



Large-scale atmospheric circulation and extreme wind events during the Black sea storms

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Storms in the Black Sea are the result of specific large-scale atmospheric circulation and wind regimes over the sea. Synoptic situations preceding and accompanying Black Sea storms are studied for the last 60 years based on reanalysis data and coastal observations. A wind speed of 15 m/s is chosen as a threshold to detect the storm situation. EOF analysis of the pressure fields and other statistical methods are applied to reveal the main types of atmospheric circulations causing severe winds and storm waves.

The aim of the work is to formalize a detection scheme of these weather types in order to forecast the probability of the storms according to the degree of proximity of predicted atmospheric pressure field to the 'storm types'.

The study shows, in agreement with previous studies, that two main configurations of the surface atmospheric pressure field are typical for the beginning of a storm situation. The main feature of the first one is the fast movement of a Mediterranean cyclone or its trough toward the Black Sea and, at the same time, a large and stable anticyclone over Eastern Europe. The second one is accompanied by an abrupt quasi-meridional intrusion of a cyclone or a trough from Scandinavia. Then very often in both cases a local Black sea cyclone appears. Its position is crucial for the wind direction and hereafter for the storm wave field and the development of the wave height. The first three EOFs cover more than 70% of the total dispersion in all cases. This fact allows to create a 'bank' of filtered surface atmospheric pressure fields for previous storms and to compare any single case with them. The work is done in the Natural Risk Assessment Laboratory, under contract G.34.31.0007.