

# The behavior of super-weak asthenosphere in the Cascadia Subduction Zone, a perspective from seismic tomography

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Observations around the base of oceanic lithospheres reveal an abrupt seismic velocity decrease and electrical conductivity increase with depth, perhaps suggesting a pervasive thin, weak layer at the top of the asthenosphere. The behavior of such a layer at subduction zones remains largely unexplored. We use on and offshore seismic experiments to generate a tomographic model that reveals a strong low-velocity feature beneath the subducting Juan de Fuca slab along the entire Cascadia Subduction Zone. A simple geodynamic argument shows that a thin, weak, buoyant layer beneath the oceanic lithosphere will accumulate at the hinge of the subducting slab, and we propose that the low-velocity feature we observe may result from this accumulation.

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