



## The Impacts of Climate Change on Atmospheric Circulations

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### Message from the Guest Editors

Dear Colleagues,

Studies of the impacts of climate change demand that observations and simulations be connected, which itself results from interactions across scales. Statistical and dynamical downscaling, and machine learning all leverage these connections in complementary ways. Attribution studies connect individual events to the new climate we have found ourselves in, and mechanistic studies of circulation change increasingly connect multiple circulation regimes—from the nearly barotropic tropics to the quasi-geostrophic midlatitudes, boundary layer turbulence, and the laminar free atmosphere above.

This issue aims to (1) capture the current state of our understanding of the interconnected atmospheric circulation response to global warming, and to (2) highlight key areas where the horizon of our understanding is being advanced. Topics include:

- Arctic–mid-latitude interactions;
- Tropical–extratropical interactions;
- Troposphere–stratosphere interactions;
- Atmosphere–ocean–cryosphere coupling;
- Land–atmosphere coupling, including biosphere–atmosphere coupling;
- Interactions between scales.





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## Message from the Editor-in-Chief

Continued developments in instrumentation and modeling have driven atmospheric science to become increasingly more complex with a deeper understanding of concepts, mechanisms, and interactions. This is the field that innovation built and it has led to a better appreciation for the complexity with atmosphere. Human life is intertwined in this complexity as we strive to better understand our atmosphere. Climate change is constantly stretching the limits of our thinking and forcing new ideas and concepts to be played out. Welcome to the Anthropocene!

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