTC

Summary: The second Tropospheric Ozone Assessment Report (TOAR-II) aims to provide an updated assessment of tropospheric ozone's global distribution and trends, including analyses of ozone impacts on health, vegetation, and climate, by 2024. To officially launch TOAR-II, define the scope and gain momentum in various working groups, a kick-off workshop was held from Monday, Jan 25th to Wednesday, Feb 3rd, 2021. Due to the ongoing Covid-19 pandemic, the meeting was held in virtual format, split into 4 sessions of up to 2 hours each. The Zoom online meeting platform was used and several sessions included breakout room discussions. Each session was attended by at least 130 participants (up to 177 participants joined on the second day) from 40 countries.

Each day started with a short introductory presentation summarizing the main goals and procedures of TOAR-II and recapitulating the discussions from the previous days. The first day (Day 1) was mainly devoted to discussions on relevant topics for the TOAR-II assessment, with the goal to identify topics, which are not covered by the already established *Focus Working Groups*. These discussions took place in virtual breakout rooms with random participation. As with all other breakout room events, the main discussion points were captured online in Google slides. The following day, the discussion points were summarized in a *mind map* (see link below) which was then used by the TOAR-II Steering Committee to distill some overarching topics.

On the second day of the meeting, the time in breakout rooms was used to allow existing Focus Working Groups to present themselves to the wider community and begin the planning of their activities. In addition to the six Focus Working Groups, which have already been established, four breakout rooms were set-up for discussions on the topics (Mega)cities, fire impacts, ozone deposition and ozone radiative forcing. These topics had been identified, among others, on Day 1 and appeared to attract sufficient attention by the meeting participants. Day 2 ended with a short presentation on the TOAR data infrastructure operated by Forschungszentrum Jülich and a Q&A session on the TOAR database and web services (data user forum). User feedback was sampled via an online questionnaire (the results are presented below). An important outcome from this feedback

session was the request of several users to receive training on the TOAR database and web services. The data centre team will develop a training schedule over Q2/2021 and begin training in Q3/2021.

Day 3 of the workshop started with a keynote lecture on statistical thinking and modern statistical methods by Kai-Lan Chang (University of Colorado/NOAA CSL). Thereafter, seven cross-cutting breakout groups were formed to discuss the following topics: (1) How does Covid-19 influence the TOAR assessment? (2) How can we identify and obtain observations from data-sparse regions? (3) How can we use modelling to support TOAR? (4) How can big data analysis support TOAR? (5) How can TOAR best serve the health impacts community? (6) How do climate and weather extremes impact ozone-vegetation interactions? (7) How are PM2.5 and ozone related? These seven topics were selected by the TOAR-II Steering Committee, based on the mind map that summarized input from the workshop participants on Day 1. Key results from these breakouts were recorded online in Google slides and briefly reported in the plenary. Day 3 ended with four so-called “ice breaker” meetings, which were intended to provide some space for potential new focus working groups to meet and discuss first ideas: 1) Stratosphere-troposphere exchange ; 2) East Asia; 3) Tropospheric Ozone in Global and Regional Atmospheric Chemistry Models: Evaluation and Future Scenario Forecasts; 4) South Asia. As it turned out that there was also a need to better identify potential overlaps and common objectives between some of the existing working groups, and two additional breakout sessions were reserved for such discussions: 5) OPT-TOP joint meeting; 6) HEGIFTOM-Satellite-Statistics joint meeting.

The final day of the workshop began with a summary of the first three days and presentation of the overall TOAR-II roadmap. This was followed by a ~20-minute Q&A session and an online questionnaire to sample the participants’ satisfaction with the workshop arrangements (the results are presented below). The meeting ended with a short presentation on next steps and the promise to make all relevant material available soon. The TOAR-II Steering Committee also stated its commitment to support the development of the Focus Working Group work plans. Finally, the TOAR-II co-chairs expressed their gratitude to the virtual meeting organizers, Erika von Schneidemesser and Corinna Bobzien (IASS Potsdam). The next full TOAR-II event will take place in conjunction with the virtual IGAC conference in September 2021, and the next meeting fully dedicated to TOAR-II will happen in mid-November 2021. In the meantime, the Focus Working Groups are asked to organize their own activities, and new working groups are requested to prepare and submit a proposal to the TOAR-II Steering Committee.

Important links:

[TOAR-II webpage](#) with all relevant information about the activity, including links to [register](#) for the TOAR-II email list and descriptions of approved TOAR-II working groups. *Please note: due to data privacy regulations, especially in the EU, we cannot copy your contact information from one list to another without your explicit consent. Therefore, please do [register](#) for the TOAR-II email to remain engaged with future TOAR-II activities.*

Focus Working Group sign-up sheet:

<https://docs.google.com/document/d/128JceVBZZqpQS91HHhGs12xd6Z2HNJTKXhtgwPckw64/edit?usp=sharing> (please send email to owen.r.coper@noaa.gov if you cannot access this sheet and want to participate in or lead a focus working group).

