

Repeating Glacial Earthquakes Reveal Migration of Subglacial Sticky-spots.

*Jeremy Paul Winberry¹, Audrey D Huerta¹, Howard Conway², Sridhar Anandakrishnan⁴, Richard Aster³, Michelle Koutnik², Andrew Nyblade⁴, Douglas Wiens⁵

1. Central Washington University, 2. University of Washington, 3. Colorado State University, 4. Pennsylvania State University, 5. Washington University in Saint Louis

Many glaciers primarily dissipate their gravitational potential energy by sliding along the ice-bedrock interface. In such cases, a glacier's driving stress is often balanced by regions of enhanced basal traction known as sticky-spots. While the role of sticky-spots in the force budget of glaciers and ice streams has long been recognized, their formation remains less well understood. In this presentation, we leverage recent advances in seismograph coverage in the Transantarctic Mountains (TAM) to study relatively large glacial seismic events ($> M2$) that can be observed at regional distances. We report on 5 newly discovered and one previously studied sequences of repeating glacial earthquakes. These new sequences reveal that families can remain active for up to 7 years. Additionally, by tracking subtle changes in relative arrival times as well as waveform similarity, we deduce that these sticky-spots originate from migrating bands of basal debris.

Keywords: ice sheet, repeating earthquake, glacier