

On the generation of Maud Rise polynyas in the Weddell Sea

Open ocean polynyas, offshore openings of sea ice, are an efficient way of short-cutting conventional pathways of deep water formation. The biggest open-ocean polynyas seen were the Weddell Sea polynyas in the 1970s. A polynya of this size and duration has not reopened in the last 50 years. Instead, open-ocean polynyas are irregularly found at Maud Rise, a seamount in the Weddell Sea, for example, in 2016 and 2017. The formation processes of these Maud Rise polynyas are not known with certainty, and it is a challenge to generate them reasonably well in ocean models. This thesis investigates the mechanisms leading to the most recent Maud Rise Polynyas in 2016 and 2017 from a modeling perspective in combination with available observations. This thesis highlights the need to improve the convection scheme in numerical simulations and the complex chain of processes leading to the generation of the most recent polynyas.



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