

Cenozoic volcanism in Sikhote Alin, Khingan, and Stanovoy, Far East Russia

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Many volcanic arc-trench systems, especially those in the Western Pacific, are associated with backarc basins (Taylor and Karner, 1983), although it has been established that backarc basins are built by breakup and opening of the overriding lithosphere at convergent plate margins, the principal cause of such opening has been controversial. The mechanisms of backarc opening proposed so far may fall into two broad categories: 'passive' processes which emphasize the role of relative plate motions (Chase, 1978; Uyeda and Kanamori, 1979), and 'active' processes which invoke material flow within the mantle wedge to initiate backarc extension (Karig, 1971; Toksoz and Bird, 1977).

The attention will be paid to magmatism of inner continent, simply because that region was attached to the NE Japan or Sakhalin arc. In order to document the magmatic activity more comprehensively, the analyses will cover the whole region of the inner Sikhote Alin, Khingan and Stanovoy, although previous works focused solely on the coastal range. The final goal of this is to discuss the linkage between such magmatism and the backarc opening event.

K-Ar ages and major/trace element compositions were obtained from 12 fresh lavas from the inner Sikhote Alin, Khingan and Stanovoy, Far East Russia, in order to document the secular variation in volcanism and upper mantle processes during backarc opening. This region is distinct in that it was the home of the NE Japan and Sakhalin arc sliver before the opening of the Japan Sea backarc basin. Also, the distribution of lavas from the coastal region versus the inner continent is the characteristic feature of this region. Cenozoic intraplate volcanism can be including local marginal several volcanic provinces, that is, the inner Sikhote Alin, Khingan and Stanovoy. The costal side volcanism in the north Sikhote Alin took place during 40-25 Ma and 20-5 Ma, and was separated by a marked hiatus in volcanism during 25-20 Ma, which is synchronous to the period of the major opening event in the Japan Sea backarc basin. However, inner continental volcanisms have been little active in this hiatus interval during 25-20 Ma, and the volcanism is active little longer than the costal side during 20-1 Ma.

It should be stressed that the volcanic activity during the pre-opening stage of the East margin of Asia occurred in the entire inner continent of East Asia, whereas volcanism in the inner continent during 25-1 Ma. Such an arc-like signature may not suggest the location of an arc-trench system in this region. In particular, the volcanism during 20-1 Ma exhibits spot-like signatures appeared including some costal side of Sikhote Alin and inner continent, Far East South. Intraplate-type lavas with typical hotspot magma compositions typify the inner continent volcanism and may be caused by mantle upwelling beneath the Cenozoic intraplate basalt province in the northeast China and Far East south Russia.