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Arctic Sea Ice Loss Weakens Northern Hemisphere Summertime Storminess but Not Until the Late 21st Century

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Abstract

Observations show Arctic sea ice has declined and midlatitude storminess has weakened during Northern Hemisphere (NH) summertime. It is currently unclear whether Arctic sea ice loss impacts summertime storminess because most previous work focuses on other seasons. Here we quantify the impact of Arctic sea ice loss on NH summertime storminess using equilibrium and transient climate model simulations. The equilibrium simulations show mid-to-late 21st century Arctic sea ice loss weakens summertime storminess, but only in the presence of ocean coupling. With ocean coupling, the equator-to-pole temperature and atmospheric energy gradients significantly weaken due to increased surface turbulent flux in the polar region following Arctic sea ice loss. The transient simulations show Arctic sea ice loss does not significantly weaken summertime storminess until the late 21st century. Furthermore, Arctic Amplification, which is dominated by Arctic sea ice loss in the present day, does not significantly impact the present-day weakening of summertime storminess.


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