Petrological study on the intrusive contact of a Setouchi volcanic rock dike in the Nakajima Island, Ehime Prefecture

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We performed a detailed petrological study on the intrusive contact between a Setouchi andesitic dike and host Ryoke granitoids occurring in the Nakajima Island, Ehime Prefecture. At the intrusive contact, the andesite contains many fragments of host granitoids. The bulk SiO_2 contents of the marginal andesite at the intrusive contact are markedly higher than those of internal domain implying the mixing between the andesite intrusion and the host granitoids. Other bulk chemical compositions such as MgO, CaO, Na_2O, K_2O, Cr and Zr also imply mixing of the host granitoids into the andesite intrusion at the intrusive contact. However, the Al_2O_3 contents of the marginal andesite can not be explained by bulk mixing of the host granitoids and the andesite intrusion because the Al_2O_3 contents of the marginal andesite are higher than those of the host granites and internal domain of the andesite intrusion. Assuming that the marginal andesite with chilled margin texture retain original compositions of intrusive magma, we tested the major element mass-balance modeling to explain chemical compositions of internal domain of the andesite intrusion. The modeling reproduced the major element compositions of internal andesites by adding ~7 % of host granite components and ~12 % of mafic phenocryst minerals into the marginal andesite.

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