



On the Discrepancy between Observed and CMIP5 Multi-Model Simulated Barents Sea Winter Sea Ice Decline

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This study aims to understand the relative roles of external forcing vs. internal climate variability in causing the observed Barents Sea winter sea ice extent (SIE) decline since 1979. We identify major discrepancies in the spatial patterns of winter Northern Hemisphere sea ice concentration trends over the satellite period between observations and CMIP5 multi-model mean externally forced response. The CMIP5 externally forced decline in Barents Sea winter SIE is much weaker than that observed. Across CMIP5 ensemble members, March Barents Sea SIE trends have little correlation with global mean surface air temperature trends, but are strongly anti-correlated with trends in Atlantic heat transport across the Barents Sea Opening. Further comparison with control simulations from coupled climate models suggests that the enhanced Atlantic heat transport across the Barents Sea Opening associated with regional internal variability has played a leading role in the observed decline in winter Barents Sea SIE since 1979.