ASOPOS 2.0 Report (AR2):
A Joint Effort of GAW-NDACC-IOC and GRUAN

Herman G.J. Smit, Anne Thompson and the ASOPOS 2.0 Panel

GRUAN-ICM 12 at 17.November 2020
ASOPOS 1.0 (2001-2009)

**JOSIE**
Jülich
Ozone
Sonde
Intercomparison Experiment
1996, 1998, 2000,
Smit et al., JGR 2007

**ASOPOS 1.0**
Assessment for Standard Operating Procedures for Ozone Sondes

**BESOS**
Balloon Experiment on Standards for Ozone Sondes
April 2004, Laramie, USA,
Deshler, JGR, 2008

Sept. 2001  WMO-Geneva: ASOPOS 1.0 Panel define preliminary SOP/GAW#1
April 2004  BESOS field campaign at Laramie (WY, USA) to test/validate SOP/GAW#1
Sept. 2004  FZJ-Juelich  ASOPOS 1.0 Panel agreed unanimously on SOP/GAW#1
May 2009   GAW Report # 201 approved by SAG-O3
Jan. 2011   GAW Report # 201 published at WMO/GAW-web server
Jan. 2014   GAW Report # 201 printed by WMO/GAW
ASOPOS 2.0 (2018-2020)

Homogenisation O3S Data

Preparatory Work I: Collection O3S Data
A. "Table Log Book O3S-Station Data"
B. "Time Series O3S Parameters"

Preparatory Work II: Program Station Specific Guidelines To Process Early Years O3S Data

Replicating O3S-Data

Validation O3S-Data
A. Internal & External Consistency
B. Quantify Uncertainty PO3

Submission O3S-Data

SPARC Assessment
O3-Trend Use
Documentation
A. Data Processing
B. Uncertainty PO3

O3S-DQA
- Ozone
- Sonde
- Data
- Quality Assessment

ASOPOS 2.0
Assessment for
Standard Operating Procedures for Ozone Sondes

O3S-DQA Coaching

O3S-Station PI

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- Tarasick et al., AMT, 2016
- Van Malderen et al., 2016
- Witte et al., JGR 2017, 2018-A & B, 2019
- Thompson et al., 2017
- Deshler et al., AMT, 2017
- Sterling et al., AMT, 2018

Publications on O3S Performance:
- JOSIE 2017-SHADOZ: Thompson et al., BAMS, 2019
- Uncertainty Budget: Tarasick et al., ESS, 2020 (in review)
- Resolving fast and slow time response: Voemel et al., AMT, 2020
- TCO-Drop : Stauffer et al., GRL, 2020

The here listed peer reviewed publications are the base and drive to prepare the ASOPOS 2.0 Report

2009 & 2010 on QA Manufacturers
2017-SHADOZ on QA-Operation

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ASOPOS 2.0 Report: Background

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ASOPOS 2.0 Report, AR2: Major Issues Addressed

Major Objective:
“Updating” WMO/GAW 201 with newer and broader goals on traceability, uncertainty chain, storage of data and adopting better practices for GAW stations waiting on guidance”

Key objectives that are addressed in the Report:

i. Review Measurement principles
ii. Evaluation of best practice in ozonesonde measurements
iii. Traceability of post-flight processing from raw to evaluated profile data, inclusion of Meta Data
iv. Uncertainty budget (traceability of uncertainty chain)
v. Data storage of measured value, overall uncertainty, QA-data flagging scheme, meta data, this ensures re-processing the sonde profile data after new understandings.

From the very beginning of ASOPOS 2.0 it was decided that the Report is neither a complete Review Article on principles of the ECC measurement nor simply a new “SOPs” instruction set like WMO/GAW 201. The Lead Authors and the larger ASOPOS team attending 2018-2020 meetings agreed that AR2 is a combination of both. A peer reviewed journal publication with more “principle” details is planned for 2021.
Title of AR2: “Ozonesonde Measurement Principles and Assessment of Best Operational Practices”

Structure of AR2: Combine Chapter 2 & 3 and Chapter 4 + Annex A & B

Present ToC reflects the structure of the different components of the QA/QC system of WMO/GAW

Preface (to be written by WMO-GAW)

Chapter 1  Introduction
Chapter 2  Technical description of ECC-Ozone
Chapter 3  Data Quality Objectives (DQO’s) (incl. uncertainty budget) (= Scientific Base for SOP’s)
Chapter 4  Standard Operating Procedures (SOP’s)
              (incl. traceability when processing from raw to evaluated profile data plus
              their uncertainties, quality flags and data storage) (Includes video clips for
              preparation of an ECC-Ozone
Chapter 5  Data Quality Indicators (DQI’s)
Annex-A  Measurement Guidelines (MG’s) (= Practical guidelines to prepare and operate an Ozone-sonde)
Annex-B  Meta Data (= Practical guidelines to collect and store the meta data)
### ASOPOS 2.0 Report: Revision Approach and Final Report Timeline

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Activity Description</th>
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<tbody>
<tr>
<td>28 October 2020</td>
<td><strong>Lead Authors Meeting</strong> &gt;&gt;&gt;&gt; Preparation of workplan for November 2020</td>
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<tr>
<td>01-30 Nov. 2020</td>
<td>Based on Reviews preparation of revised AR2-V4 and approval by lead authors</td>
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<tr>
<td>01-15 Dec. 2020</td>
<td>Edit and format AR2-V4 for WMO printing style</td>
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<tr>
<td>15 Dec. 2020</td>
<td>Submission to GAW-Office at WMO for publishing</td>
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<td>Mid 2021</td>
<td>AR2 printed as GAW-Report, co-sponsorship of NDACC, SHADOZ &amp; GRUAN (?)</td>
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<td>Fall 2021</td>
<td>Presentation AR2 at QOS 2021</td>
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<tr>
<td>2021</td>
<td>Preparation of scientific article on ASOPOS 2.0</td>
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<tr>
<td>2021/2022</td>
<td>Implementation into the O3S-network (incl. manufacturers, software etc.)</td>
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