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Atmospheric circulation response to Arctic sea ice loss

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The Arctic is warming at a rate greater than the global mean temperature rise, this is a contributory factor in the reduction of Arctic sea ice cover. Arctic sea ice coverage has been reducing at an accelerated rate over the past decade and the lowest ever recorded ice extent was in September 2012. The reduction in sea ice cover increases the amount of absorbed shortwave solar radiation. This increased energy is transferred from the ocean to the atmosphere during the ice growth season, this in turn further warms the Arctic atmosphere.

The purpose of this study is to understand how the atmosphere may respond to the loss of Arctic sea ice. This includes how the ice loss affects remote locations through large-scale changes in the atmospheric circulation and the identification of any potential feedbacks in the system.

This presentation will show the results of semi-idealized atmosphere only GCM experiments where annually repeating cycles of sea ice and sea surface temperatures are prescribed as the boundary conditions. The experiments have been performed on the Met Office climate model HadGEM3(N96L85). A reference period of 1996-2005 is used in the control experiment and the perturbation period is defined to be 2007-2011. The ERA-Interim data show that the Eurasian Arctic is anomalously warm in Spring and that there are distinct circulation anomalies in Summer. This study aims to understand the thermal and circulation responses with a particular focus in Spring and Summer.