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Crust and Upper mantle structure revealed by simulated annealing inversion of receiver functions

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Mt. Fuji has ejected a huge amount of basaltic products during the last 100,000 years. Even though the region around Mt. Fuji is tectonically active, the seismicity below Mt. Fuji is low, resulting in little knowledge about the seismic structure there. To gain more insight into the magma-plumbing system, we obtain the seismic structure beneath Mt. Fuji by the receiver function (RF) technique. Cross sections of RF amplitudes reveal two distinct velocity boundaries around Mt. Fuji, at depths of 40?50 km and 20?30 km, which we interpret to be the boundary between the crust-mantle transition layer (CMTL) and the uppermost mantle of the Izu-Bonin arc (IBA) and the velocity discontinuity just below the region where low- frequency earthquakes (LFEs) of Mt. Fuji have occurred, respectively. The velocity boundary at about 50-km depth shows a clear gap just beneath Mt. Fuji. We suggest that this gap represents a weaker velocity contrast zone through which the magma of Mt. Fuji ascends from the Pacific (PAC) plate. We investigate the velocity structure around Mt. Fuji by simulated annealing inversion of receiver functions. Velocity structure are constrained by combining receiver functions and dispersion curves. Each dispersion curve is calculated using the velocity structure obtained from an ambient noise surface wave tomography by Nishida et al. (2008). Preliminary calculation reveals that a low-velocity region around 20 km depth explains all the characteristics of RFs near Mt. Fuji, leading us to interpret the high velocity boundary just below the LFE region as the lower boundary of Mt. Fuji's magma chamber.

Keywords: receiver function analysis, seismic structure below volcanoes, Mt. Fuji