[Archived video and presentation files](#) from the TOAR-II Quickstart Event, held in virtual format on September 16, 2020. These provide a comprehensive summary of the accomplishments of the first phase of TOAR (2014-2019) and the goals of TOAR-II.

[TOAR data portal](#) with information on TOAR data and data relevant to TOAR. Please use the “Contribute to TOAR” links if you wish to participate in the TOAR data activities.

[Archived material from the TOAR-II Kick-Off Workshop](#) contains the presentation slides, the video file of the presentation by Kai-Lan Chang on Day 3 and this document.

Mind map with topics from the breakout discussions on Day 1:

<https://gitmind.com/app/doc/d911528323>

Google slides with discussion points from Days 1, 2 and 3:

- new topic breakout groups on Day 1:
https://docs.google.com/presentation/d/1I4Udfy4WhZvdkra0_4GyqcPmwYfBV_4i7sFaNFJNm3Q/edit#slide=id.gaf7dbc4c6e_1_62
- Focus WG breakouts on Day 2:
https://docs.google.com/presentation/d/1YPsWVHr1bJ1BsbfvJ4cdufgaMJGGE9ipVTJxhZVwJM8/edit#slide=id.gb629a7715a_0_210
- cross-cutting breakouts on Day 3:
https://docs.google.com/presentation/d/1Sry34j7U3jREtoXnoVFtWhSay3XHLEpG96Kgzr7s294/edit#slide=id.gaf7dbc4c75_0_0
- ice-breaker breakouts on Day 3:
https://docs.google.com/presentation/d/1MjkhGp6BmBd8Rq3XiNHJE8TmwEHUxEHKXGOEIYqrr30/edit#slide=id.gaf7dbc4c75_0_0

Action items

Focus Working Group leads:

- Check the Focus Working Group Sign-up Sheet (above) and contact new members
- Work with Owen Cooper to update the static Focus Working Group webpages (linked from the TOAR-II webpage) and add links to email lists and dynamic web pages (if maintained).
- Proceed with your research plans

Emerging Working Group leads:

- Check the Focus Working Group Sign-up Sheet (above) and contact new members
- Identify a TOAR-II Steering Committee member who will serve as your working group's liaison to the Steering Committee
- Prepare your Focus Working Group proposal according to the procedural documents on the TOAR-II webpage.
- Ask your liaison to submit the proposal to the Steering Committee for their approval

TOAR-II Steering Committee:

- Be prepared to quickly review new Focus Working Group proposals
- Begin planning TOAR-II participation at the 16th IGAC Conference (virtual) in September 2021
- Begin planning TOAR-II Workshop 2.02 for mid-November 2021 (virtual), and come up with a name and theme for the workshop

TOAR-II Kick-Off Workshop Agenda (all times are UTC):

Day 1 (Monday, January 25): Overview and input

1300 - 1315 Welcome, Introduction to TOAR and the TOAR-II Kick-Off Workshop (TOAR-II co-Chairs)

1315 - 1335 Overview of existing Focus Working Groups (Helen Worden and WG leads):

1335 - 1340 Preparation for breakout discussions (TOAR-II co-chairs)

1340-1410 Breakout groups to discuss missing topics and ideas for additional WGs:

1410-1420 Break

1420-1450 Plenary session: reports from breakout group rapporteurs and general discussion

1450-1500 Wrap-up, next steps

Day 2 (Wednesday, January 27):

1300-1315 Plenary session with brief recap from Day 1 and outline of Days 2 and 3

1315-1320 Set-up and switch over to WG breakout groups

1320-1410 Focus Working Group breakouts

1410-1420 Break

1420-1500 TOAR data infrastructure user forum

Day 3 (Thursday, January 28):

1300-1310 Plenary welcome session

1310-1345 Presentation on statistical methods (20 min +15 min discussion time)

1345 Set-up and switch over to breakout groups

1345-1410 Cross-cutting breakout groups

1410-1420 Break

1420-1440 Plenary

1440-1500 Ice breaker meetings for developing new working groups and discussions between existing working groups (6 breakout rooms)

Day 4 (Wednesday, February, 3):

