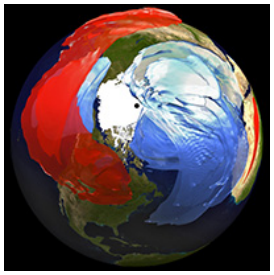

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The impact of Arctic sea-ice anomalies on the stratospheric polar vortex

Tuesday, 19 November 2019 11:30 (30 minutes)

Recent studies have proposed that regional Arctic sea-ice anomalies influence planetary wave propagation into the stratosphere and so affect the strength and location of the stratospheric polar vortex. The polar stratosphere, in turn, is known to significantly influence polar and midlatitude tropospheric weather patterns, including affecting the likelihood of cold-air outbreaks and blocking events. This 'stratospheric pathway' connecting Arctic sea-ice and midlatitude weather is therefore an important potential source of predictability over seasonal time scales.

Here I will discuss some recent and ongoing work aimed at understanding the mechanisms and robustness of the connection between Arctic sea-ice and the polar stratosphere. First I will discuss an analysis of decadal trends using two large ensembles of historical simulations with coupled climate models. This reveals that while several ensemble members simulate a weakening and shift of the stratospheric polar vortex similar to that observed, there is no robust connection between polar vortex strength and regional or pan-Arctic sea-ice anomalies in either ensemble. This is somewhat surprising given that several recent modelling studies with imposed regional sea-ice anomalies have found such a connection. I will then discuss some ongoing work, aimed at understanding this discrepancy, using an idealised atmospheric model. This focuses both on the impact of the model's representation of the stratosphere on the sea-ice-stratosphere pathway, as well as the effect of sea-ice anomalies imposed in different regions of the Arctic.

Primary author: SEVIOUR, William (University of Bristol)

Presenter: SEVIOUR, William (University of Bristol)

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