Estimating the paleoenvironment utilizing Foraminiferal Fossils

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Microfossil assemblages in marine archives represent a powerful tool to estimate prehistoric marine environments (Suto, 2011). Therefore, in this experiment, the author utilized foraminiferal fossils to estimate the environment when the Morozaki Group formed. Microfossils, including foraminiferal fossils, are more likely to dissolve chemically, but are physically stronger than other macrofossils. Therefore, a large numbers of microfossils are contained in sediments, making them a very significant tool for various paleoceanographic reconstructions (Suto, 2011).
The stratum observed in the Katana outcrop is included in Toyohama formation, Morozaki Group. According to Yamaoka (1993), the Morozaki Group formed from the Early to Middle Miocene in the Neogene. This group belongs to the Setouchi Miocene Series which was formed in deeper parts of the ocean compared with other strata such as Ichishi, Fujiwara and Mizunami Group which formed at the same time (Yoshida, 1991). The group is composed of Himaka, Toyohama, Yamami and Utumi formations in ascending order.
The Morozaki Group is mainly composed of sandstone, mudstone and tuff. Many fossils of fish and mollusks are found. However, Planktonic foraminifers were scarcely because of its siliceous lithofacies (Ibaraki et al., 1984).
In addition, this group is mainly made by turbidites. Turbidites only form when a large amount of sediments originated from a landslide transport to deeper than 200 m under water. This fact has led to the hypothesis that the Morozaki Group formed in the deep ocean (Yamaoka, 1993). Since the deep ocean has only little impact of currents and waves, muddy sediments would slowly form compared to sandy sediment. This is visible in the outcrop which had a clear difference between each layers.
Previous reports suggest the depth of the Chita Peninsula was between 200 m - 600 m (Shikama and Kase, 1976) or deeper than 500 m (Hachiya *et al.*, 1988), based on macrofossil assemblages such as mollusks. Furthermore, whilst research has been undertaken on the foraminiferal fossils from the Morozaki Group, none of them have tried to estimate the paleodepth of the Chita Peninsula utilizing this technique. Therefore, the aim of this study was to estimate the paleoenvironment, especially the depth, of the Chita Peninsula utilizing foraminiferal assemblage. Faunal analysis was used in this experiment.Faunal analysis is a method to estimate the paleoenvironment from the habitat of the detected fossil species.
As a result of this research, the paleodepth was estimated as 100 - 2000 m. The research also showed that the strata formed 17.54 Ma where there were two kinds of ocean currents and indicated a possible sub-oxic environment.

Keywords: Foraminifera, Chita peninsula, Morozaki Group, Toyohama Formation, Turbidite, Faunal analysis

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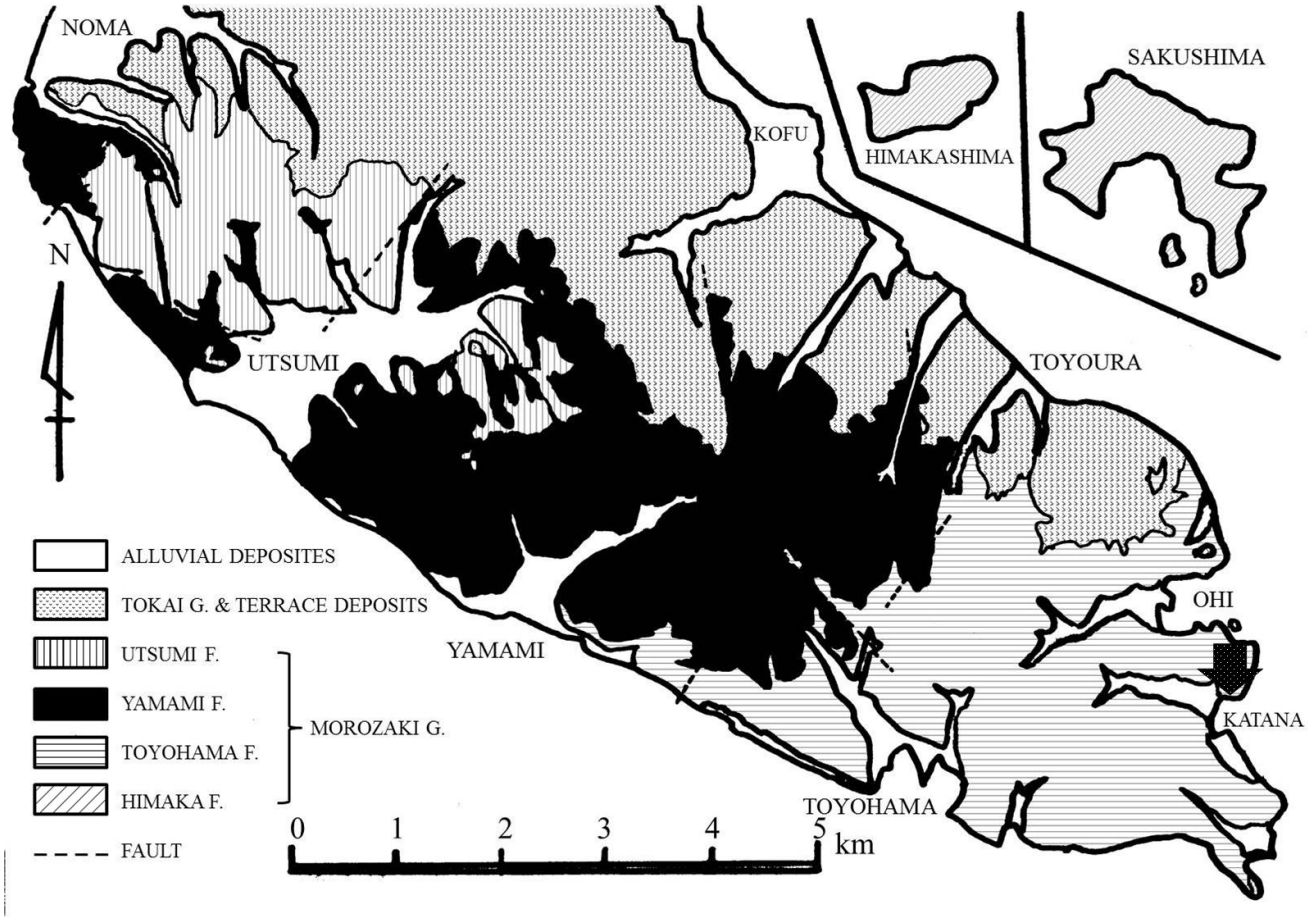

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