Supplementary Material (online version only)

In order to investigate the geochemical characteristics of volcanic rocks and their tectonic background, we compiled the reported data and plotted them on the geochemical discrimination diagrams (SiO$_2$ vs. Alkali, AFM, SiO$_2$ vs. K$_2$O, MnO-TiO$_2$-P$_2$O$_5$, Zr-Nb-Y, Y vs. Sr/Y diagrams, and N-MORB-normalized trace element pattern) at 2-0 Ma, 6-2 Ma, and 15-6 Ma intervals.

Data we used here are from the following: **2-0 Ma**: Himeshima (Itoh, 1990); Futago (Nakada, 1986); Yufu (Miyoshi et al., 2008a); Beppu (Hoshizumi et al., 1988); Kuju (Miyoshi et al., 2008a); Aso (Miyoshi et al., 2005; 2008a; 2009); Kirishima (Miyoshi et al., 2010); Aira (Miyoshi, unpublished); Kaimon (Miyoshi, unpublished); Iki (Miyoshi et al., 2008a); Kurose (Tsukui and Aramaki, 1990; Miyoshi, unpublished); Unzen (Sugimoto et al., 2005; Miyoshi et al., 2008a); Taradake (Ikawa and Nagao, 1996; Miyoshi et al., 2008a); Hisatsu (Miyoshi et al., 2010); Imuta (Miyoshi, unpublished); Hokusatsu (Shinjo et al., 2000); Fukue (Miyoshi, unpublished); Ojikajima (Sudo et al., 1998); **6-2 Ma**: Hohi (Kamata, 1998; Miyoshi et al., 2008b); Aso (HMA) (Miyoshi et al., 2008b); Fukuoka (Hoang and Uto, 2003); Nagasaki (Shiraki et al., 2000); Hisatsu (Nagao et al., 1999); Hokusatsu (Miyoshi, unpublished); **15-6 Ma**: Yabakei (Kakubuchi and Matsumoto, 1990); Kita-Matsuura (Miyoshi et al., 2008a, 2008b); Shimoshima (Miyoshi et al., 2008a); Hirado (Uto et al., 2004); Nansatsu (Miyoshi, unpublished).
SM 1. SiO$_2$ vs. total alkali diagrams for Kyushu volcanic rocks (2-0 Ma). Thin dotted lines define rock suite boundaries (LeMaitre et al., 1989), thick lines indicate alkali-sub-alkali rock suite boundary (LeMaitre et al., 1989; MacDonald and Kastura, 1964). Empty grey areas did not have any volcanic activity from 2-0 Ma.

SM 2. Total alkali vs. Fe oxides vs. MgO (AFM) diagrams for sub-alkaline volcanic rocks from Kyushu (2-0 Ma). Thick curve shows the boundary between the calc-alkaline field and the tholeiitic field after Irvine and Baragar (1971). Empty grey areas did not have any volcanic activity from 2-0 Ma. The shaded areas do not include basaltic products.

SM 4. The MnO vs. TiO₂ vs. P₂O₅ discrimination diagrams for basalts and basaltic andesites from Kyushu (2-0 Ma). The fields are MORB (mid ocean ridge basalt); OIT (ocean-island tholeiite); OIA (ocean-island alkali basalt); CAB (island-arc calc-alkaline basalt); IAT (island-arc tholeiite)(Mullen, 1983). Empty grey areas did not have any volcanic activity from 2-0 Ma. For data sources, see the text.
SM 5. The Zr vs. Nb vs. Y discrimination diagrams for basalts and basaltic andesites from Kyushu (2-0 Ma). The fields are WPA (within-plate alkali basalts); WPT (within-plate tholeiites); P–MORB (plume-type mid ocean ridge basalt); N-MORB (normal mid ocean ridge basalt); VAB (volcanic arc basalts) (Meschede, 1986). Empty grey areas did not have any volcanic activity from 2-0 Ma. The shaded areas do not include basaltic products.

SM 6. N-MORB normalized trace element patterns for Kyushu basaltic rocks (2-0 Ma). N-MORB values are from Sun and McDonough (1989). Data for OIB are
obtained from Abbey (1983), Flanagan (1976), Govindaraju (1994), and the data for IAB are obtained from Moriguti et al. (2004). Empty grey areas did not have any volcanic activity from 2-0 Ma. The shaded areas do not include basaltic products.

SM 7. Y vs. Sr/Y diagrams for Hornblende bearing silicic rocks from Kyushu (2-0 Ma). The thin curves show adakite and island-arc andesite, dacite, and rhyolite (ADR) fields defined by Defant and Drummond (1990).
SM 8. SiO$_2$ vs. total alkali diagrams for Kyushu volcanic rocks (6-2 Ma). Thin dotted lines define rock suite boundaries (LeMaitre et al., 1989), thick lines indicate alkali-sub-alkali rock suite boundary (LeMaitre et al., 1989; MacDonald and Kastura, 1964). Empty grey areas did not have any volcanic activity from 6-2 Ma.

