SHADOZ: Roles, Responsibilities, Collaborations, and Data Quality

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# Scope of SHADOZ

**SHADOZ Role:**

* “Strategic” ozonesonde network that coordinates tropical launches for science.
* Producer and provider of data and archive for tropical and subtropical stations.
* Support: (1) those who monitor O3 trends for UNEP/WMO Assessments and Montreal Protocol and (2) satellite algorithm development.

**Milestones:**

* **1998:** 1 stable station, 8 intermittent stations, data sent to WOUDC yearly.
* **2009:** SHADOZ affiliated with WMO/GAW and became an NDACC Cooperating Network.
* **NOW:** Reprocessed data from 14 sites with 10-yr record posted at SHADOZ archive (see Table 1).

**Responsibilities:**

* Collect data via station operators.
* Not operational, provide data archive for research. Near-real time data transfer not practical.
* Active participation in WMO-sponsored meetings and activities promoting standards and capacity building.
* Technological advances, data QA/QC, and scientific analysis and results are documented through peer-reviewed journals.

**Communication:** via meetings, station visits, newsletters, etc.

# Collaborations

Data are collected through cooperation of more than 20 sponsors and operational organizations (See Table 1).

# Nature of Archive, Data Flow, and Recent Reprocessing Efforts

**Data Archive (**<https://tropo.gsfc.nasa.gov/shadoz>), > 8000 O3, PTU profiles, 1998-2019:

* We are a **research data archive** and not operational. Near-real time data transfer is not practical due to nature of data collection.
* Collect data (including meta-data) where station operators use standard form to record meta-data to facilitate data reprocessing.

**Data Flow:** Station operator -> (Sponsor Co-I) -> SHADOZ data archiver -> Data Reprocessing -> SHADOZ website.

**Meta -Data Handling:**

* ***Required*** ***metadata fields*** are those variables that appear in the Electrochemical Concentration Cell (ECC) ozonesonde equation and describe the conversion from the measured raw cell current to ozone partial pressure.
* Through Assessment of Standard Operating Procedures for Ozonesondes (ASOPOS), guidelines are established for **required, essential and desired** meta-data fields. SHADOZ follows ASOPOS recommendations.

**Recent Data Reprocessing Efforts:**

* Series of ASOPOS meetings led to WMO Report 201 on ozonesonde procedures.
* Reprocessing approach based on ASOPOS guidelines. Update to these guidelines are forthcoming in 2020. (Note: H. Smit and A. M. Thompson Co-Chair ASOPOS 2.0).
* Profiles from 14 long-term (1998-2019) stations reprocessed from 2016 through early 2019 are available at SHADOZ archive with uncertainties estimates.

# Way Forward: Capacity Building and Promoting Science

* Partnerships and capacity building are an important part of SHADOZ network; this includes station visits by partnering SHADOZ Co-Is from US, Europe, Japan.
* QA/QC activities have been integral to the network such as Jülich (Germany) Ozonesonde Intercomparison Experiment (JOSIE)-SHADOZ 2017, where ozonesondes were tested in a simulation chamber designated the World Calibration Centre for Ozonesondes (WCCOS) and described in a recent Thompson et al. (2019) Bulletin of the American Meteorological Society (BAMS) article.
* The SHADOZ Archive has supported dozens of satellite missions since 1998.
* A major goal of reprocessing is to provide stable, long-term records of ozonesonde data for satellite calibration/validation efforts and trend comparisons (goal of 5% uncertainty).

**Table 1:** List of SHADOZ stations that have compiled at least 10 years worth of data.

