

The Importance of Ozonesonde Quality Assurance and JOSIE-SHADOZ (2017)

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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 constitute a mainstay of satellite calibration and model climatologies. Sonde profiles have been used for analysis of trends in the lower stratosphere where satellites can be problematic. The electrochemical-concentration cell ozonesonde has been used at ~100 stations worldwide for about 50 years. Because the instrument has undergone changes in manufacture and operating procedures over that time, there can be biases at different stations and discontinuities in profile time-series from individual site records. For 20 years the Juelich [Germany] Ozonesonde Intercomparison Experiment (JOSIE) has periodically tested ozonesondes in a simulation chamber designed as the World Calibration Centre for Ozonesondes by the World Meteorological Organization. In October-November 2017 NASA and ESRL/GMD sonde researchers helped lead a special JOSIE campaign to evaluate the sondes and procedures used in Southern Hemisphere Additional Ozonesondes (SHADOZ), a 14-station sonde network operating in the tropics and subtropics. Experimental protocol for the SHADOZ sonde configurations, which represent most of those in use today, are described, along with preliminary results. In terms of total column ozone, all SHADOZ stations, four of which follow the ESRL/GMD protocol, fall within 3-4% of the reference instrument in JOSIE.

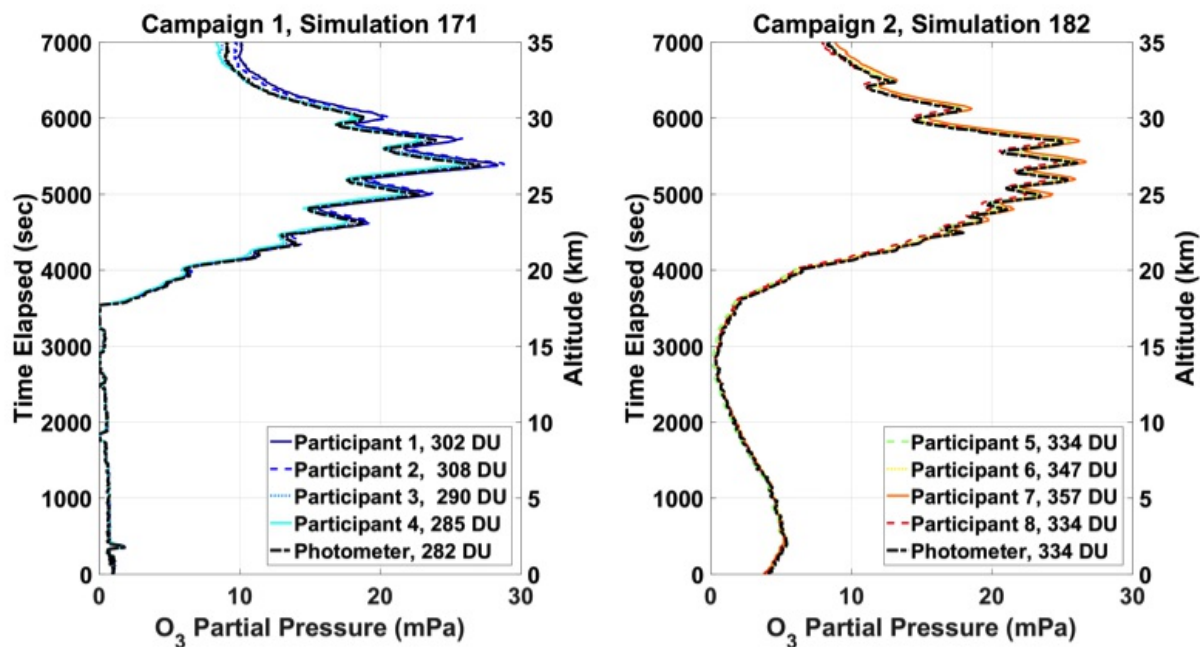


Figure 1. An example of two chamber simulations of ozone profiles representing the eight SHADOZ stations versus the world standard ozone photometer (black dashed).