

Early Cenozoic large plate tectonic reorganization in the Pacific Ocean and its record in accretionary complex in western Pacific margin

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Late Paleocene to early Eocene (~50 -42 Ma) is regarded as a period of large organization of the Pacific and other plates and appears to have taken place related tectonic events along the circum-Pacific subduction zone. A hypothesis suggests that it might have been caused by subduction initiation along the Izu-Bonin-Mariana margin following the subduction of the Izanagi-Pacific oceanic ridge, and resulted in the change in moving vector of the Pacific Plate. The hypothesis has been controversial but revived with new observations of stagnant slabs beneath the Asian continent and others.

We examined the geology of the late Cretaceous and early Cenozoic accretion complexes of the Shimanto Belt and others in the Japanese islands. In that period, the Japanese islands were located along the continental margin because it was the before the Oligo-Miocene rifting and opening of the Japan Sea.

The Shimanto belt is subdivided into two subbelts; northern and southern subbelts. The youngest portion of the northern Shimanto belt is the latest Cretaceous to the earliest Paleocene in age and includes N-MORB type basaltic blocks with a short age gap with terrigenous trench filling sediments. Previous studies hypothesized that in-situ magmatic eruption in the trench but it was denied by detailed geological, structural, and chemical investigation for the relationship between the basalt and surroundings. Instead of the in-situ eruption hypothesis, very hot plate subduction and seismogenic megathrusting is proposed. Other parts of the late Cretaceous northern Shimanto Belt indicate oceanic plate older than the terrigenous trench filling sediments was subducted. This observation is inconsistent with the commonly popular ~80 Ma Kula-Pacific ridge subduction hypothesis.

Between the northern and southern Shimanto Belts, is recognized a large tectonic gap named the Nobeoka thrust in Kyushu and the Aki Tectonic Line in Shikoku. Several m.y. age gap is common between the subbelts and northernmost portion of the southern Shimanto belts is composed dominantly of Eocene terrigenous sediments of accretionary complex. Locally they include basaltic blocks without thick pelagic sediments but just hemipelagic shale. Thermal overprints reconstructed by illite crystallinity, vitrinite reflectance, and fission track ages of zircons are high in general and dated mainly in Eocene just after the deposition.

These facts suggest the rapid development of accretionary prism after the tectonic break in earliest Paleocene took place with thermal event.

The other prominent Eocene event is the development of the coal mine fields from Kyushu, mainland Honshu to Hokkaido, and Sakhalin, Russia along the Asian continental margin more than 2,000 km. These regional developments of coal fields along the Asian margin after the Paleocene tectonic break in the accretion complex are quite prominent and informative. We suggest that all these events in early Cenozoic might have been related to global scale reorganization of plate tectonics.