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The atmospheric response to the Weddell Sea Polynya

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The Weddell Sea Polynya is a large opening within the sea ice cover of the Weddell sea sector, typically found sitting over the Maud Rise in its largest occurrences. It has been a rare event in the satellite period, appearing throughout the 1970s and again in 2016/17. Many mechanisms have been suggested to cause the onset of the Weddell Sea Polynya, from deep convection of the ocean and upwelling at the Maud Rise, in addition to increased cyclone activity and the influence of atmospheric rivers. It is thought that with increasing atmospheric greenhouse gasses, the Weddell Sea Polynya will be even less frequent, due to an intensification of the haline stratification within the polynya region. The opening of the polynya creates an ocean to air heat flux in the cooler months, with the potential to influence atmospheric dynamics. The atmospheric response to the polynya and regional ice loss may be observed locally within the low-pressure region of the Weddell Sea or further afield climate. Here, we use high and low resolution AGCM experiments with the HadGEM3 UK Met Office model, alongside PRIMAVERA high-resolution analysis of the polynya, to evaluate the atmospheric response to the polynya and associated features, in addition to the role of model resolution in resolving the polynya and its associated features.