

Changes in atmospheric composition discerned from long-term NDACC measurements: Ozonesonde Pump Efficiency and Sensor Background Measurements from Environmental Chamber Tests

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Balloon borne electrochemical concentration cell (ECC) ozonesondes are the primary method used for measuring profiles of ozone concentration from the surface to 30-35 km altitude. Regular evaluation of ECC sonde performance is important for long term ozone trend analysis, satellite measurement comparisons, and maintaining consistency when combining data sets from various ozonesonde sites. The Juelich Ozone Sonde Intercomparison Experiments (JOSIE) have been the primary internationally recognized method for evaluating the precision, accuracy, and response of different ozonesonde types and standard operating procedures. In addition, a few individual laboratories have provided useful results by carrying out side experiments to look at two of the main issues among ozonesonde users: sensor background current and air pump efficiency at low pressures. Here we report on a new set of pump efficiency measurements, from various models of ozonesondes, carried out in the NOAA ESRL environmental chamber. Dual ozonesondes were compared in several simulations to determine if differences in measured pump efficiencies could be detected in the profiles. Ozone background tests were also investigated at various ambient pressure levels compared to standard surface background measurements. The results are important in maintaining a consistent long term ozonesonde record at NOAA.