Upper mantle isotopic components beneath the Ryukyu arc system: evidence for 'back-arc' entrapment of Pacific MORB

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New Sr, Nd, and Pb isotopic data for Cenozoic intraplate basalts erupted since the last 10 million years from northwest Kyushu, Japan, and the Okinawa Trough, suggest that mantle sources supplying Ryukyu 'back-arc' side eruptions are a hybrid of depleted Pacific MORB and EM2-rich lithospheric components (average $^{87}Sr/^{86}Sr$, $^{143}Nd/^{144}Nd$, $^{206}Pb/^{204}Pb$, and $\Delta 8/4Pb$, respectively, 0.7040, 0.5128, 18.32, 60). These compositions differ fundamentally from those characterizing basalts in northern Kyushu and the Japan Sea which tap enriched DUPAL-like [1, 2], EM1-rich sources (average $^{87}Sr/^{86}Sr$, $^{143}Nd/^{144}Nd$, $^{206}Pb/^{204}Pb$, and $\Delta 8/4Pb$, respectively, 0.7043, 0.51275, 18.00, 85), believed to prevail beneath east and southeast Asia, and the western Pacific basins [3]. The apparent absence of EM1-like mantle beneath the Ryukyu 'back-arc' side suggests that Pacific MORB may have been trapped within the mantle wedge, separating Eurasian DUPAL-type asthenosphere from the subducting Philippine Sea plate slab, the latter preventing effective eastward-flow of sub-Eurasian mantle.

References:

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[3] Hickey-Vargas R., Hergt J.M, and Spadea P. (1995) *AGU Monogr*. **88**, 175-197.