

Scientific Sponsorship Statement

Ozone soundings from Neumayer

Since 1992 the Alfred Wegener Institute for Polar and Marine Research (AWI) performs ozone soundings at the Antarctic research station Neumayer (70° 35'S, 8°15'W). The station is located close to the shore of the Ekström Ice Shelf 42 m above sea level. Typically, Neumayer lies within the area surrounded by the stratospheric polar vortex where a pronounced ozone depletion takes place every Antarctic spring.

Routinely, one sounding per week takes place. In summertime the balloons (TOTEX 1500) reach heights between 30 and 37 km. In wintertime - when stratospheric temperatures drop below -80°C - even specially treated balloons tend to burst at lower levels.

During summer, the maximum of the ozone concentration over Neumayer exists typically at height levels between 20 and 25 km. The total ozone varies around 300 Dobson. Until the beginning of September the height of the ozone maximum level decreases about 5 km, indicating a mean vertical downward displacement of the air mass within the polar vortex.

During September, when sun light hits the stratosphere again, the ozone layer vanishes quite suddenly and nearly completely. Instead of local ozone maxima, local minima can be found at height levels between 16 and 21 km. The total ozone drops to about 150 Dobson units with the lowest values in early October. Around December, when the polar vortex breaks down, warm air masses with higher ozone concentrations are advected from lower latitudes.

The soundings are performed by using the DigiCORA system from Vaisala. The ozone sondes (ECC-6A) are attached via an interface (RSA11) to a RS80-16GE sondes, which measure the vertical profiles of pressure, temperature, humidity, and the wind vector. The wind vector is determined with the aid of a GPS-system, the height information is calculated using the hydrostatic approximation. All calculations are done by the DigiCORA-system in conjunction with the Vaisala software "OZONE" or "METGRAPH". The METGRAPH *.z-files are converted into CSV-files with the program SndPro provided by WOUDC.

The ozone sensor is based on an electrochemical concentration cell. The pre-flight calibration of the ozone sensor is performed according to the technical manual instructions from Vaisala. The Vaisala ozone measurement system has been tested in international WMO intercomparisons (Third WMO intercomparison of the ozonesondes used in the global ozone observation system, Vanscoy, Canada 13 - 24 May 1991).

The soundings from Neumayer are not corrected by using ground based total ozone measurements, because this procedure seems to be questionable for the Vaisala system. Furthermore, this correction procedure is impossible during polar night. Thus, the surface ozone values are compared to surface measurements obtained by instruments based on absorption of UV-radiation. The upper part of the ozone profiles have been compared frequently to different satellite experiments (TOMS, ADEOS, ILAS, POAM III). All suspect data is removed after visual inspection of each single sounding.

Since Neumayer has the status of a GAW-station, the actual soundings from Neumayer (will) get(s) submitted without delay to the WOUDC. The data are postprocessed and validated. The data are free for any scientific use as long as the Alfred-Wegener-Institute is quoted as origin of the data correctly. Furthermore, the AWI asks for a copy of any publication using data from the AWI. Non-scientific use without an explicit permission from the AWI is prohibited.

More than 1000 ozone soundings have been performed by the Alfred Wegener Institute for Polar and Marine Research within the last decade at different observatories (Ny Aalesund, Spitzbergen, RV Polarstern and Neumayer). They are all archived in the "Meteorological Information System of the Alfred Wegener Institute, called MISAWI. For further information please contact Dr. Gert König-Langlo (gkoenig@awi-bremerhaven.de) or have a look at <http://www.awi-bremerhaven.de/MET/Neumayer/met.html>.