

Starting and stopping basal sliding on ice streams: New insights from Whillans Ice Plain, West Antarctica

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The bidaily speed-up events of the Whillans Ice Plain, West Antarctica, provide a unique glimpse into glacier basal mechanics. Our results locate the slip initiation south of Ice Raft A, closer to the grounding line and the southernmost extent of the Ross Ice Shelf. The initiation may be controlled by a discontinuity in basal boundary conditions at the suture between two ice streams. A strong correlation between the amplitude of seismic waves generated at the rupture front and the total slip achieved over the duration of the slip event (~ 30 min) suggests slip-predictable behavior, i.e., the ability to forecast the eventual slip based on the first minute of seismic radiation. Successive slip events propagate with different rupture speeds (100-300 m/s) that strongly correlate with the inter-event duration, suggestive of a healing mechanism. The basal stress conditions currently promote freezing during inter-event periods and melting during the speed-up events. We update the results of Walter et al. (2011) with new insights from data collected in the 2010/11 field season, as well as examination of archived far-field seismic data from the last decade.

Walter, J. I., E. E. Brodsky, S. Tulaczyk, S. Y. Schwartz, and R. Pettersson (2011), Transient slip events from near-field seismic and geodetic data on a glacier fault, Whillans Ice Plain, West Antarctica, *J. Geophys. Res.*, 116, F01021, doi:10.1029/2010JF001754.