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# マントル遷移層に滞留、660-km 層を貫通、下部マントル最上部にトラップされるスラブ
# Subducted slabs stagnant above, penetrating through and trapped below the 660-km discontinuity

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We constructed a new P-wave tomographic model of the mantle using more than ten millions of travel time data. The finite frequency effect of seismic ray was taken into account by calculating banana-donut kernels at 2 Hz for all the first arrival data and at 0.1 Hz for the broadband differential travel time data. Based on this model, a systematic survey was made for subducted slab images around the Circum Pacific including Kurile, Honshu, Izu-Bonin, Mariana, Java, Tonga-Kermadec, southern and northern South America, and Central America. This survey clarified a progressive lateral variation of slab configuration along the arc or through the arc to arc, where a subducted slab is in general in one or two of the following four stages: I. slab stagnant above the 660, II. slab penetrating the 660, III. slab trapped in the uppermost lower mantle (660 to ˜1000 km in depth), and IV. slab descending well into the deep lower mantle. The majority of the slab images are either at stage I or III. We interpret I to IV as the successive stages of slab subduction through the transition region with the 660 at the middle, where I and III are relatively stable or neutral stages and II and IV are relatively unstable, transient stages. In particular, we emphasize III as a distinct stage of slab subduction.The presence of this stage may be a consequence of significant softening of the penetrated slab that has undergone post-spinel phase transition. There is a remarkable distinction in deepest hypocentral distribution between a slab at stage I and a slab at stage II or III. Deepest earthquakes occurring within the slab now stagnant above the 660 are limited to depths above ˜620 km and often aligned subhorizontally. Those occurring in the slab penetrating the 660 extend in depth well beyond ˜620 km and are aligned very steeply. All of these observations point to significance of regarding the uppermost lower mantle as a part of the mantle transition region (Bullen, 1963) from the view point of mantle dynamics.

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