

Key Tectonic Controversies in the Cenozoic Western Pacific and East Asian regions

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The western Pacific region and the East Asian continental margin in the Cenozoic period is the place where the dynamic plate interactions have kept going and the unsolved queries remain in local and global scales and in short and long geological time scales. The followings are key controversies to answer the queries;

1. What is the main framework in modern geodynamic activity? The classic “Eurasian-North American plate boundary hypothesis for the northern Japan and Hokkaido” is still used in many cases but recent blooming geodetic observations especially from the Asian continent require the redefinition. When is the modern tectonic framework started or reset is also controversial.
2. The Neogene interaction between the SW Japan and the Philippine Sea Plate is quite controversial. The traditional hypothesis insists the early Middle Miocene arrival of the Izu-Bonin-Mariana arc at almost present location but recent hypotheses emphasize the late Miocene arrival. Unusual magmatic activity in the Middle Miocene outer SW Japan was hypothesized mainly by spreading ridge encounter with the trench but recent one insists the collision of active island arc.
3. Hokkaido-Sakhalin region was a subduction zone in the Cretaceous time but changed to an oblique collision zone in Eocene-Oligocene. The timing coincides with the global plate reorganization (e.g. the classic Hawaii-Emperor bent and recent hypothesis of the encounter of the Izanagi-Pacific spreading ridge with the subduction zone). Were these events intimately related and is there evidence to the causal relationship?
4. If the Eocene-Oligocene global plate reorganization were true, the related geologic events are observed in all other regions? Continuous growth of accretionary complex and magmatic activity with short interruptions in SW Japan is controversial from this point of view.
5. Timing, kinematics, and the essential cause of the back-arc basins; the Japan Sea, Kuril Basin, Okinawa Trough, South China Sea and others are still a matter of controversial.
6. What is the answer from the seismic tomography for the mantle beneath the Asia and western Pacific regions to these queries?
7. Synthesizing all these answers, can we solve a chicken-egg controversy of the “top-down vs bottom-up” for the tectonics in the western Pacific and Asian regions?

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