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Climate projection of synoptic patterns forming extremely high wind speed over the Barents Sea

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Frequency of extreme weather events is not very high, but their consequences for the human well-being may be hazardous. These seldom events are not always well simulated by climate models directly. Sometimes it is more effective to analyze numerical projection of large-scale synoptic event generating extreme weather. For example, in mid-latitude surface wind speed depends mainly on the sea level pressure (SLP) field - its configuration and horizontal pressure gradient. This idea was implemented for analysis of extreme wind speed events over the Barents Sea. The calendar of high surface wind speed V (10 m above the surface) was prepared for events with V exceeding 99th percentile value in the central part of the Barents Sea. Analysis of probability distribution function of V was carried out on the base of ERA-Interim reanalysis data (6-hours, 0.75x0.75 degrees of latitude and longitude) for the period 1981-2010. Storm wind events number was found to be 240 days. Sea level pressure field over the sea and surrounding area was selected for each storm wind event. For the climate of the future (scenario RCP8.5), projections of SLP from CMIP5 numerical experiments were used. More than 20 climate models results of projected SLP (2006-2100) over the Barents Sea were correlated with modern storm wind SLP fields. Our calculations showed the positive tendency of annual frequency of storm SLP patterns over the Barents Sea by the end of 21st century.