SM 9. Total alkali vs. Fe oxides vs. MgO (AFM) diagrams for sub-alkaline volcanic rocks from Kyushu (6-2 Ma). Thick curve shows the boundary between the calc-alkaline field and the tholeiitic field after Irvine and Baragar (1971). Empty grey areas did not have any volcanic activity from 6-2 Ma. The shaded areas do not include basaltic products.
**SM 10.** SiO$_2$ vs. K$_2$O diagrams for Kyushu volcanic rocks (6-2 Ma). Thin lines in the diagram show the low-K, medium-K, high-K & shoshonite rock series boundaries summarized by Rickwood (1989). Empty grey areas did not have any volcanic activity from 6-2 Ma.

**SM 11.** The MnO vs. TiO$_2$ vs. P$_2$O$_5$ discrimination diagrams for basalts and basaltic andesites from Kyushu (6-2 Ma). The fields are MORB (mid ocean ridge basalt); OIT (ocean-island tholeiite); OIA (ocean-island alkali basalt); CAB (island-arc calc-
alkaline basalt); IAT (island-arc tholeiite)(Mullen, 1983). Empty grey areas did not have any volcanic activity from 6-2 Ma. For data sources, see the text.

SM 12. The Zr vs. Nb vs. Y discrimination diagrams for basalts and basaltic andesites from Kyushu (6-2 Ma). The fields are WPA (within-plate alkali basalts); WPT (within-plate tholeiites); P–MORB (plume-type mid ocean ridge basalt); N-MORB (normal mid ocean ridge basalt); VAB (volcanic arc basalts) (Meschede, 1986). Empty grey areas did not have any volcanic activity from 6-2 Ma. The shaded areas do not include basaltic products.
**SM 13.** N-MORB normalized trace element patterns for Kyushu basaltic rocks (6-2 Ma). N-MORB values are from Sun & McDonough (1989). Data for OIB are obtained from Abbey (1983), Flanagan (1976), Govindaraju (1994), and the data for IAB are obtained from Moriguti et al. (2004). Empty grey areas did not have any volcanic activity from 6-2 Ma. The shaded areas do not include basaltic products.

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**SM 14.** Y vs. Sr/Y diagrams for Hornblende bearing silicic rocks from Kyushu (6-2 Ma). The thin curves show adakite and island-arc andesite, dacite, and rhyolite (ADR) fields defined by Defant and Drummond (1990).
SM 15. SiO₂ vs. total alkali diagrams for Kyushu volcanic rocks (15-6 Ma). Thin dotted lines define rock suite boundaries (LeMaitre et al., 1989), thick lines indicate alkali-sub-alkali rock suite boundary (LeMaitre et al., 1989; MacDonald and Kastura, 1964). Empty grey areas did not have any volcanic activity from 15-6 Ma.

SM 16. Total alkali vs. Fe oxides vs. MgO (AFM) diagrams for sub-alkaline volcanic rocks from Kyushu (15-6 Ma). Thick curve shows the boundary between the calc-alkaline field and the tholeiitic field after Irvine and Baragar (1971). Empty grey areas
did not have any volcanic activity from 15-6 Ma. The shaded areas do not include basaltic products.

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**SM 18.** The MnO vs. TiO$_2$ vs. P$_2$O$_5$ discrimination diagrams for basalts and basaltic andesites from Kyushu (15-6 Ma). The fields are MORB (mid ocean ridge basalt); OIT (ocean-island tholeiite); OIA (ocean-island alkali basalt); CAB (island-arc calc-alkaline basalt); IAT (island-arc tholeiite) (Mullen, 1983). Empty grey areas did not have any volcanic activity from 15-6 Ma. For data sources, see the text.

**SM 19.** The Zr vs. Nb vs. Y discrimination diagrams for basalts and basaltic andesites from Kyushu (15-6 Ma). The fields are WPA (within-plate alkali basalts); WPT (within-plate tholeiites); P–MORB (plume-type mid ocean ridge basalt); N-MORB (normal mid ocean ridge basalt); VAB (volcanic arc basalts) (Meschede, 1986). Empty grey areas did not have any volcanic activity from 15-6 Ma. The shaded areas do not include basaltic products.
**SM 20.** N-MORB normalized trace element patterns for Kyushu basaltic rocks (15-6 Ma). N-MORB values are from Sun & McDonough (1989). Data for OIB are obtained from Abbey (1983), Flanagan (1976), Govindaraju (1994), and the data for IAB are obtained from Moriguti et al. (2004). Empty grey areas did not have any volcanic activity from 15-6 Ma. The shaded areas do not include basaltic products.
SM 21. Y vs. Sr/Y diagrams for Hornblende bearing silicic rocks from Kyushu (15-6 Ma). The thin curves show adakite and island-arc andesite, dacite, and rhyolite (ADR) fields defined by Defant and Drummond (1990).
REFERENCES


Meschede, M., 1986, A method of discriminating between different types of mid-ocean ridge basalts and continental tholeiites with the Nb-Zr-Y diagram: Chemical


