



Quality Control and Homogenization of China's 6-hourly Surface Pressure Data

Fang Yuan (1), Guoli Tang (1), Xiaolan L. Wang (2), Hui Wan (2), and Lijuan Cao (1)

(1) China Meteorological Administration, National Meteorological Information Center, Beijing, China, (2) Environment Canada, Climate Research Division, Toronto, Canada (xiaolan.wang@ec.gc.ca)

Aiming to produce a homogeneous high-quality 6-hourly surface pressure database, this study applied a comprehensive quality control (QC) system and a data homogenization procedure to correct both random and systematic errors in 6-hourly surface pressure data from 194 sites in China for the period 1951-2012. Relocation and/or joining of stations were found to be the main causes for discontinuities (systematic errors) in the surface pressure database (including both station pressure and sea level pressure). Both physical and statistical approaches were used to detect and correct errors, along with available metadata. The hydrostatic model was used to identify and correct for errors caused by the use of incorrect station elevation values in the reduction of barometer readings to station or sea level pressure values, or by changes in station elevation due to relocation and/or joining of two or more station records. A statistical approach based on the penalized maximum F test was also used when a physical-based correction is not possible due to lack of related data or metadata (e.g. an elevation change was documented, but the old station elevation was not). However, all discontinuities that were adjusted in this study have metadata support (i.e. documented change points). As a result, pressure data for 74 of the 194 sites were adjusted for station elevation changes using the hydrostatic model, and pressure data for additional 31 sites were homogenized using a quantile-matching adjustment method. The effect of the artificial discontinuities on pressure trends was also assessed by comparing the trends of the raw and homogenized pressure data.