

## Modelling the Stability of Antarctic ice sheet in the past interglacials and its implication on future projection.

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Ice sheet volume changes are the largest potential source of sea level change in the past and future. Projection of the ice sheet in future has been challenging and requires different approach from other components of climate system for model validation because of two main reasons. One is its millennial-scale long response time to external forcing which leads to its long commitment. The other is the existence of threshold or tipping point in the system which characterizes the irreversible behavior under climate changes. It can make a large difference in Antarctica ice sheet volume even under a small change in forcing. Here we show the case studies of the last interglacial climate and Antarctic ice sheet compared to the present interglacial. Multiple lines of evidence show that the sea level was higher at the last interglacial than today and the Antarctica ice sheet mass loss may have contributed substantially to it. One study using NCAR CCSM3 climate model and another one using MIROC 4m both simulate the climate change from the penultimate glacial maximum to the last interglacial and are compared with ice core studies and paleoceanography studies. Several ice sheet modelling studies show a mass loss of Antarctica ice sheet at the last interglacials under a few degree warmer conditions than our current interglacial. It is shown in many models that subsurface ocean warming and the marine ice sheet instability are the key processes. There are still many steps needed to link the lessons from modelling the interglacials to the model validation for future projection through both domestic and international collaboration.

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