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Deformation of the Philippine Sea slab and its implication for tectonics of central and western Japan

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The contraction rate in central and western Japan was estimated from the deformation of the Philippine sea slab. Usually a slab subducts with little deformation as indicated by the slab contour lines which are nearly parallel to the trench. Little deformation of slabs is also reasonable from the point of view of elastic energy.

However, large deformation of the Philippine Sea slab under central Japan has been estimated from hypocenter distributions, receiver function analyses, and tomography. Such large deformation is considered to be caused by east-west contraction, which prevails in the most area of Japan.

Observed characteristics of the deformation in 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) was 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.

Keywords: slab, deformation, Philippine Sea Plate, Kinki triangle, central Japan