

SIT004-09

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Slab subduction processes in a depth range 400-1000 km around the Circum Pacific

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There have been many tomographic studies to sharpen the images of deeply subducted slabs but, to our knowledge, none of them addressed the possible unique role of the uppermost lower mantle in the processes of slab subduction. We made a systematic survey of the slab images around the Circum Pacific in our P-wave tomographic model to show that a subducting slab is now in one of the following four stages:

- A. Slab is stagnant above the 660.
- B. Stagnant slab begins to penetrate the 660.
- C. Penetrated slab is trapped in the uppermost lower mantle.
- D. Trapped slab begins to penetrate well into the deep lower mantle.

We interpret A to D as the successive stages of slab subduction through the mantle transition region from 400 to 1000 km depths. In particular, we emphasize C as a distinct stage of slab subduction. Although the 660 is often interpreted as not only the boundary of phase transition but also the boundary of viscosity contrast, the distinct stage C implies that viscosity increase does not occur sharply across the 660 but gradually through the uppermost part of the lower mantle.

Keywords: mantle dynamics, mantle viscosity