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Extra-tropical cyclone activity in the ensemble of 20th Century Reanalysis (20CRv2)

x. l. Wang (1), y. Feng (1), g. p. Compo (2,3), j. s. Whitaker (3), p. d. Sardeshmukh (2,3), r. j. Allen (4), and v. r. Swail (1)

(1) Climate Research Division, Environment Canada, Toronto, Canada (xiaolan.wang@ec.gc.ca), (2) University of Colorado, CIRES, Climate Diagnostic Center, Boulder, CO, USA , (3) NOAA Earth System Research Laboratory, Physical Sciences Division, Boulder, CO, USA, (4) Hadley Center, Met Office, Exeter, UK

An objective cyclone identification/tracking algorithm is applied to the 6-hourly SLP fields of each of the 56 runs of the 20th Century Reanalysis (20CR) for 1871-2008 (138 years), and to the ensemble mean 6-hourly SLP fields, to infer extra-tropical cyclone activity and historical trends therein. The analysis is done for the northern and southern hemispheres (NH and SH), separately. The presentation includes ensemble mean and spread of cyclone counts (or track counts) and intensity. A preliminary assessment of temporal homogeneity and trend of the 20CR cyclone activity index is also presented. The discontinuities are accounted for in the estimates of cyclone climatic trends. The main conclusions are:
(1) The ensemble mean 6-hourly fields are not suitable for identifying/tracking cyclones, especially for periods/areas that have much fewer observations.
(2) The 20CR is found to be homogeneous over 100+ years for several NH regions. It contains discontinuities in data sparse regions/periods, such as the Canadian Arctic and Siberia in the earlier periods, and the Southern Hemisphere.
(3) After accounting for the discontinuities, cyclone activity trends are characterized by increased intensity of strong cyclones in the high latitude areas in the cold season of both hemispheres, which was also accompanied by an increase in strong cyclone counts in all high latitude regions except the Canadian Arctic.

The 20CRv2 is also found to be comparable to modern reanalyses, although it uses surface pressure data only.