



## **Implementation of a thermodynamic sea ice module in the NWP model COSMO and its impact on simulations for the Laptev Sea area in the Siberian Arctic**

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Previous versions of the numerical weather prediction model COSMO (Consortium for Small-Scale Modeling) have used a constant sea ice surface temperature, but observations show a high degree of variability on sub-daily time-scales. To account for this, we have implemented a thermodynamic sea ice module in COSMO and performed simulations at a resolution of 15 km and 5 km for the Laptev Sea area in April 2008. Temporal and spatial variability of surface and 2m air temperature are verified by four automatic weather stations deployed along the edge of the West New Siberian Polynya during the TRANSDRIFT XIII-2 expedition and by surface temperature charts derived from MODIS satellite data. A remarkable agreement between the new model results and these observations demonstrates that the implemented sea ice module can be applied for short range simulations. Our COSMO simulations provide a high resolution and high quality atmospheric data set for the Laptev Sea for the period 14 to 30 April 2008. Based on this data set, we derive a mean total sea ice production rate of 0.53 km<sup>3</sup>/day for all Laptev Sea polynyas. Our results indicate that ice production in Laptev Sea polynyas has been overestimated in previous studies.