



## **Impact of sea ice cover and thickness on the regional climate model MAR simulations over the Arctic-CORDEX domain**

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Since the beginning of this century, Arctic has experienced a fast decrease in its sea ice extent, explaining in large part the observed regional climate warming (called “the Arctic Amplification”) much stronger than global average warming. Sea ice concentration (SIC) and thickness (SIT) are the main controlling factors of the Arctic Ocean surface temperature change, by isolating upper air from warmer oceanic water. In addition, a change in surface temperature disrupts the climate system, mainly by influencing regional atmospheric circulation. In most of regional climate models (RCM), SIC usually comes from large scale forcing data sets (e.g. reanalyses) and SIT is a fixed parameter as for example in the regional climate model MAR, despite its major seasonal variations. We compare here MAR simulations driven by ERA-Interim and fixed SIT to MAR simulations forced by ERA-Interim for the atmosphere and high resolution SIT and SIC from GLORYS2V4 reanalysis over the Arctic-CORDEX domain between 1993 and 2015. The aim of this study is i) to improve the representation of MAR’s boundary layer over the Arctic Ocean by reducing the biases between in situ observations and MAR simulations; ii) to estimate the impact of SIC/SIT on Arctic boundary layer and local atmospheric circulation.