

**THE HYDRAULIC CONNECTION BETWEEN BEAVER LAKE AND THE OCEAN
BENEATH THE AMERY ICE SHELF**

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Beaver Lake, an epishelf lake, is a large mostly freshwater lake in hydraulic connection with the open ocean via the waters beneath the Amery Ice Shelf. The hydraulic connection is unknown and complicates tidal predictions and the interpretation of sea level in the region. Observations show Beaver Lake tides lag tides beneath the Amery Ice Shelf by about an hour. The phase lag can be due to a narrow inlet, created by the overlying ice shelf, restricting flow in and out of Beaver Lake. A simple model of the lake show the channel dimensions required for the phase lag. Synthetic Aperture Radar imagery is used to define the lake edge and ice shelf boundary, the bathymetry is interpolated from depth records taken near the shore from lake chemistry and biology studies and the overlying ice shelf draft is derived from ice thickness data. Modelled and observed tidal data are also presented. The model can be used to improve tidal predictions in Beaver Lake and beneath the Amery Ice Shelf. The phase lag can be a useful proxy for monitoring the thickness of the overlying ice shelf.