

HELSTOP: A Project Design for the Harmonization and Evaluation **Of Lower Stratospheric and Tropospheric Ozone Vertical Profiles**



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Importance Of Tropospheric & Stratospheric Ozone



Vertical Ozone Profiling Techniques at Z= 0-20 km





Measuring and characterizing the vertical distribution of ozone are two essential activities to understand underlying processes

- balloon borne sondes
- **Lidar:** UV-DIAL = Differential Absorption Lidar in UV spectrum

Ozonesondes: Electrochemical

- **FTIR:** Fourier Transform Infra-Red of solar absorption spectrum
- IAGOS (MOZAIC): UV-Photometer aboard In-Service Aircraft **New Techniques:**
- **MAXDOAS**: Multi Axis Differential **Optical Absorption Spectroscopy** Satellites (e.g. TROPOMI, OMI, MLS etc.): remote sensing from space

Recent Comparisons Between Different Ozone Profiling Techniques

LIDAR versus Sondes:

(at OHP, southern France)



MOZAIC versus Sondes:

(at different sounding sites)

Sonde vs aircraft (WOUDC minus MOZAIC) lccle - Brussels (BRU), Belgium Hohenpeissenberg - Munich (MUC), Germany **Tropospheric O3: Sondes + MOZAIC** (above western North-America)



Source: Cooper et al., JGR, 2012

MAXDOAS versus Sondes:

(above Cabauw, Netherlands)





Conferences, 2016





HELSTOP: <u>Harmonization and Evaluation of Lower Stratospheric and Tropospheric Ozone Profiles</u>

HELSTOP is a networking activity with the overarching aim:

- I. To provide a harmonized and consistent dataset of vertical ozone profiles in the troposphere and lower stratosphere, retrieved by different techniques
- II. To bring together different communities of ozone profiling networks (e.g. GAW, NDACC, SHADOZ, IAGOS etc.), satellite retrieval groups, chemistry-climate model groups to enhance

WG1: Homogenisation of Ozone data from wellestablished ground based profiling techniques

WG2: Optimisation of new tropospheric Ozone products from remote sensing techniques

international research collaborations

- Evaluation of standard operating procedures and definition of best practices with respect to calibration, quality control and quality assurance procedures and reports, data processing for well-established tropospheric ozone profiling techniques (ozonesondes, IAGOS, LIDAR, FTIR) (WG1. Internal Consistency)
- ✓ Improved and/or new techniques for tropospheric ozone vertical profile retrieval (MAXDOAS) (WG2: New data products)
- Cross-comparison of vertical profiles of different techniques (WG3: Consistency, Homogenisation, Evaluation)
 - Validation and traceability of ozone profile techniques
 - Better characterization of the complementarity between the different techniques in terms of vertical sensitivity Ο
 - Improvement of vertical ozone profiling instruments
 - Validation of air quality models
- Knowledge transfer towards policy makers and other stakeholders with an interest in tropospheric ozone (hence climate) change and air quality) (WG4: Interaction with Stakeholders).
- **Capacity Building (WG1, WG2, WG3, and WG4):**
 - Workshops, Scientific training , Summer schools
 - Dissemination (e.g. publications, flyer(s), web-portal etc....)
 - Participation in future activities, e.g. second phase of TOAR (Tropospheric Ozone Assessment Report)



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