

## **Detecting Aseismic Slab Beneath Philippine Sea Plate from Formosa Array in Northern Taiwan**

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The plenty of earthquakes occurred within the Benioff zone clearly show the Philippine Sea plate is subducting northward beneath the Eurasian plate in the northeastern Taiwan area while the Eurasian plate underthrusts the Philippine Sea plate in the southern Taiwan area. For explaining the flipping of subduction polarity in Taiwan, a tectonic model that involves breakoff of the east-dipping Eurasian slab might be required. To examine a possible breakoff slab beneath northern Taiwan, we have taken advantage of the densely seismic data recorded at Formosa Array in northern Taiwan. Such a dense array provides a powerful ability not only to look for the consistently seismic energy reflected from the deep detached slab, but also to constrain the geometry and depth of the reflector. At first, we found that the unambiguous later P-waves generated by two deep earthquakes were well recorded at the entire seismic array. Secondly, the source location of those later P-waves was estimated by both arrival times and polarizations of incident seismic waves. Thirdly, a ray-tracing modeling of both ray-paths and their travel-times was conducted for constraining the reflector geometry. Finally, a tectonic model with a breakoff slab was proposed to explain the tectonic evolution of Taiwan orogeny.

**Keywords:** Aseismic slab, Eurasian plate, seismic reflections, Formosa Array, Taiwan