

## Using passive source seismic data to determine the crustal structure of the Aleutian Island Arc

*Helen A. Janiszewski (School of Arts and Sciences, Rutgers University), Geoffrey A. Abers (Lamont Doherty Earth Observatory, Columbia University), Josh A. Calkins (Lamont Doherty Earth Observatory, Columbia University), Donna J. Shillington (Lamont Doherty Earth Observatory, Columbia University)*

Passive- source seismic data collected by 15 seismic stations along the Aleutian Island Arc were analyzed with receiver functions to give estimates of the crustal thickness, as well as new insights into the intracrustal and subcrustal structure of the Aleutians. Receiver function analysis is a novel technique in the Aleutians, which have previously been the subject of several active source seismic studies. Although the Moho ranges from 25- 48 km deep along the arc, its depth below many stations is between 32- 37 km. There is also evidence for a sharp boundary approximately 24 km beneath some stations; this is likely the boundary between the middle and lower crust. This verifies results of Shillington et. al. (2004) and expands on the area covered by that study. With a more refined method that copes with the dipping layers, further constraints could be placed on the geometry of the subducting slab. By including information from active-source data, high quality  $V_p/V_s$  data may be obtained. Such data would put new and tighter constraints on the composition of the crust. These planned future analyses will better characterize the composition of the crust, and help explain how island arcs are altered to form continental crust.

The receiver functions also unexpectedly showed strong evidence for a magma chamber under the island of Akutan. Back azimuthal variations in the receiver functions correlate with the seismic stations' locations relative to the volcano on the island. This, along with forward models containing a shallow low velocity layer with high  $V_p/V_s$  have led us to the conclusion that the data are indicative of a magma chamber.

Citations: Shillington, D. J., H. J. A. Van Avendonk, W. S. Holbrook, P. B. Kelemen, and M. J. Hornbach (2004), Composition and structure of the central Aleutian island arc from arc-parallel wide-angle seismic data, *Geochem. Geophys. Geosyst.*, 5, Q10006, doi: 10.1029/2004GC000715.