Geophysical Research Abstracts,
Vol. 11, EGU2009-2875, 2009
EGU General Assembly 2009

A comprehensive, standardised historical upper air dataset

A. Stickler, A. Grant, T. Ewen, and S. Brönnimann
Institute for Atmospheric and Climate Science, ETH Zürich, Switzerland (alexander.stickler@env.ethz.ch)

In order to better understand global climate variability, it is vital to address its relation to atmospheric circulation. This requires information from upper levels. Furthermore, to reliably assess climate trends it is crucial to eliminate inhomogeneities in the data. Current global upper-level datasets reach back to the 1940s or 1950s only and do not cover some important periods in the first half of the 20th century. Extending the observational record is therefore considered important to a) analyse climate variability in the past, and b) verify atmospheric global models (AGCMs) used to predict future climate change.

A large number of global as well as regional upper air datasets covering the pre-reanalysis period (before 1948 and 1957, respectively) has been made available during the recent past. These datasets comprise wind, pressure, geopotential height, temperature and humidity data taken with kites, registering balloons, pilot balloons, aircraft and radiosondes. However, no systematic compilation, homogenisation and quality assessment of these data has ever been performed. Here we present a comprehensive, standardised monthly global historical upper air dataset that has been derived from these very heterogeneous data. To detect inhomogeneities or suspicious biases and to correct the data if necessary, the data have been compared to statistical reconstructions of temperature, geopotential height and wind fields.

The combined dataset (3993 station records worldwide, > 12.5 million profiles) has been converted to standardised ASCII formats for pressure level as well as for geometrical altitude level data. It is made available to the public in the form of monthly mean data. The p-level data are given on a uniform grid, integrating the primary data without interpolation. The geometrical altitude level data are mapped onto a new, common altitude grid relative to the sea level. Whenever the original data are given on levels relative to the ground, the wind and temperature data have been interpolated to the new levels (in general only above 2 km a.g.l.). In all other cases, the primary data are once again integrated without interpolation.