

Spatial and Temporal distribution of volcanism in the late Cenozoic NE Honshu arc, Japan

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There are many contributions about the spatial and temporal evolution of volcanism in the late Cenozoic NE Honshu arc, Japan. Ohguchi et al. (1989) have shown the temporal change of the Neogene to Quaternary volcanic front in the NE Honshu arc based a lot of geological data. During 30 to 20 Ma, the volcanic front moved to the east, then retreated to the west quickly. Since 12 Ma, the position of the volcanic front was swinging around the present position. Yoshida et al. (1995) have divided the volcanism in the late Cenozoic NE Honshu arc into 9 stages. In this time section, there were three prominent periods of volcanic activity: continental margin, back-arc basin, and island arc volcanic periods. They showed that the spatial and temporal evolution of volcanism have close relation with the thermal structures in the wedge mantle. Ohki et al. (1993) have explained the change in the direction of volcanic front from NW-SE to N-S as the results of back-arc opening at the end of continental arc stage. Kondo et al (1998) examined the spatial and temporal distribution of volcanic activity after 14 Ma in detail. They are clarified that there are two parts of volcanism in the NE Honshu, one is the axial part along the volcanic front, and other is the branch part which extended from the axial part at the volcanic front to the back-arc side. They, also have shown that the random distribution of volcanism after 14 Ma was localized to several centers after 8 Ma. Hayashi et al. (1996), also pointed out the distribution of the Quaternary volcanoes forms some clusters which corresponds to the distribution of the late Cenozoic caldera clusters shown by Sato and Yoshida (1993). Tamura et al.(2002) explained these patterns of volcano distribution by the hot finger developed in wedge mantle. Umeda et al. (1999), Yamada and Yoshida (2002) and Kondo et al. (2004) have examined the spatial and temporal distribution of volcanism in detail based many compiled and new data. They clarified that the site of volcanism after 5 Ma moved from back-arc side to volcanic front side with the speed of ca.. 2 cm/year. Such a migration could explained by a persistent small-scale convection in the part of a low viscosity of the mantle wedge (Honda and Yoshida, 2005). Basically, the spatial and temporal evolution of volcanism in the NE Honshu arc, was controled by the thermal structure related with the angle, direction and speed of plate subduction. On the other hand, Yoshida et al. (2005) are clarifying that volcanic activity in the NE Honshu arc has close time relation with the basin subsidence and upheaval process. In this presentation, we discuss about the relation between volcanism and basin evolution which are related with regional stress field and deformation of magma plumbing system. For more understanding of the spatial and temporal evolution of volcanism, we need to integrate the mantle and crustal process of magmatism which closely related with tectonic evolution of island arc.