

I-205 2006/07 South Pole Lake Seismic Experiment

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Radar imaging and satellite altimetry work have primarily been used to identify a catalog of >100 subglacial lakes beneath the Antarctic Ice Sheet. The South Pole Lake active seismic experiment was designed to validate the presence of a subglacial lake at the base of the ice sheet near the South Pole. Radio echo sounding of this region identifies a feature that is typical of many cataloged subglacial lakes in its radar signature and subglacial morphology. However, temperature modeling and radar reflection strength modeling have cast doubts on the presence of free water at the base of the ice sheet in this region. Seismic reflection methods were applied to image the subglacial regime near the South Pole and validate the existence of this subglacial lake [*Peters et al.*, 2008].

A party of four field members spent December 2006 and early January 2007 collecting active seismic data over the above-mentioned subglacial lake. A hot water drill was used to drill shot holes up to 30m into the ice, where explosive charges were lowered and detonated to provide the seismic source. Each shot location was surveyed in with GPS, as well as the Texan locations. Due to the difficulty in imaging the basal reflection, the main receiver array of 48 geophones remained stationary during the experiment. The early Texan configuration consisted of Texans spaced along a 2D profile at 240m intervals. The latter configuration consisted of the Texans spaced at 60m intervals over the supposed transition from lake to non-lake. All the data were collected along a 2D profile that extended a little over 10km. The documents *I-205 2006/07 South Pole Seismic Log Book* and *I-205 South Pole Source - Receiver Information* give the full details on the locations of all the sources and receivers from this experiment.

Results from this experiment have been presented in *Peters et al.* [2008] and *Peters* [2009].

Peters, L. E., S. Anandakrishnan, C. W. Holland, H. J. Horgan, D. D. Blankenship, and D. E. Voigt (2008), Seismic detection of a subglacial lake near the South Pole, Antarctica, *Geophys. Res. Lett.*, *35*, L23501, doi: 10.1029/2008GL35704.

Peters, L.E. (2009), A seismic investigation of basal conditions in glaciated regions, (PhD thesis, The Pennsylvania State University).