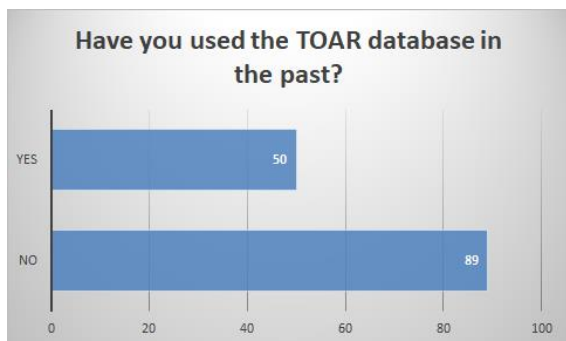
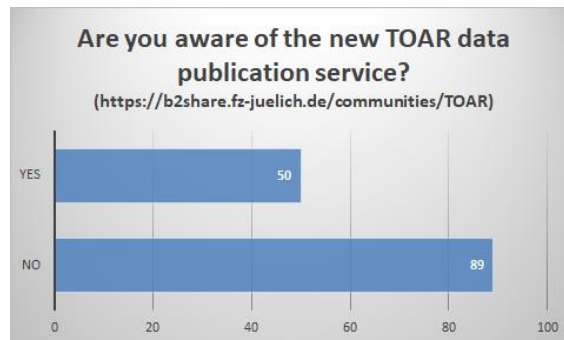
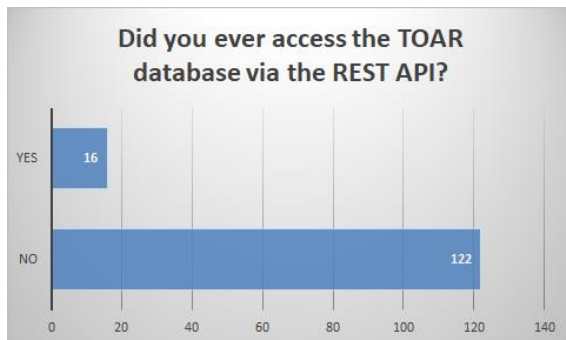
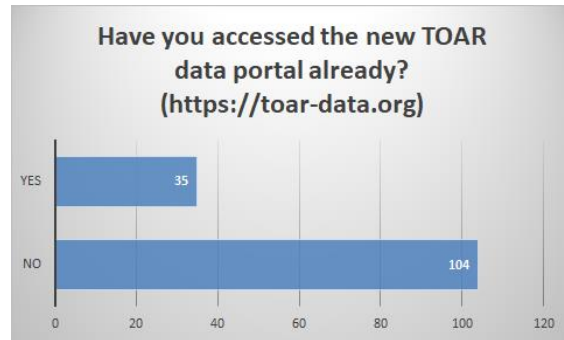
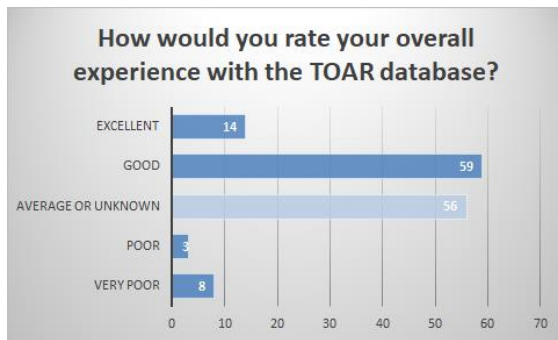
1300-1330 Summary of meeting Days 1-3 including open issues and action items (TOAR-II co-Chairs)

1330-1420 Plenary discussions

1420-1430 Wrap-up, TOAR-II timeline, next steps and forthcoming meetings (TOAR-II co-Chairs)

