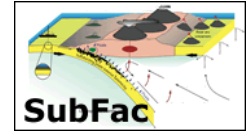


# Studies of the Izu Backarc



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This project involved a study of the role of volatiles in mantle melting across the Izu back region. Inclusions from representative olivine-bearing mafic basalt samples from across the Izu rear arc region (between latitudes ~30-32°N) were analyzed for water and major and trace elements. Results show that water and other subduction-related components contribute to Izu back arc melts across the entire rear arc region ( a distance of ~200 km). Water contents of melt inclusions range between 1-2.5 wt.% and are higher than in MORB and OIB magmas. There is a clear relation between water content of the mantle source (calculated from melt inclusions) and inferred degree of melting, calculated from inversion of trace element data (Kelley et al., 2006)\*. The relation is approximately linear and similar to that already observed in the Marianas Trough and elsewhere (Stolper and Newman, 1994\*; Kelley et al., 2006\*). This is taken as evidence that mantle water contents exert the primary control on mantle melting across the entire portion of the magmatically active Izu back arc. This also argues against a discrete “wet side – dry side” back arc spreading model (Langmuir 2006)\*, and shows that slab-derived components are supplied to the mantle wedge across the entire rear arc region.

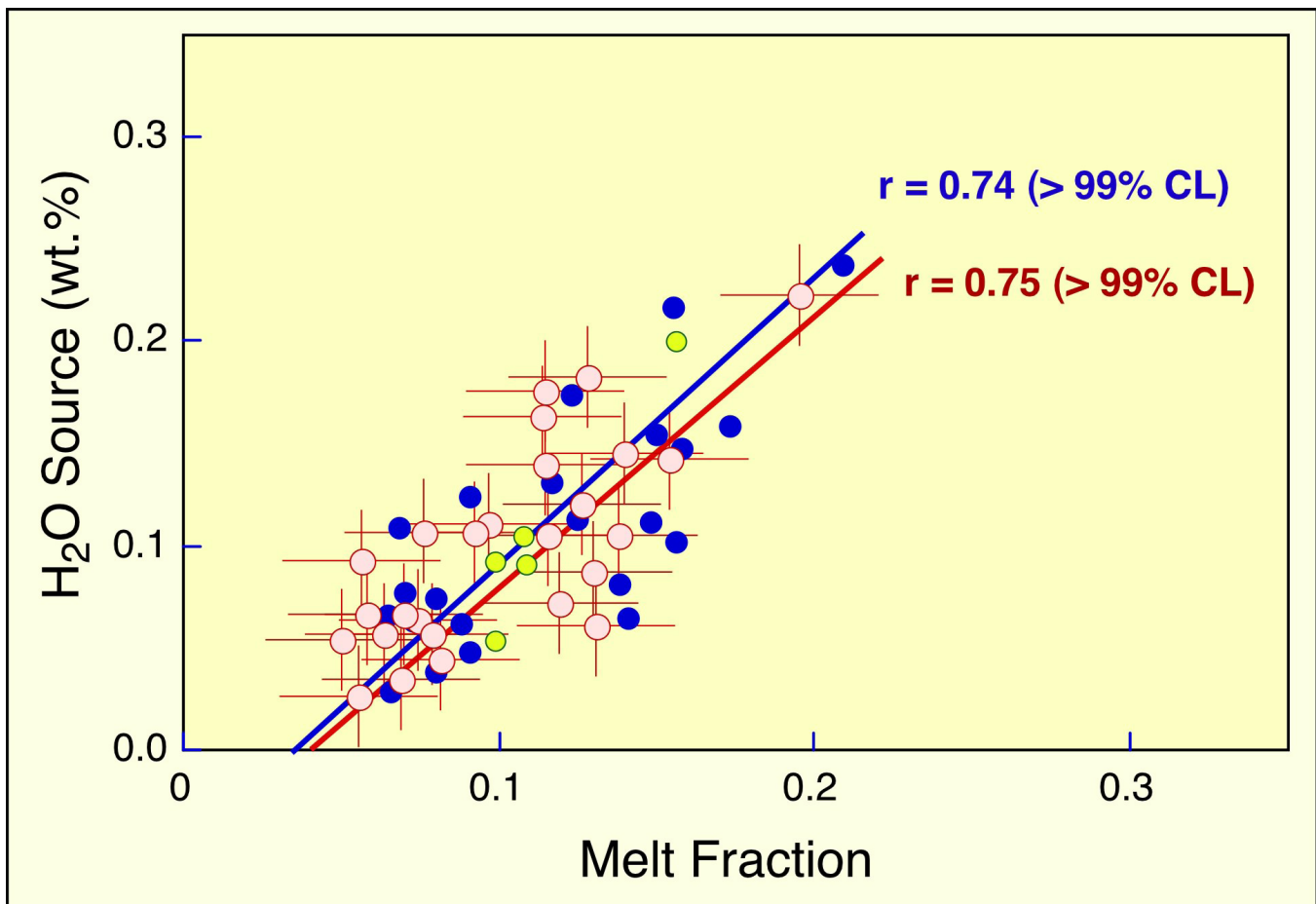


Figure: Relation between water in the mantle source and degree of melting for Izu back arc melt inclusions, estimated using the method of Kelley et al. (2006)\*. Red and blue symbols and lines show results calculated using a Philippine Sea Plate MORB mantle source (Hickey-Vargas, 1998)\* and the depleted mantle of Salters and Stracke (2004)\*, respectively. The slope of the correlation line is not sensitive to mantle source. Yellow symbols show inclusions inferred to derive from an enriched mantle source.



\*References listed in appendix A.