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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Extreme weather events in the Baltic Sea coastline areas of Latvia

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Latvia as well as all the other Baltic states is subjected to climate change, which is believed to strengthen even more in the nearest future. The most vulnerable territories in Latvia, that are subjected to natural disasters of sea water level rise, storm surges and flooding, coastal erosion, also extremely high and low temperatures, are the ones situated in the coastal areas of the Baltic Sea and the Gulf of Riga. According to genesis 47% of total coastline is low accumulation type and 33 % are up to 5 m high coasts with different origin - dunes, moraine clay, Devonian sandstone and clay bluffs. The total length of seacoast is 498 km and be regarded as vulnerable to above mentioned extreme events. The Potsdam Institute for Climate Impact Research has calculated that Latvia (ASTRA project) coastline can expect economical losses 1 576,414 million USD. However implementing the appropriate adaptation measures losses can be reduced by 40%

To assess the magnitude of the natural hazards and their long-term changes, and work out an appropriate plan for adaptation to the climate change, it is important to analyze the meteorological data behind historical rare events in the region.

The analysis of extreme weather events in the coastal areas of the Baltic Sea is based on meteorological observations in the coastal weather stations of the territory of Latvia. Mean variables as well as extremes (sea water level, air and sea water temperature, sea ice conditions, precipitation, and wind speed) both on seasonal/monthly time scales were used. During the analysis it was stated that there has been a statistically significant increase in the mean values of air temperature and sea surface temperature over the instrumental observation period. Also the temperature extremes have been subjected to changes: there has been an increase in the number of extremely hot days and a decrease in the number of extremely cold days. The overall warming has caused changes in the processes of the sea ice formation and persistence. In general, the stations on cost of the Baltic Sea reported earlier start of sea ice formation in autumn and earlier disappearance in spring while for Gulf of Riga the latest sea ice formation and earlier disappearance were found. Annual mean and maximum sea level were gradually rising over the observation from the end of 19th century.

The increasing tendency has also been observed for the extreme wind conditions, heavy precipitation and, at some sites, also very heavy precipitation.

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