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Influence of anthropogenic forcing and internal climate variability on winds over the Amundsen Sea shelf

Paul Holland¹, Thomas Bracegirdle¹, Pierre Dutrieux¹, Kaitlin Naughten¹, David Schneider^{2,3}, Gemma O'Connor⁴, Eric Steig⁴, and Adrian Jenkins⁵

¹British Antarctic Survey, Cambridge, UK

²National Center for Atmospheric Research, Boulder, USA

³University of Colorado, Boulder, USA

⁴University of Washington, Seattle, USA

⁵Northumbria University, Newcastle, UK

Ocean-driven ice loss from the West Antarctic Ice Sheet (WAIS) is a significant contributor to sea-level rise. In the 20th century, modelled wind trends over the Amundsen Sea imply an ocean warming that could explain this ice loss. In this presentation, climate model simulations are used to separate internal and anthropogenic influences on these wind trends. Tropical Pacific variability is found to be most influential in winter and over the Amundsen Sea continental shelf, while greenhouse gases and ozone depletion are dominant in summer and north of the shelf. Model projections feature strong wind trends that imply future ocean warming. In these projections, moderate greenhouse-gas mitigation has no influence on wind trends near the Amundsen Sea shelf. Internal climate variability creates a large and irreducible uncertainty in winds over the shelf. This complex regional and seasonal interplay between anthropogenic forcing and internal variability may determine the attribution and projection of ice loss from the WAIS.