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On the modified Circumpolar Deep Water upwelling over the Four Ladies Bank in Prydz Bay, East Antarctica

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We report on mooring observations of tidal currents in Prydz Bay, East Antarctica. Tides in Prydz Bay are mixed diurnal-semidiurnal and much weaker than that in the Ross Sea and the Weddell Sea, with the spatial and temporal averaged value of 2.58 cm s^{-1} for all the current meter observations over the continental shelf. The major axes of the tidal ellipses are generally aligned south-north, probably steered by the topography. The tidal phases are modulated by both the baroclinic and barotropic tidal components. The averaged tidal kinetic energy can account for a fraction of ~13% with respect to the total kinetic energy at the Amery Ice Shelf calving front during the observing period. The long-term average tidal heat flux across the Amery Ice Shelf calving front is negligible, but the ratio of the tidal heat flux standard deviation to the residual heat flux standard deviation can be up to 41%. We also report on borehole observations of tide-like pulsing of potential temperature and salinity, indicating the indispensable tidal influences in the ice-ocean boundary layer. These mooring and borehole data support that the tidal processes should be highlighted in the investigations of the interaction between the Amery Ice Shelf and ocean.