Geophysical Research Abstracts, Vol. 8, 05510, 2006
SRef-ID: 1607-7962/gra/EGU06-A-05510

Mountain Building Processes of Japan - Present and Past

Gaku Kimura
Department of Earth and Planetary Science, The University of Tokyo, Japan

Mountain building process is not only the issue to study how to make highly raised mountain chain but also how to create and modify the continental crust and how to contribute to in-and-out mass fluxes in solid earth. From this point of views, subduction zone is a quite important scientific target for the mountain building processes because the zone is a primary setting to create and recycle the continental crust.

The continental growth in subduction zone is progressed through two processes: magmatic one due to arc-magmatism and episodic oceanic-ridge trench encounter and tectonic process due to accretion. Tectonic accretion is also two-folded: sediment accretion due to the growth of accretionary prism and collision of island arc and/or continental fragments.

Modern southwest Japan is one of the best fields in the world. From the east to the west, arc-arc collision, collision of several giant seamounts and development of huge accretionary prism is going at present Nankai Trough. Present dynamic process is been monitored in terms of highly dense GPS and seismometer network on land. The observation documents that southwest Japan is now strongly coupled with subducting Phillipine Sea Plate and the large earthquake is come again in this century. Historical, archeological and geological investigations document that the large earthquake has repeatedly occurred in the past of several tens of thousand years. Time integration of these earthquakes has been resulted in the growth of accretionary prism and mountain building.

Integrated geophysical studies for the Nankai Trough suggests that the plate boundary fault zone is systematically transformed from aseismic frontal decollement to seimogenic one and that the shape of accretionary prism is systematically transformed to thickened one in association with this transformation. Reflectivity of the boundary

fault suggests that fluid behavior is of a primary importance.

On land study of plate boundary rocks exhumed from seismogenic depth also suggests fluid-rock interaction of the plate boundary zone would control dynamic behavior of the zone and therefore the long-term growth of accretionary prism and mountain building in subduction zone.