Spatial and temporal variation of adakitic magmatism in SW Japan

PINEDA-VELASCO, I.[1]*, KITAGAWA, H.[1], NGUYEN, T-T.[1], KOBAYASHI, K.[1] AND NAKAMURA, E.[1]

[1] PML, ISEI, Okayama Univ., Misasa, 682-0193, Japan (*correspondence: ivan.pineda@s.okayama-u.ac.jp)

Cenozoic volcanism in SW Japan is characterized by sporadic eruptions of alkaline basalts and voluminous emplacement of dacite magmas in a close spatial proximity. Dacites show adakitic composition (high Sr/Y and LREE/HREE [1]) and is attributed to melting to the young (~17 Ma) subducting slab of the Philippine Sea Plate (PHS). However, it is still uncertain the origin and temporal relationship between basalt and adakite activities.

The authors conduced a geochronological and geo-chemical analyses on adakites in SW Japan (Aonoyama, Oe-Takayama, Sambe, and Wakurayama). The K-Ar ages indicate the activity of adakites ranges from 2 Ma to Holocene era. Newly obtained data reveal that adakitic activity (~0.9 Ma) occurred in Wakurayama area, that was significantly younger age than previously considered, ~5 Ma [2]. The activities of adakites in recent 2 Myrs seem to coincide well in time with the eruption of adjacent alkaline basalts (e.g., Abu, Yokota). Such magmatic bimodality could be explained by the interaction of upwelling hot mantle and subducting slab of PHS [3].

Enrichment in Pb, Sr, and Li, and depletion in Nb, Ta, P, and Ti in adakites are consistent with the derivation of magma source from the sub-arc mantle. Double-spike Pb isotopic data defines a positive linear trend [4], suggesting the involvement of two major magma sources; PHS slab as unradiogenic end-member, and the subducting sediment as the other. Minor involvement of a third component is recognized in some adakites with higher $^{207}Pb/^{204}Pb$ at a given $^{206}Pb/^{204}Pb$. The contribution of this source is also found in closely associated alkaline basalts (Daikonjima), and could be interpreted as the local mantle.

Our results suggest that the slab melting to produce adakitic magma was induced by the interaction of subducting slab and hot buoyant mantle. Such interaction could occur at slab tears or toes. Low-velocity anomalies has been reported in a tear of PHS [5], seemingly consistent with the inference.

[1] Defand & Drummond (1990) *Nature*, **347**, 662-665. [2] Morris *et al*. (1990) *J. Southeast Asian Earth Sci*., **4**, 125-131. [3] Feineman *et al*. (2013) *Geochem. Geophys. Geosyst*., **14**, 3009-3031. [4] Pineda-Velasco et al. (2015) *Geochem. Geophys. Geosyst*., **16**, 2848-2852. [5] Huang et al. (2013) *J.l of Asian Earth Sci*., **75**, 82-94.