

# Quality Assurance in Ozonesonde Data: The JOSIE-SHADOZ (2017) Experience

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The ozonesonde is a small balloon-borne instrument that is attached to a standard radiosonde to measure profiles of ozone from the surface to 35 km with 100-m vertical resolution. Ozonesonde data are popular with the SPARC (Stratosphere-troposphere Processes And their Role in Climate) community as a mainstay of satellite calibration, model evaluation and analysis of trends, especially in the lower stratosphere and TTL (Tropopause Transition Layer). The electrochemical-concentration cell (ECC) ozonesonde, that has been used at ~100 stations worldwide for decades, has undergone changes in manufacturer design and operating procedures that create biases among stations and discontinuities in profile time-series from individual site records. For more than 20 years the Jülich [Germany] Ozone Sonde Intercomparison Experiment (JOSIE) has periodically tested ozonesondes in a simulation chamber designated the World Calibration Centre for Ozonesondes by WMO. Community evaluation based on JOSIE and related experiments sets the standards for sonde operations (e.g., WMO/GAW Report #201, 2014) that are widely followed by ozonesonde operators. In October-November 2017 a JOSIE campaign was held to evaluate the sondes and procedures used in SHADOZ (Southern Hemisphere Additional Ozonesondes; a 14-station tropical and subtropical network that has archived more than 7000 profiles since 1998 at <https://tropo.gsfc.nasa.gov/shadoz>). Thanks to the UNEP/Vienna Convention Trust Fund, operators from 8 SHADOZ stations participated, testing protocols for SHADOZ ECC sonde configurations (Thompson et al., 2017; Witte et al., 2018), which represent most of the techniques used globally today. Compared to the JOSIE ozone reference instrument, SHADOZ stations that follow WMO-recommended ECC protocols recorded total ozone within 3% and 5-10% throughout the troposphere and stratospheric profile. The 2017 JOSIE experience confirms the high quality of the SHADOZ record and demonstrates that an engaged ozonesonde community, working with consensus-based procedures, can achieve the high-precision and accuracy standards demanded by SPARC-sponsored ozone activities.

Key words: sondes, quality assurance, ozonesondes, JOSIE, SHADOZ

## References

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