Minutes HEGIFTOM Working Group Meeting 29 November 2021

Documents, presentations and ***HEGIFTOM-FWG Meeting29Nov2021-V1 (HS & RVM).PDF*** also shared at <https://drive.google.com/drive/folders/1UfDkBevHgssWDt8-M2vg47HrBNE9tNN0?usp=sharing>

**Organizers**: Roeland Van Malderen and Herman Smit

**Objectives**:

1. Overview of current activities and tools for comparing ground-based free-tropospheric ozone retrievals, also with satellites and models; encourage working group members to participate.
2. Gather discussion and feedback from working group members for next year’s activities.

## Topic 1

**Introduction** to HEGIFTOM: Herman S. presented briefly the workplan, and crossover to other FWG of TOAR-II *(slides #3-#5 of* ***“HEGIFTOM-FWG Meeting29Nov2021-V1 (HS & RVM).PDF”*** *)*

## Topic 2

**Internal Consistency**: Herman S. presented the outcome of YEAR#1 (2021) incl. harmonized data sets; *(slides #6-#9 of* ***“HEGIFTOM-FWG Meeting29Nov2021-V1 (HS & RVM).PDF”*** *)*

Deliverable: internal report on homogenized data sets from different data sets and their availability. As base serves a template “**Description Homogenized Free Tropospheric Ozone Profile Data“** to be filled in by the instrument PI’s (Slide#8). Briefly explained the HEGIFTOM- Strategy On Data Repository (Slide #9). Detailed workplan and Outcome of Year#1, both at Google Docs:

[**https://drive.google.com/drive/folders/1UfDkBevHgssWDt8-M2vg47HrBNE9tNN0**](https://drive.google.com/drive/folders/1UfDkBevHgssWDt8-M2vg47HrBNE9tNN0)

## Topic 3

**External Consistency** /YEAR#2 *(slides #10 & #11 of* ***“HEGIFTOM-FWG Meeting29Nov2021-V1 (HS & RVM).PDF”*** *)*: Intercomparisons and collaboration with Satellite, Re-analysis, and Modell FWG’s.

Four presentations were given:

* **Homogenized ozonesonde time series: Improved agreement with independent data sets**, *Ryan Stauffer).*

Brief overview of the status of the homogenisation of long term ozonesonde records and improvements achieved by that. Next steps: Collaborate to compare homogenized ozonesonde data to other sources (IAGOS, lidar, FTIR, MW, etc.), including tropospheric measurements for TOAR-II

* **Umkehr vs. Sondes**, *Irina Petropavlovskikh*

AK-smoothed ozonesonde data compare well with Umkehr since 2000. Seasonal cycles differ (up to 10% in layer 4 and up to 20 % in layer 1) even after applying AKs. MLO comparisons indicate drop-off in ozonesondes in 2014 (both in stratosphere and troposphere). Lauder ozonesonde appears to drift relative to Umkehr between 2000-2012. Umkehr at Lauder needs correction after 2017 (not large in stratosphere, but clearly seen in troposphere).

* **Intercomparing data sets through their projection onto a model grid**, *Yann Cohen*. Showed the methodology and some first results with comparing IAGOS aircraft data with model data. Next step: Can the methodology also be applied to FTIR or Ozonesondes with IAGOS?
* **Systematic use of NDACC data for monitoring the performance of the CAMS o-suite and reanalysis models**, *Bavo Langerock*.

After brief introduction to CAMS and the data delivery by NDACC, some results of validations of CAMS model versus observations were presented. Exploring if the model can be used to visualize the performance of the observation networks.

*Open Discussion*

Based on commitments made in <https://docs.google.com/presentation/d/1XOt4kQ8VyxPc1yYz0A0VGB0fyNmt6lqAtL6Bds9nlA0/edit?usp=sharing> , the following cross-comparison table between different techniques measuring tropospheric ozone has been compiled:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Instrument | Ozonesondes | MOZAIC/ IAGOS | FTIR | Lidar | Umkehr |
| Ozonesondes |  | 1, 2? | 3 | 4 | 3 |
| MOZAIC/ IAGOS |  |  | 2 |  |  |
| FTIR |  |  |  |  | 3 |
| Lidar |  |  |  |  |  |
| Umkehr |  |  |  |  | 5 |
| MAX-DOAS/ Pandora |  |  |  |  |  |
| Surface |  |  | 6 |  |  |
| Satellite | 8, 9? | 9? | 7, 9? | 9? | 9? |
| Models | (8), 9? | 9? | 9? | 9? | 9? |

