1. Synoptic variability in 20CR vs NCEP

Zonal means of the magnitudes of bandpass statistics JFM 1948-2008

2. Spectrum analysis

Analysis of the temporal evolution (linear trends) of synoptic scale spectra for period 1948-2008. In order to estimate the change in the spectral functions linear trends were computed for all frequencies. Both data sets show increasing magnitudes of shorter-period synoptic scale variability (1-4 days and 6-8 days) and weakening of the slow synoptic variability (11-13 days)

3. Cyclone lifecycle 20CR vs NCEP

Duration of life

4. Reliability of 20CR in the Late 19th- and Early 20th- Century

Late 19th and early 20th centuries (1871-1947) variability in 20CR for January-March in the Pacific and Arctic exhibits strong upward changes in all characteristics of the intensity of synoptic scale variability. Thus, variability patterns in both cyclone counts and bandpass statistics should be taken with caution. However over the Atlantic ocean and continents (North America, Eurasia) 1871-1947 variations are likely more reliable.

5. Ensemble spread in 20CR is potential reason for artifacts in long-term variability

Interannual variability for winter period (January-March) synoptic activity is more consistent in the 2 products over the oceans compared to the continents. Of the two oceans, Atlantic demonstrates higher correlation (more than 0.97) compared to the Pacific ocean. Magnitudes of the synoptic scale variability is correlated much better compare to ultra-high frequency variability.


The correlation coefficients between number of cyclones counts and bandpass statistics should be taken with caution. Thus, variability patterns in both cyclone counts and bandpass statistics should be taken with caution.

7. Capturing atmospheric circulation modes: NAO and NP

Associated correlation with NAO for 1948-2008

Associated correlation with NP for 1871-1947

Associated correlation with NP for 1948-2008

Correlation patterns with NAO persist during both 1871-1947 and 1948-2008 periods, while the correlation with NP is clearly observed only after 1948.