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Climatology of cyclones and anticyclones in the Mediterranean-Black Sea region

V.N. Maslova, E.N. Voskresenskaya, and O.Yu. Kovalenko

Marine Hydrophysical Institute, Atmosphere and Ocean Interaction Department, Sevastopol, Ukraine
(veronika_maslova@mail.ru)

The aim of the study is to analyze interannual variability of cyclones' and anticyclones' characteristics in the Mediterranean-Black Sea region associated with global climate processes.
Synoptic climatology in the Mediterranean-Black Sea region is studied separately for cyclones and anticyclones, including blockings, and jointly on the example of cyclonicity index which represents the combination of frequency and intensity of cyclones and anticyclones.
The synoptic vortices and their characteristics were obtained using daily NCEP/NCAR reanalysis data sets on 1000 hPa geopotential height in 1948 – 2006 and special methodology by Bardin (1995). The comparative analysis of the data obtained using this methodology and information from composite-kinematic maps of the Ukrainian Hydrometeorological Service demonstrated a good agreement between analyzed series (correlation coefficient is around 0.9). Standard statistical methods such as correlation and composite analyzes were used to show the connections
between regional variability of cyclones and anticyclones and global climate variability associated with global modes of the ocean – atmosphere system, such as North Atlantic and Equatorial Pacific.
The determining influence of the North Atlantic processes on cyclones'/anticyclones' variability in the Mediterranean-Black Sea region is proved. Cyclones are more frequent and intense during the negative North Atlantic Oscillation phase and anticyclones are more frequent and intense vice versa during its positive phase. Also it is shown that the frequency of cyclones increases during double El Nino events and the frequency of blockings
is higher during La Nina years. It is demonstrated that the low-frequency variability of the cyclonicity index in the Mediterranean-Black Sea region is characterized by interannual and decadal scales associated with the climatic modes of the North Atlantic and Pacific.