Geophysical Research Abstracts
Vol. 15, EGU2013-11753, 2013
EGU General Assembly 2013

The quality control system of the 20th Century Reanalysis dataset

Gilbert Compo (1,2,3), Jeffrey Whitaker (2), Prashant Sardeshmukh (1,2), Chesley McColl (1,2)

(1) CIRES, University of Colorado, Boulder, USA, (2) Physical Sciences Division, NOAA Earth System Research Laboratory, USA , (3) (compo@colorado.edu)

The Twentieth Century Reanalysis (20CR) project is an international effort to produce a comprehensive global atmospheric circulation dataset spanning the twentieth century, assimilating only surface pressure reports from the International Surface Pressure Databank (ISPD) and using observed monthly sea-surface temperature and sea-ice distributions as boundary conditions. It is chiefly motivated by a need to provide an observational dataset with quantified uncertainties for validations of climate model simulations of the twentieth century on all time-scales, with emphasis on the statistics of daily weather. It uses an Ensemble Kalman Filter data assimilation method with background 'first guess' fields supplied by an ensemble of forecasts from a global numerical weather prediction model. This directly yields a global analysis every 6 hours as the most likely state of the atmosphere, and also an uncertainty estimate of that analysis. A five-step quality control and data selection procedure is used to detect, remove or correct erroneous observations before generating each analysis. ISPD observations of surface pressure and SLP were quality controlled during the assimilation cycle through basic checks for meteorological plausibility, comparisons with the first-guess ensemble and neighbors, bias correction of land station data, and a data thinning procedure to avoid noise in richly observed regions. The results of these checks are contained in "feedback" tables of the ISPD.

The 20CR dataset provides the first estimates of global tropospheric variability, and of the dataset's time-varying quality, from 1871 to 2010 at 6-hourly temporal and 2° spatial resolutions. Intercomparisons with independent radiosonde data indicate that the reanalyses are generally of high quality.