



The Role of feedbacks in Antarctic sea ice change

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The changes in Antarctic sea ice over the last thirty years have a strong seasonal dependence, and the way these changes grow in spring and decay in autumn suggests that feedbacks are strongly involved. The changes may ultimately be caused by atmospheric warming, the winds, snowfall changes, etc., but we cannot understand these forcings without first untangling the feedbacks.

A highly simplified sea ice –mixed layer model has been used to investigate the importance of feedbacks on the evolution of sea ice. Two contrasting regions in the Southern Ocean were studied; the Amundsen Sea where sea ice extent has been decreasing, and the Weddell Sea where it has been expanding.

Processes studied include i) ocean mixing of warm deep waters, ii) the impact of sea ice growth and melt cycles on the mixed layer depth, iii) the albedo feedback, iv) the ice thickness –insulation feedback, and v) changes in the freezing temperature of the mixed layer.