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2022-03-25

Aue , L , Akperov , M , Uotila , P , Vihma , T & Rinke , A 2022 , Regional differences in cyclone impacts on Arctic sea ice concentration during winter . in EGU General Assembly 2022 . EGU General Assembly 2022 , Vienna , Austria , 23/05/2022 . https://doi.org/10.5194/egusphere-egu22-8386

http://hdl.handle.net/10138/347220
https://doi.org/10.5194/egusphere-egu22-8386

EGU22-8386
https://doi.org/10.5194/egusphere-egu22-8386
EGU General Assembly 2022


# Regional differences in cyclone impacts on Arctic sea ice concentration during winter

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Cyclone events in the Arctic strongly affect both atmospheric variables, such as wind, air temperature and clouds, and surface variables, including sea ice concentration (SIC) and turbulent heat fluxes. However, despite the progress via recent statistical studies, the overall impact of cyclones on Arctic weather, sea ice, and feedback processes between them is not quantitatively well known.

In this study we built up on previous publications and present further details on cyclone impacts on Arctic sea ice in winter by covering a wider range of timescales than before and evaluating our results separately for three different marginal seas of the Arctic Ocean. Hereby we make use of the ERA5 reanalysis and a storm tracking algorithm to analyze the temporal evolution of SIC up to two weeks around the occurrence of each cyclone and compare it with a non-cyclone reference state.

The results show an initial decrease in SIC associated with the occurrence of a cyclone for the Barents and Kara Seas, which is balanced by an increase during the following days. On the contrary, in the Greenland Sea SIC remains lower after a cyclone event for the whole analyzed time period. For all the marginal seas considered, the impact of cyclones on sea ice is intensified, if SIC at a grid cell is low and if the intensity of a cyclone is high. Ongoing work consists of providing more details about the mechanisms responsible for the identified regional differences in cyclone influence on sea ice.