09:30h
T11F-05 INVITED

Anisotropy, Mantle Flow and Scattered Surface Waves in the Kamchatka Region

* Park, J
jeffrey.park@yale.edu
Yale University, Kline Geology Laboratory P.O. Box 208109, New Haven, CT 06520-8109 United States
Levin, V
Yale University, Kline Geology Laboratory P.O. Box 208109, New Haven, CT 06520-8109 United States
Lees, J
Yale University, Kline Geology Laboratory P.O. Box 208109, New Haven, CT 06520-8109 United States
Brandon, M T
Yale University, Kline Geology Laboratory P.O. Box 208109, New Haven, CT 06520-8109 United States
Peyton, V
Yale University, Kline Geology Laboratory P.O. Box 208109, New Haven, CT 06520-8109 United States
Gordeev, E
OMSP, 683006, Petropavlovsk, KAM Russian Federation
Chebrov, V
OMSP, 683006, Petropavlovsk, KAM Russian Federation
Ozerov, A
Institute of Volcanology, 683006, Petropavlovsk, KAM Russian Federation

Active subduction of the Pacific plate beneath the Kamchatka peninsula appears to terminate at its intersection with the Aleutian Island chain, where a transform plate boundary forms a ``corner'' with the subduction zone. Weak seismicity north of the Aleutian junction suggests that the subducting Pacific plate terminates at this point, dangling a slab edge into the ambient upper mantle flow. By analogy with the Lau Basin in the Tonga region, slab rollback at the Aleutian corner could lead to slab-parallel flow, and possibly transport of fore-arc asthenosphere eastward to the back-arc side. In an alternative scenario, a contiguous slab that is currently aseismic might extend north of the Aleutian junction, forming a barrier for the east-west asthenospheric flow. Mantle flow leads to peridotite deformation, preferred alignment of mantle minerals, and elastic anisotropy. Sharp lateral gradients of anisotropy would induce quasi-Love (QL) waves (Love-to-Rayleigh scattering) at $T>50$ seconds. Long-period data from the GSN station PET (Petropavlovsk-Kamchatsky) show strong QL waves, presumably associated with local mantle flow. Asthenospheric slab-parallel flow is consistent with Love waves that arrive from the north, that is, on the overriding side of the subduction zone. Arriving from the seaward side, however, long-period surface waves lack the scattered waves diagnostic of slab-parallel flow. In August 1998 a joint team of US and Russian investigators installed a network of 15 broadband portable seismometers on the Kamchatka peninsula. Data records from the portable network display long-period quasi-Love waves similar to those seen at PET, but with important differences that imply lateral variations in anisotropy. Love waves that propagate along the slab to PET show strong long-period QL-scattered energy. This behavior is confirmed by portable stations PZT and KRO near the Pacific coast, but not by station APA in the interior, suggesting that anisotropy is local to the slab. QL waves from the north are not observed at TKI, north of the Aleutian junction at the base of peninsula; therefore evidence for slab-parallel flow beneath the

7218 Lithosphere and upper mantle
7255 Surface waves and free oscillations
8120 Dynamics of lithosphere and mantle--general
8150 Plate boundary--general (3040)
1999 AGU Fall Meeting