

Will Kamb Ice Stream Restart or Get Captured by Whillans Ice Stream? Preliminary Insights From Changes in Ice Surface Velocities in the UpC Area Between 1996 and 2004

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Understanding of temporal variability in ice stream flow is important in assessing the future contribution of West Antarctica to global sea-level changes. The stoppage of Kamb Ice Stream (KIS), ~150 years ago represents the most significant recent example of ice stream variability. It switched the Ross Sea sector of the West Antarctic ice sheet from negative to positive mass balance. However, it is unclear whether the stoppage is going to persist over longer term (1000s to 10,000s of years) or reverse over relatively short term (10s to 100s of years).

In an effort to evaluate the rate of ice surface velocity changes on KIS, we have performed GPS measurements in the UpC area during November and December 2004. This crucial area represents a transition zone between the stopped trunk of KIS and its two tributaries, which are still moving at dozens of meters per year. In addition, a number of previous investigators have measured ice velocity there in the past, providing a useful basis for velocity comparisons.

In the field, we were able to locate dozens of pole markers used by others in years 1996 and 2000 (H. Engelhardt and T. Scambos, personal communication). By re-measuring their position we can compare average ice surface velocities over the periods 1996-2004 and 2000-2004 to the original velocities (1996, 2000). The comparison reveals increases and decreases of up to a few percent. The preliminary spatial pattern of these changes indicates that ice is accelerating more clearly toward the direction of KIS trunk rather than pushing across the interstream ridge toward the Whillans Ice Stream. Our ice velocity database will increase by nearly a factor of ten after the next season, which will take place 12/2005.