

背弧海盆の拡大と火成活動
Backarc basin spreading and volcanism

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本研究課題の議論は、Nakada and Yokose (1988) *で一部報告されている。以下のその要旨を示す。

The space and time distribution of the Cenozoic volcanic rocks from Sendai area, southwest Kyushu, Japan has been discussed. In this area, the volcanism is closely related to tectonic events: the subduction of the Philippine Sea Plate (6Ma), opening of the Kagoshima graben (3Ma) and opening of the Okinawa Trough (2Ma).

The Cenozoic volcanism can be divided into 3 stages: early stage (4-2Ma), middle stage (2-1 Ma) and late stage (0.5-0 Ma). The early stage volcanic rocks mainly comprise calc-alkali andesites. In the beginning of this stage, some andesites have similar geochemical character to adakite (such as high Sr/Y ratio). The volcanic rocks of the middle stage comprise basalts (Sendai basalts) and rhyodacites. The volcanism, as a whole, can be denoted a bimodal volcanism. The chemical character of the basalts subdivided into three rock series: high alumina basalt, low alkali tholeiite and alkali basalt. The alkali basalts indicate an OIB type and the other basalts have island arc geochemical characteristics on discrimination diagrams. Their chemical characteristics including rhyolites are identical to the rocks dredged from the base of the Okinawa Trough.

The late stage volcanism were limited to the east side of the Kagoshima graben. This stage is divided into three subgroups: andesitic stratovolcanos (Imuta and Sakurajima volcano), basaltic maars (Yonemaru and Sumiyoshi), large-scale felsic volcanism (Aira caldera). Although the compositional gap is small, the volcanism of this stage is also bimodal in composition. The basalts in the late stage have small LILE/HFSE ratios and Nb depletion on a spider diagram in comparison with those of the middle stage.

The space and time distribution of the basaltic rocks may constrain the pattern of mantle convection. The above chemical variation observed in the basalts can be interpreted as increasing of degree of melting combined with substitution the depleted mantle source for the enriched mantle source beneath the volcanic region. The replacement of the mantle wedge may have begun with the western part at deeper level, then it may continued to the eastern part at shallow level. We propose that the Cenozoic volcanism in southwest Kyushu has been controlled by not arc-trench system, but by the counter flow of mantle convection at the back-arc region.

*: Nakada S. and Yokose H. (1998), Pliocene-Pleistocene volcanism in Sendai area, southwest Kyushu, Japan: implication for the opening of Okinawa trough. AGU 1998 Fall Meeting (San Francisco).