

Deformation of the Philippine Sea Slab and its Implication for the Tectonics of Central and Western Japan

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In this study, I estimate the contraction rate in central and western Japan from deformation of the Philippine Sea slab. Usually a slab subducts with little deformation as indicated by the slab contour lines that are nearly parallel to the trench in most subduction zones. Little deformation of slabs is reasonable from the view point of elastic energy.

However, the Philippine Sea slab is an exception; large deformation of it beneath central Japan has been estimated from hypocenter distributions, receiver function analyses, and seismic waveform tomography. It is considered that such large deformation is caused by east-west contraction, which prevails in the most area of Japanese islands.

Observed characteristics of the deformation of the Philippine Sea slab are as follows: (1) little deformation in the west of the Kii strait; in the east of the Kii strait, (2) little deformation in the region between the Nankai trough and the coast line, (3) progressively accumulated deformation to the north of the coast line. Little deformation in the west of the Kii strait is consistent with less number of active faults and their commonly slow displacement rates.

The deformation rate of the Philippine Sea slab related to the characteristic (3) is estimated to be about 5 - 10 km/Ma. This estimate would give the minimum contraction rate in the crust of the Chubu and Kinki district, Japan.

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