Extremes of extratropical storms over North Atlantic based on cyclone indicators in ESIMO

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The goal of this work is to show the changes in extremes of extratropical storms using of cyclone activity indicators. The list of cyclone parameters includes number of cyclone tracks, cyclone frequency, the cyclone activity, maximum storm wind and maximum precipitation near cyclone centres that are available on the Unified State System of Information on the Global Ocean (ESIMO) portal [http://portal.esimo.ru]. The cyclone parameters were calculated based on automated cyclone identification and tracking algorithm using the 6-hourly SLP and surface wind from the NCEP/NCAR DOE reanalyses. The cyclone frequency and index of cyclone activity are calculated as number of the cyclones centres and sum of pressure anomaly in cyclones centres during the month in every grid point.

Focus of this study is intensity of extratropical storms, that here is the maximum storm wind in cyclones. The maximum wind strength was defined from a 5° spherical radius near cyclone centre. The data with cyclone track, cyclones centres and maximum wind coordinates are presented on ESIMO portal for last calendar month (Fig.1). Storm activity indicators are calculated, as number cyclones with different maximum wind intensity, using scale Beaufort, and are presented for North Atlantic and Baltic Sea for every month and winter and summer season for period from 1999/12 to present (Fig.2).

Figure1: Maximum wind speed near cyclones centres for last month.

a) b)

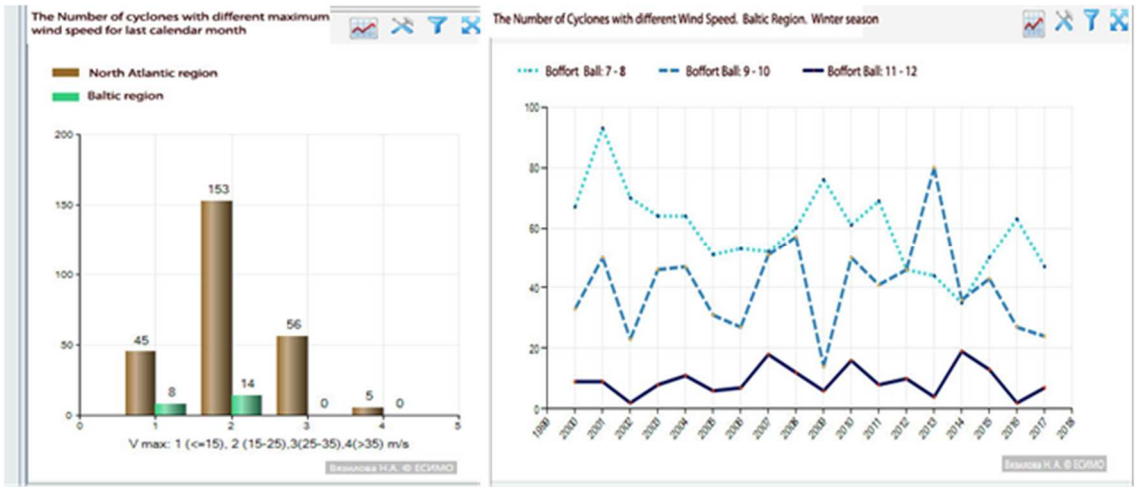

Figure 2: The number of cyclones with different maximum wind speed: a) for North Atlantic and Baltic Sea region during last calendar month, b) Baltic Sea region for period from 1999 to present. Winter season.

Extreme storms are usually defined as cyclones with extreme wind, wind strength 24 m/sec and more, using scale Beaufort. Analyses of distribution for cyclones with different maximum wind intensity (weak strong, moderately strong, extreme wind) shows, that in high-latitude North Atlantic most part of storms with extreme wind are the cyclones with extreme depth of pressure, with an MSLP of 970 hPa or less. On other side, in low- latitude North Atlantic extreme wind strength often is observed in cyclones with moderate pressure depth. It is important to note, that as in north, as in south region of North Atlantic, the part of extreme storms, the storms with wind strength from 24 m/sec and more, increases during past years.