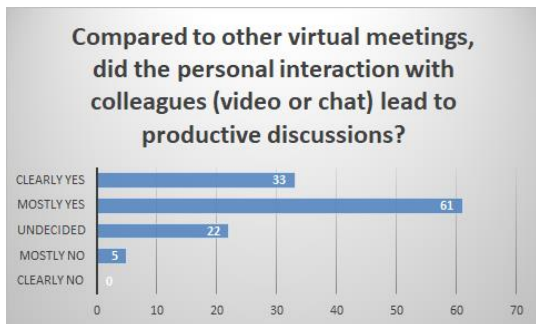
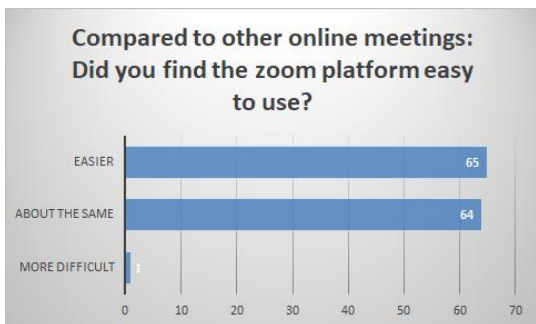
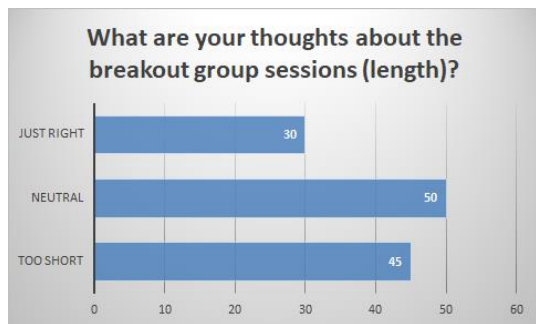
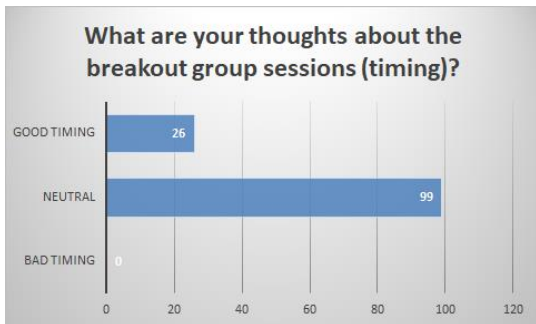
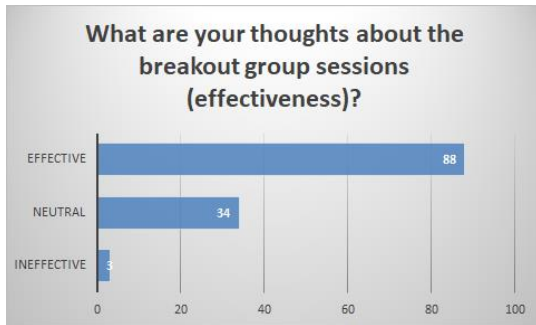
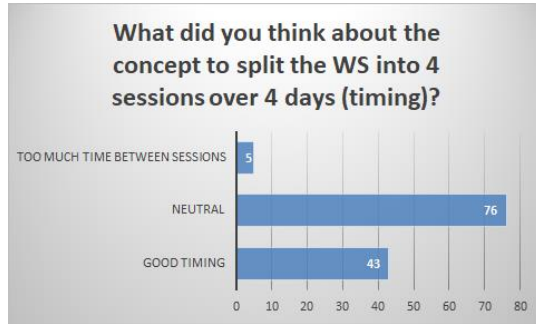
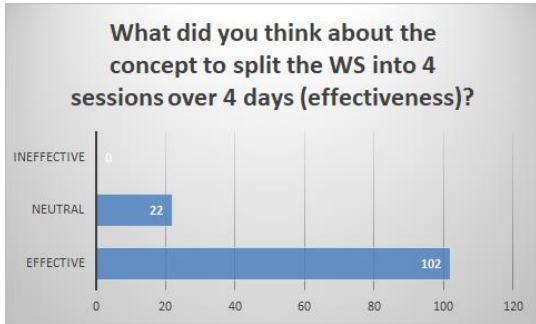
Results of online polls:

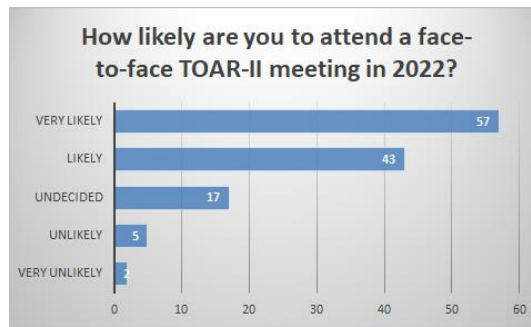
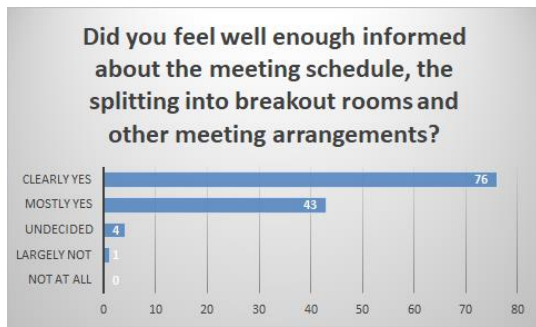
Poll on TOAR data infrastructure (Day 2):



Conclusions: the TOAR database and the new data infrastructure including the TOAR data portal, database and web services are known to less than half of the TOAR-II meeting participants. Those, who have worked with the TOAR data infrastructure in the past, are generally satisfied with the services provided. The TOAR data centre team will enhance its promotion efforts and prepare a training program to facilitate access to TOAR data for all users.

Poll on kickoff meeting procedures and arrangements (Day 4):





Addition to the last question: “(assuming the pandemic is over and the meeting would be held in Geneva, Switzerland)? The meeting would have an online component for those who are not able to travel.”