



Cyclone activity over the Northern Hemisphere in the first part of the 20th century from 20C reanalysis

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We analysed cyclone activity in the Historical Twentieth Century Reanalysis (20CR) covering the period from 1908 to 1958. Synoptic scale processes in 6-hourly data from 20C reanalysis were analysed in two ways: deriving bandpass statistics of the heights of different tropospheric levels and using numerical storm tracking for identification of cyclones and quantification of the characteristics of their life cycle. In order to assess the reliability of estimation of cyclone activity in 20CR we separately performed the analysis for the period 1948-1958 overlapping in 20CR and NCEP/NCAR reanalysis. Cyclone activity for this decade is qualitatively similar in the two reanalyses while the quantitative differences exist, being higher over the North Pacific compared to the North Atlantic. Similarly, correlation between NCEP/NCAR and 20CR for both cyclone counts and bandpass statistics is significantly higher in the Atlantic compared to the North Pacific. Using fifty year output of the computed bandpass statistics and cyclone tracks we considered changes in the cyclone activity over the Northern Hemisphere during the period from 1908 to 1958. Between the periods of 1910s and 1940s-1950s there has been considerable intensification of cyclone activity in the Eastern Arctic and in the Pacific, while there has been found no significant trends in the North Atlantic. The mechanisms of the observed changes and their association with large-scale circulation modes are discussed.