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Split Philippine Sea Plate beneath Western Japan

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The shape of the Philippine Sea Plate subducting beneath western Japan is a crucial factor in understanding earthquakes and volcanic activity. We propose that the subducted plate was split along an extinct ridge due to an abrupt change of subduction direction, followed by elastic deformation of the plate and an accumulation of stress near the ridge. This shape is consistent with receiver function images, the distribution of deep tremor sources, the seismicity and focal mechanisms of intraplate earthquakes, and the distribution of anomalous ratios of helium isotopes in ground water. The movement history of the plate can explain active tectonics in western Japan in the last 2?4 Ma. The location history of the volcanic front and the tear control where fluids ascend in the crust, and these fluids are responsible for the generation of large earthquakes and volcanoes.

Keywords: Philippine Sea Plate, Plate motion, Receiver function