

Umkehr data reprocessing version at the U.S. Dobson stations

K. Miyagawa (1), I. Petropavlovskikh (2,3), R. D. Evan (2,3), G. McConveille (2,3)

(1) Science & Technology Corp, Hampton, VA 23666-1393, United States (miyagawa.koji@noaa.gov), (2) U. of Colorado, CIRES, Boulder, United States, (3) NOAA, ESRL/GMD, Boulder, United States

The WMO Dobson Umkehr ozone profile records provide historical information about inter-annual stratospheric ozone variability and depletion since 1957s, and even earlier records available from several European stations. Dobson Umkehr spectrophotometer measurement under the NOAA ozone network were first automated in the 1980s, improving traditional manual data acquisition of 1960s-1970s.

In this study, we present an analysis of the quality in the level 0 data (R-values) that varies with solar zenith angle and the instrument. The noise and stability in the Umkehr measurement is assessed through the reference to the atmospheric variability captured by an independent zenith cloud detector (the intensity of light from the zenith monitored through a 862 nm interference filter), and by comparison with the reference N value curve, which is based on a standard ozone profile. Based on these analyses the Umkehr measurement is either completely eliminated or adjusted according to the analysis. The software for the reprocessing of the historical Umkehr measurements has been upgraded.

In addition, the Dobson total column ozone processing was recently updated and became available for the Umkehr ozone profile reprocessing. The current Umkehr ozone profile processing is complicated by the interference of the stray light into the measurement. The newly developed algorithm takes into account the stray light correction.

This study presents the updates to the Umkehr ozone profile record at NOAA Boulder and Mauna Loa Dobson stations. The differences in the updated Umkehr ozone profiles will be assessed against the historical WOUDC archived data, satellites (NOAA SBUV, Aura OMI, NPP OMPS and other) and ozonesonde profiles.