

A Study of Quasi-millennial Extratropical Cyclone Activity Using Tracking and Clustering Methods

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There is growing interest in knowing the impact of climate change on extratropical northern hemisphere cyclone activity. Therefore many studies deal with perspectives of changing storm statistics in the course of emerging anthropogenic climate change. In order to assess the significance of expected future changes, knowledge about the natural variability of storminess is also needed. To analyze long-term change of these properties, mean sea level pressure fields (MSLP) of a quasi-millennial (1000-1990) global climate simulation by ECHO-G are applied to track storm events using a previously developed tracking algorithm. The variabilities of numbers of extratropical storms on yearly and centennial time scales are checked. Storm tracks are clustered as several groups using the K_mean clustering method. Climatological changes of extratropical cyclones including frequency, density and lifespan are analyzed for each group. Storm track activity of different clusters is studied with the dominant patterns of atmospheric variability by canonical correlation analysis (CCA). And the difference of extratropical cyclone activity between Northern Hemisphere and Southern Hemisphere will be also compared.