



## **Decadal invariability in the flow of Rutford Ice Stream, West Antarctica**

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We estimate long-term velocity changes of Rutford Ice Stream by comparing recent ground-based GPS measurements (2004 and 2006) with GPS measurements made a decade ago (1994 and 1996). All GPS measurement locations used in this study are from the upper reaches of the ice stream, more than 80 km upstream of the grounding line. In contrast with previous studies suggesting a slight long-term deceleration of the ice stream, we find no evidence of any decadal changes in mean velocities when averaged over two year intervals. For a number of stakes, mean velocities for much shorter time spans of a few weeks could also be calculated. These velocity estimates show significant temporal variations in flow. Flow velocities further down-stream on Rutford Ice Stream are known to vary in response to tides. We therefore suggest that these shorter-term flow variations in the upper reaches of the ice stream are also tidally induced. At all stake locations mean velocities from 1994 to 1996 agree to within 1% with mean velocities from 2004 to 2006. It therefore appears that the temporal variability in the flow of Rutford Ice Stream is limited to diurnal, weekly, and possibly monthly periods in reaction to tidal forcing, and that there is no significant decadal-scale variation in ice flow.