1. **David Tarasick**: has a student who is extending the trajectory-mapped IAGOS product. As part of the validation he is comparing sondes and aircraft profiles.
2. **Yann Cohen, Corinne Vigouroux, Romain Blot**: gridding several data sets onto a same model grid, by extending the existing tool first made for IAGOS data (see presentation by Yann Cohen); first test with FTIR - and sondes?
3. **Corinne Vigouroux, Irina Petropavlovskikh, Jim Hannigan, Peter Effertz**: FTIR/Umkehr/ozonesonde/MW comparisons at several stations, including AKs, sampling biases and uncertainty comparisons
4. **Gerard Ancellet**: continue the ozonesonde/lidar comparison at OHP; next step is to improve homogenization of OHP tropo lidar
5. **Irina Petropavlovskikh? + Peter Effertz?**: Compare Umkehr from Dobson and Brewer Umkehrs at Arosa, Boulder, other stations?
6. **Omaira Garcia**: working on surface/FTIR comparisons at several sites
7. **Yana Virolainen**: comparison of FTIR tropospheric ozone against IASI (LISA-product) at several sites.
8. **Arno Keppens, Daan Hubert**: multiple harmonised SAT records (OE & residual) vs sonde (vs model). Focus on long-term changes in tropo O3.
9. **Irina Petropavlovskikh + Bavo Langerock + others:** reanalyses vs GB vs satellite overpass tropospheric ozone, spatial and temporal inhomogeneities in GB comparisons

Some additional remarks made during the discussion:

* Next to a document describing the different homogenized GB datasets, Daan Hubert asked for hands-on examples by the measurement community on how to properly propagate reported errors. E.g. integration of sonde to a tropospheric column (different error terms have different random/systematic behaviour, depending on altitude, time, location).
* Ann Mari Fjæraa made the case for defining a common new ozonesonde file-format (hdf?), including uncertainties, coordinated with WOUDC & NDACC & EVDC, as well as including data streams, and the need for Rapid Delivery. The NDACC ozonesonde representatives are considering the conversion from ascii to geoms hdf format, with available tools, via central processing, rather than relying on the local conversion before submission by the ozonesonde station PIs.
* At several TOAR-II meetings, there has been a request for consistency among different FWGs in the use of meteorological data to convert instrument’s natural coordinates to common coordinates before comparing different instruments. Also uniformity in the tropopause height definition (and boundary layer height) when e.g. considering tropospheric columns has been asked for.
  + There has been contact between different FWG chairs (HEGIFTOM, satellite ozone, chemical reanalysis, modelling, OPT, ROSTEES) on this matter, and a meeting will be held in January 2022 to streamline the opinions and expectations.
  + The satellite ozone working group is using TCR-2 reanalysis (Miyazaki et al) with tools to reduce large data downloads. This model will also be used in the chemical reanalysis FWG.
  + A common tropopause height definition will be difficult the achieve, an alternative could be to use fixed pressure levels (e.g. 100 or 150 hPa in the tropics, as suggested by OPT/ROSTEES, and 300 hPa in the extra-tropics).

## Topic 4

**Representativeness**: sets; *(slides #17-#18 of* ***“HEGIFTOM-FWG Meeting29Nov2021-V1 (HS & RVM).PDF”*** *)*

*Topic had been discussed already during topic 3.*

## Topic 5

**AOB**

1. HEGIFTOM Website: to be done January 2022, to be hosted by KMI/Uccle
2. Next HEGIFTOM PI-Meeting: Jan. 2022
3. Next HEGIFTOM Workshops:
   1. Representativeness: Joint meeting of HEGIFTOM with Satellites & Chemical Reanalysis FWG in beginning of 2022 (Jan/Feb). R. Van Malderen will contact the chairs to have a preparatory meeting before in the second half of January.
   2. 3rd FWG Meeting (on-line): March/April 2022
4. About four intercomparison papers planned for 2022/2023.