

Analyzing TAMSEIS for Seismic Events of High Temporal Regularity Beneath David Glacier in the Transantarctic Mountains

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Highly regular seismicity associated with the flow of David Glacier in the Transantarctic Mountains of Antarctica has been detected and analyzed. We used data from the Transantarctic Mountains Seismic Experiment (TAMSEIS) network, which consisted of 42 broadband seismometers deployed from November 2000 through December 2003. The seismic events recur at a regular time interval of approximately 20 min. Travel times suggest that the events originated from the base of the David Glacier (approximately 1.8 km deep in this area). P-wave first motions are consistent with low-angle reverse faulting. A fault strike of 185 degrees was calculated, which is normal to the flow of David Glacier. The events are likely caused by an asperity beneath David glacier that regularly released stress that accumulated as David Glacier flowed over the asperity. The regularity of the events is due to the constant and homogenous driving stress of the overlying ice as well as the weakness of the bed. Models of earthquake source regions that include a few asperities within a weak active fault are thought to display similar behavior.