

Changes in some characteristics of Arctic cyclones

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An increase in cyclone activity has occurred in the second half of 20th century over the Arctic Ocean (e.g. Gulev et al, 2001 and Zhang et al, 2004). Number of cyclones has increased, more deep and long-living cyclones have appeared. The aim of this study is to analyse temporal and spatial changes in some characteristics of cyclones moving into the Arctic, i.e. into the area north from the polar circle (66.5°N). The database of cyclones described in detail by Gulev et al. (2001) is used. The database consists of cyclone tracking output of the 6-hourly NCEP/NCAR reanalysis (Kalnay et al, 1996) SLP fields using the software worked out by Grigoriev et al. (2000). Cyclones are presented by the geographical coordinates of their centres and by minimum SLP. Analysed characteristics are: duration of a cyclone, geographical coordinates, SLP of the first, last and northernmost tracing point and of the tracing point with the lowest SLP. To analyse the characteristics, all cyclones were divided into groups in dependence of where they cross the polar circle. The polar circle is divided into 10 sectors - two 20-degree (80°W-100°W and 20°W-40°W) and eight 40-degree sectors (20°W-20°E...100°W-140W and 40°W-80°W). Totally 11154 cyclones that crossed the polar circle in 1948-2002 were analysed. Results of the analyse show a great inter-annual variability of the cyclone characteristics. A statistically significant trend was present only in a few cases. For example eastward and north-eastward shift of first tracing point can be noticed. That may be concurrent with phenomenon of north-eastward shift of NAO, reported in many recent studies (e.g. Jung et al. 2003).

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