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**Title:** *Impacts of the Laptev Sea polynyas on sea ice production and the atmospheric boundary layer*

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The polynyas in the Laptev Sea are considered to be highly productive areas for the formation of sea ice throughout the winter season. In addition, heat and moisture fluxes are strongly modulated by open water fractions associated with polynyas, having important consequences e.g. for the atmospheric boundary layer and ocean processes.

We present results of dynamical downscaling using simulations of the NWP model COSMO for the Laptev Sea of the Siberian Arctic. COSMO runs with 15 and 5 km horizontal resolution are nested in global GME and ERA-Interim model data for the recent climate (last decade). Sea ice information is taken from AMSR-E data. Model results are compared to in-situ data and satellite-derived results. While the resolution of reanalyses and most regional climate models is too coarse to include the impact of polynyas on the atmosphere, our data allows for studies of the boundary layer modification and associated large-scale impacts. Using the energy balance equation we are able to estimate the potential ice production for the polynyas. We find that most previous studies overestimate the polynya ice production