Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SCG04-P01 Room:Convention Hall Time:May 21 14:00-15:00

Chronology and Sr isotope study for Cretaceous and Paleogene Granitic Rocks SW Japan

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We especially focus on (1)spatial-temporal variation of granitic rock, (2) temporal variation of isotopic signature and whole rock chemistry and (3) tectonic and dynamic setting that caused the observed spatial-temporal variation and provided heat for the melt generation, based on the U-Pb zircon age, whole rock chemistry and Sr isotope ratio.

U-Pb zircon age determinations using LA-ICPMS was performed on total 81 rock samples. The obtained age ranges from 95 Ma to 30 Ma, with a possible temporal gap between 60 Ma and 50 Ma. During 95-60 Ma, the systematic migration of granitoid magmatism from the south to the north occurred. We also compile temporal variation of petrological signatures from literature. As a result, we observed (1) initial ratio of Sr isotopes (87Sr/86Sr) decreased from enriched characters (0.7090-0.7065) to depleted ones (0.7065-0.7050), and (2) rock types of granitoid changed from ilmenite-series to magnetite-series.

In this study, we also conduct Sr isotope initial ratio and whole rock chemistry of dated granitic samples. Based on these results, we discuss the origin of these variations and origin of granitic rocks in the SW Japan.

SCG04-P02 Room:Convention Hall Time:May 21 14:00-15:00

Crustal reflector imaging around the Oligocene paleo arc in the Izu island arc deduced from OBS wide-angle data

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The Izu-Bonin island arc is a typical oceanic island arc formed by subduction of the Pacific plate beneath the Philippine Sea plate. In the fore-arc region of this arc, two paleo arcs (Oligocene and Eocene paleo arcs) run parallel to the volcanic front (Taylor, 1992). To understand the arc crust evolution and continental crust formation, the ultra-deep drilling to the middle crust of the Izu-Bonin arc has been proposed beneath the Oligocene paleo arc (IBM-4 site) (Tatsumi and Stern, 2006). Around the Oligocene paleo arc (IBM-4 site), the multi-channel seismic reflection (MCS) and seismic refraction study using ocean bottom seismographs (OBSs) surveys were conducted, however, this region is too deep to image the crustal structure by the MCS survey. On the other hand, in OBSs, wide-angle reflection phases reflected from reflectors in the crust are also visible. For this study, using the dataset of OBSs and the pre-stack depth migration (PSDM), we will image the seismic reflection profile in the crust around the Oligocene paleo arc.

The dataset of OBSs used this study is obtained by the wide-angle seismic survey from the volcanic front, the Oligocene paleo arc to the Eocene paleo arc in the fore-arc region off the east of Aoga-shima in 2008 (Yamashita et al., 2009). In this survey, 85 OBSs are deployed 1 km interval along this survey line having about 100 km.

In the result of PSDM, we could image the crustal structure where it was difficult to obtain reflection in the MCS profile. We find one reflector in the crust beneath the Oligocene paleo arc. It is the possible that this reflector correspond to the top of the middle crust. Moreover, the obvious reflector exists between the volcanic arc and the Oligocene paleo arc at about 15 km depth. This reflector possibly correspond the Moho.

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Paleo-arc arrangement during Eocene to Oligocene in Izu-Ogasawara forearc region revealed from seismic reflection survey

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The Izu-Bonin (Ogasawara)-Mariana (IBM) arc is known to the typical oceanic island arc, and it is the most suitable area to understand the growth process of island arc. The IBM arc consists of several arrangement which created by repetition of rifting and backarc spreading. Taylor (1992) identified Eocene and Oligocene paleo arc are located in the IBM forearc region by ODP drilling.

By previous seismic survey and deep sea drilling, convex basements are distributed along North-South direction in present forearc region. The convex basements are reported to be formed during Eocene and Oligocene (Taylor, 1992). In IBM forearc region, the middle crust with 6 km/s is recognized by seismic survey using OBSs. In IBM region, four IODP drilling sites are proposed in order to understand comprehensive growth process of arc and continental crust evolution (Tatsumi, 2008). Two of them are located in forearc region.

Japan Agency for Marine-Earth Science and Technology (JAMSTEC) carried out multi-channel seismic reflection survey using 7,800/12,000 cu.in. air gun and 5-6 km streamer with 444/204 ch hydrophones for understanding of crustal structure in the IBM region since 2004. JAMSTEC also conducted mini-MCS survey using 12 ch short streamer and 3,000 cu.in air-gun around the IBM region for linkage of volcanic sediments in 2007. We analyzed and interpreted these data in order to obtain the configuration of paleo-arc arrangement in forearc region.

In IBM forearc region, thick sedimentary basin distribute from east side of volcanic front. Two convex basement peaks are indicated in across profile of forearc region. These peaks are estimated the top of paleoarc (Eocene and Oligocene) by previous ODP drilling. We considered from MCS profiles these peaks are continued along the current volcanic arc. The distance between the Eocene and Oligocene arc is different along the NS direction. We also applied the attribute analysis for MCS profile to emphasize the reflection from volcanic basement. The profile of reflection strength shows the clear peak of volcanic arrangement. By mapping the basement high beneath the sediments, we identified the volcanic arrangement between Oligocene arc and Eocene arc. We discuss about the crustal evolution from these characteristics.