



Separating the impact of sea ice and sea surface temperature changes on Arctic climate and its linkages to mid-latitudes

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Arctic climate change is strongly influenced by changed surface conditions like declining sea ice cover and rising sea surface temperatures. These changes are not confined to the Arctic, but interact with the global climate system. We performed time-slice model experiments with changed sea ice and sea surface temperature conditions. These experiments are analyzed in relation to reanalysis data aiming at a separation between the effects of sea ice and sea surface temperature and focusing on linkages between the Arctic and mid-latitudes in winter. The diagnostics involve cyclone tracking, blocking analysis and vertical wave propagation analysis. This framework allows to further characterize the relevance of tropospheric and stratospheric pathways. Results show that reanalysis results are best reproduced with the combined effect of sea ice and sea surface temperatures. Anyway, the reproduction is far from perfect and additional insights on further experiments and model improvements will be given considering the boundary layer as well as the stratosphere.