

Collision Tectonics Involving Oceanic Plateau and Island arc
- a Comparative Study -

Asahiko Taira¹ (+81-3-5351-6437; ataira@ori.u-tokyo.ac.jp)

Paul Mann²

Saneatsu Saito¹

Kan Aoike¹

KH98-1 Shipboard Scientific Party

¹Ocean Research Institute, University of Tokyo, Minamidai, Nakano-ku, Tokyo 164-8639, Japan

²Institute of Geophysics, University of Texas at Austin, Austin, TX 78759, United States

Collision of oceanic "buoyant features" such as oceanic arcs and plateaus at convergent plate boundary is one of main mechanisms of extensive crustal deformation, arc reversal and orogenic belt formation. Collision of the Ontong Java Plateau (OJP) against the Solomon arc (OJP collision zone) represents collisional tectonics of a gigantic oceanic plateau against an arc. OJP collision zone was studied by recent two expeditions: EW95-11(R/V Maurice Ewing) and KH98-1(R/V Hakuho-maru). Izu collision zone (collision of the Izu-Bonin arc against the Honshu arc in central Japan) and its vicinity represent an zone of active arc-arc collision with coeval deformation of accretionary prism. The Izu-Bonin arc crust is about 20 km thick and characterized by a 6.2 km/sec, possibly felsic layer at mid-crustal level (Suyehiro et al.,1996). On the other hand, the OJP crust shows 35 km thickness with no 6.2 km/sec layer comparable with arc crust. We believe OJP crust is exclusively made of mafic and ultramafic rocks. Several lines of evidence indicate that the upper 6-7 km thick layer of OJP has been accreted to form an accretionary prism at the Northern Solomon trench. A similar accretionary complex, although compositional more felsic, is also recognized at Izu-collision zone where crustal slices of Izu-Bonin arc have been added to Honshu arc. Compiling examples of other collision zones, we suggest that arc collision is an important mechanism for juvenile crust addition to continental crust. On the other hand, oceanic plateau collision may leave relatively small amount of crustal materials as an accretionary prism. Majority of plateau crust, in stead, seems to be subducted into the mantle. This contrasting survival rate of arc vs. plateau at convergent margin may have important implication for the origin of Archean greenstone belt and early continental growth.