



Observation and Representativity Errors in Historical Upper-Air Observations

R. Wartenburger (1,2), S. Brönnimann (1,2), A. Stickler (1,2)

(1) Oeschger Centre for Climate Change Research, Bern, Switzerland, (2) Institute of Geography, University Bern, Bern, Switzerland

Upper-air observations are a fundamental data source for global atmospheric data products such as reanalyses, but uncertainties, particularly in the early years, are not well known. Most of the early observations, which have now been digitised, are prone to a large variety of undocumented errors that need to be quantified. In this presentation, a method is presented for systematically estimating observation and representativity errors in upper-air observations. The method is based on a comparison of neighbouring observations and is hence independent of metadata, making it applicable to a wide scope of observational datasets. We apply the method to upper-air temperature, geopotential height and wind observations from the Comprehensive Historical Upper-Air Network (CHUAN; 1904 – 1966). The estimated mean random observation errors for all observations within the study period are 1.5 K for air temperature, 1.3 hPa for pressure, 3.0 m/s for wind speed and 21.4° for wind direction. The errors can be used in ERA-CLIM and other data assimilation approaches.