

Leipziger Meteorologisches Kolloquium

Donnerstag, 14.12.2023, 16.00 Uhr, Stephanstraße 3a, Bjerknes Lecture Hall

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***From convection over sea-ice leads to roll convection in cold-air outbreaks -
LES studies***

In the context of arctic warming it is important to understand processes involved in the heat transfer from ocean to atmosphere. Even though the polar drift ice is a good isolator, frequently cracks in the sea-ice appear, which are like open windows where heat fluxes of the order of 100 W/m^2 can appear in arctic/antarctic winter. These cracks appear due to divergences in the ice drift and often have a channel-like shape, called leads. Leads are up to some hundred kilometres long and vary in width between a few meters up to some 10 of kilometres. As the heat transfer happens in terms of turbulent transport within the atmospheric boundary layer, large eddy simulations (LES) are an adequate tool to study the processes involved. In LES the bulk of turbulence is resolved explicitly and therefore results depends not much on turbulence parameterization. Anyhow, this need to be "payed" with large computational costs due to high resolution needed. In this talk the author present results on LES simulations on the convection above leads of the recent years of his work.

In the second part of the talk LES studies on polar cold-air outbreaks with relative large models domains (for LES) will be presented. It was found, that sea-ice structures in the marginal ice zone are an important driver for roll convection and cloud streets associated with it. Further, it turned out that roll convection does not increase (mean) heat fluxes, as often assumed.