



## **What can model-simulated present-day Antarctic sea-ice biases tell us about uncertainty in projections of 21st century climate change at high southern latitudes?**

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Many climate models exhibit large biases in climatological mean Antarctic sea ice area (SIA) in their historical simulations. These biases are strongly related to multi-model uncertainty in CMIP5 ensemble projections of 21st century change in sea ice ( $r = -0.86$ ), thus providing a link between a historical observable variable and simulated future change. Understanding this relationship and its link to broader climate change at high southern latitudes is potentially important for reducing uncertainty in long-term climate projections over Antarctica and southern mid-latitudes.

Over the Antarctic continent projected changes in Antarctic-wide net precipitation and temperature are found to be strongly associated with simulated historical mean SIA (e.g. cross-model correlations of  $r = 0.77$  and  $0.70$ ). This is consistent with previous research emphasising the importance of Southern Ocean sea surface conditions in influencing climate over the whole of Antarctica.

Results exploring implications of the above relationships for mid-latitude meridional temperature gradients and the Southern Hemisphere tropospheric jet will be shown. A key finding is that approximately 45% of the CMIP5 variance in projected future change in jet strength is related to historical climatological sea ice area. However, no significant relationship with projected jet shift is found. Possible explanations for this and broader implications will be discussed.