

Significance of Early to Middle Miocene Nanno Plankton Fossils from Pliocene Hayakawa Tuff Breccia in Northern Izu Peninsula

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Hayakawa Tuff Breccia (HTB) is mainly composed of (submarine?) pumiceous turbidite deposit distributed in the valleys of Haya-kawa and Sukumo-gawa area in Hakone volcano, northern Izu peninsula. HTB have been correlated with Harada formation of Pliocene Shirahama group in southern part of Izu peninsula on the basis of investigation of molluscan fauna (e.g. Tomida, 1995). We found calcareous nanno plankton and foraminifera fossils from bore hole samples of HTB drilled at eastern flank of Hakone volcano and obtained microfossil age of HTB.

In samples of -780 to -820m, index nanno plankton species of CN11b (Okada and Bukry, 1980; c. 4.2Ma) are identified. In samples of -830 to -850m in depth, zones of CN9 to CN11b are recognized. This fact (early Pliocene to late Miocene) suggest that there are consistent with previous studies based on molluscan fossil.

However we also identified some index nanno plankton species of CN3-4 (early to middle Miocene) in samples of -820 to -850m. This observation indicates that early to middle Miocene deposit had existed in the source of the HTB. In this province, Yugashima group is the early to middle Miocene deposit, which is strongly altered by hydrothermal activity and poor in microfossils. Early to late Miocene nanno plankton fossils in early Pliocene HTB suggest that the hydrothermal activity occurred after deposition of HTB (i.e. about 4.2Ma) in this area. In Shimoda area southern Izu peninsula, Matsumoto et al. (1985) reported that the hydrothermal activity take place after c. 5Ma. Onset of the hydrothermal activity in Hakone area can be simultaneous with that of Shimoda area. Hirooka (1983) argued Izu terrane, which moved northward, had arrived present latitude up to this age. It is worth noting that the hydrothermal activity took place almost simultaneously in northern and southern end of Izu peninsula to prevail collision process of Izu terrane.