



Simulations of ice flux through Totten Glacier as ice shelf calving changes

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Totten glacier is one of the most important ocean portals for the East Antarctic ice sheet. Melt rates under the ice shelf in front of the glacier are very high, and the ice shelf seems to suffer from extensive basal melt-induced calving. The ice shelf is underlain by a relatively narrow and convoluted cavity, which recent resurveying suggests maybe substantially different from Bedmap2 geometry. Here we use the BISICLES ice flow model and ice shelf buttressing derived from inverse modeling to simulate present day ice dynamics. We then use a discrete particle model so simulate ice shelf fracturing to simulate how the ice shelf geometry, calving patterns and buttressing force could evolve. The new ice shelf geometry is then used with the continuum model to assess ice flux through the region 50 years into the future. The results suggest considerable changes in glacier-ice shelf configuration, but which are sensitive to ice shelf pinning points and sub-shelf cavity geometry.