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A sharp lateral gradient of shear-wave velocity at the western edge of the Pacific LLSVP

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The western margin of the Pacific LLSVP (Large Low Shear Velocity Province) in the D'' region is investigated. The differential travel times of ScS-S are measured for the rays propagating along nearly the north-south direction, which is considered to be parallel to the strike direction of the western boundary of the Pacific LLSVP. Over 190 high-quality ScS-S differential travel times from 52 events occurred in the North Pacific and Southeast Asia recorded at the broadband stations in Japan and Australia are used. The differential travel times were corrected for the contribution above D'' (250 km above the CMB) using eight global tomography models. The abrupt change in the differential travel times is very clearly observed beneath the region East of Philippine Islands, indicating a sharp lateral boundary in shear-wave velocity across this region. The Vs contrast of up to 4 percent is observed beneath the region from -4 to 4 degrees in latitude and 130 to 140 degrees in longitude, within 400-600 km. We will discuss the possible origin of the structure in terms of the thermal and chemical anomalies.

Keywords: Pacific LLSVP, ScS, D'', lowermost mantle, plume