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Sensitivity of forecasts of the Antarctic ice sheet to uncertainties in the initial state of flow and thickness change.

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Predictive simulations of changes in the size and shape of the large ice sheets of Greenland and Antarctica remain subject to a number of uncertainties. In this poster we investigate the propagation of uncertainties in the initial state of flow and thickness of the Antarctic ice sheet into the forecast of 21st and 22nd Century behaviour. The effect of uncertainty in the bed elevation and the sensitivity to grid resolution is also considered. The forecasts of the Antarctic ice sheet are made using a vertically integrated hybrid model that includes membrane stresses and the effects of vertical shearing. The initial state is constrained to match satellite observation of velocity and elevation change using an inverse method to adjust the basal drag coefficient and the viscosity of floating ice shelves. We attempt to establish the relative importance of uncertainty in bed elevation and in the initial conditions for the rate of thickness change, ice velocity, and surface elevation.