Transformation of the Russian Arctic coast due to changes of wind waves activity as climate change responce

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Global warming causes changes of those natural processes which depend on climate. Transformation of the Arctic coast depends on the changes of wind wave's activity. Highly resolving simulation data of the COSMO model are used to calculate wave's energy, variation of temperature, and so on, allowing to assess the rates of the destruction of the coasts. Traditionally this work was done on the basis of station data. However, the network of stations is rare and therefore the scales of phenomenon cannot be realistically estimated. Data of COSMO simulation allow solving this problem. COSMO-RU is a regional dynamic model, applicable for studying nonlinear feedback processes. It out-puts a wide range of consistent climate parameters including e.g. all components of the near-surface energy. water balance and wind field. Its deep-soil module can handle permafrost. It is applied to generate very-high resolution simulations for extremes with a spatial resolution of about 2.8 km. Model region covers the Western part of the Arctic region consisting of White Sea, Barents Sea and Kara Sea. Model data are validated and inter-compared to observations giving evidence of its high guality. High resolution runs performs well nearly exactly reproduces the wind frequency distribution. It provides a solid basis for assessing climatically-induced environmental changes around the Arctic coast. Wind field were used to calculate waves energy, to assess their influence on the sea coast and to assess both temporal and geographical variability of destruction of the coasts. It provides an advance in understanding of environmental response to climate variability in the Polar Regions.