

## Representation of landfast sea ice in ICON

Landfast sea ice plays a key role in shaping the Arctic and Antarctic icescapes and in air-ice-ocean interactions, especially in polynyas. However, it has been neglected in global climate models. As global climate models approach the kilometer scale, the exclusion of landfast ice becomes unthinkable. In this project, parameterizations for landfast ice will be implemented into the sea ice dynamics of ICON-O, which is the ocean component of ICON. The effect of representing landfast sea ice on the dynamics of flaw polynyas, sea ice leads and new ice formation in the Arctic Ocean is studied, as well as the interaction with the atmosphere. Therefore, simulations with the stand-alone ICON-O at horizontal resolutions of global 5km and Arctic zoom grid with 1.5km, as well as fully coupled ICON-Sapphire (5km ocean/ 10km atmosphere) are performed. The project aims at improving the sea ice component and atmosphere-sea-ice-ocean interactions in ICON.