



Along-arc geochemical variations in the Solomon island arc

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Along the Solomon Islands, SW Pacific, the Australian Plate is presently subducted beneath the Pacific Plate. Particular features of the Solomon arc are the extremely mafic bulk composition of erupting magmas and the subduction of an active spreading center. Here we present a comprehensive Sr-Nd-Hf isotope and major/trace element data set, covering more than 1000 km of the arc (from SE of Bougainville to the N-Vanuatu arc). Picritic and ankaramitic rocks in the Solomon Islands are not only confined to the New Georgia Group, where they are located above the subducting Woodlark spreading center [e. g., 1], but also occur in the Santa Cruz archipelago. New findings also include high Sr/Y-andesites (Sr/Y up to 90) and high-Mg andesites. The high-Mg andesites are close to boninitic compositions with up to 7.8 wt. % MgO and 54.5 wt. % SiO₂. Both magma compositions reflect the unusually hot thermal regime in the subarc mantle.

LILE abundances in most Solomon island arc magmas indicate a strong source overprint by subduction components. Volcanic rocks from some islands, however, are considerably less enriched by LILEs suggesting a back-arc setting and possibly an eruption prior to the onset of subduction volcanism 6 Myrs ago. ⁸⁷Sr/⁸⁶Sr and εNd values along the arc range from 0.7029 to 0.7052 and +3.8 to +8.1, respectively. These Sr-Nd values partially overlap with compositions of the Indian MORB field and values of the neighbouring New Britain and Vanuatu arcs [2, 3]. εHf values range from +10.5 to +14.6 and show little variation along the arc. The combined εHf-εNd values therefore show that all examined Solomon arc magmas were most likely generated within the Indian mantle domain.

References

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- [3] Woodhead, J. D. et al. (1998): J Petrol 39: 1641 – 1668.