

The age of the Kiyokawa Formation of the Middle Pleistocene Shimosa Group, Japan

Hiroomi Nakazato[1]

[1] NIRE

The Kiyokawa Formation of the Shimosa Group consists of the lowermost sand and gravel layer, the lower mud layer, the middle sand layer containing abundant molluscan fossils and the upper sand layer containing *Macaronichnus* burrows in ascending order in the Kisarazu Upland in the middle part of the Boso Peninsula. In this area the Kiyokawa Formation rests unconformably upon the Kamiizumi Formation and is overlain by the Yokota Formation conformably. It is thought that such a succession of the sedimentary units was formed by glacio-eustatic sea level changes (Aoki and Baba, 1971, 1973, etc.). There are two ideas by the age of the low sea level period that forms the erosion surface of the base about the formation age of the Kiyokawa Formation.

One is an idea that values the erosional base of the Kiyokawa Formation, and correlates it to a big low sea level period that precedes the Soda transgression in the Oiso and Yokohama region. Sugihara et al. (1978) examined the upper to middle Pleistocene distributed around Tokyo Bay based on correlation of marker tephra, and found the TB-8 including orthopyroxene that showed extremely high refractive indices from the lower part of the Kiyokawa Formation. And, they thought that the unconformity at the base of the Kiyokawa Formation formed in the low sea level period to precede the Soda transgression. Afterwards, Kanto Ash Layers Research Group and Volcanic Ash Research Subgroup of Subsurface Research Group of the Port of Tokyo (2000) correlated the Ky2, 3, 3.5 tephra that Sugihara et al. (1978) compared with TB-7, 8, and 9 to the TCu-1 and NBP-1 (TCu-4). One of the reasons was that the Ky2 and 3 contained a lot of orthopyroxene of low refractive indices.

Another idea is that the base of the Soda Formation is compared with the base of the Kamiizumi Formation, and the base of the Kiyokawa Formation corresponds to small regression stage in the depositional period of the Soda Loam Formation. Tokuhashi and Endo (1984) assumed that the lower five formations of the group conformably overlay the underlying formations. Nakazato and Sato (1988) showed that the Kamiizumi Formation was distributed from the surrounding of Kisarazu to the northeastern part of Chiba Prefecture, and correlated the Km2 of the base of the Kamiizumi Formation with the TCu-1 of Oiso. Nakazato (2002) showed that the Ky3.5 was compared to not TCu-4 but TB-9 based on the mode characteristics of the refractive indices of hornblende. In addition, Nakazawa et al. (printing) clarified the refractive index characteristic of each unit of TB-8 in the Oiso hill, and the orthopyroxene of high refractive indices that characterized TB-8 was included only in one unit of the upper part, and showed that TB-8 contained the orthopyroxene of low refractive indices in the majority of units.

The Km1 tephra group intercalated in the base of the Kamiizumi Formation contains the wide-spread tephra Aso-1 (Suzuki, 1996). The marine isotope stage of the Aso-1 was thought to be stage 8.2 (Shirai, 2001; Nagahashi et al., 2002). This shows that the low sea level period that precedes the Soda transgression corresponds to not the base of the Kiyokawa Formation but the base of the Kamiizumi Formation. Therefore, the base of the Kiyokawa Formation corresponds to small regression period (stage 7.4) in the stage 7, and the age is 225,000 years ago according to Bassinot et al. (1994).