

Depositional facies of the Tertiary distributed around the northern part of Ibaraki Prefecture

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Late Cretaceous to Tertiary sediments are widely distributed in the Joban basin. They cover the pre-Late Cretaceous Abukuma granitic rocks and Abukuma metamorphic rocks and gently incline east with NNE strike. Although many researches have been made as represented by Sugai et al. (1957) and Kubo et al. (2002), depositional facies and basin analysis have not been done except for the upper Cretaceous Futaba Group (Ando et al., 1995) and a part of the Tertiary (Yabe et al., 1995). Therefore, the authors aim at reconstructing the depositional history of the Tertiary distributed around Kitaibaraki City, Ibaraki Prefecture in terms of facies and sequence stratigraphic analysis.

The Tertiary distributed in northern Ibaraki Prefecture comprises the Eocene to lower Oligocene Shiramizu, the upper Miocene Yunagaya, the middle Miocene Takaku and the middle to upper Miocene Taga Groups in ascending order, with unconformity each another. Nineteen depositional facies and seven facies associations (A-G) are recognized in the Shiramizu and Yunagaya Groups. Moreover, the facies association A was divided into A1 and A2 through the dominance of sandy or gravelly facies. Judging from their distribution and successions, the following sedimentary environments are inferred: estuary with marsh to inner bay and sandy meandering river (FA: A2, B, C) for the Iwaki Formation, upper to lower shoreface and inner shelf (FA: D, E) for the Asagai Formation, shelf (FA: F) for the Sirasaka Formation, gravelly braided river, sandy meandering river and estuary with marsh to inner bay (FA: A1, A2, B, C) for the Kunugidaira Formation, upper shoreface (FA: D) for the Goyasu Formation, lower shoreface and inner shelf (FA: E) for the Mizunoya Formation and slope (FA: G) for Kamenoo Formation.

Since the surface sections of the Iwaki Formation are poorly exposed for tracing detailed facies distributions, the previous descriptions of seven drilled holes by Eguti and Syouji (1954) as well as our data from surface sections are used for the integrated facies correlation. The Iwaki Formation in the Kitaibaraki area seems to have been formed by two transgressive-regressive cycles reflecting two relative sea-level changes on a bay-like depression separated by two topographic highs of the northern and southern ends of the area.

The Kunugidaira Formation becomes thinner northeastward, and shows facies change upward from gravelly braided river to inner bay facies. It seems to be incised valley fill associated with a sea-level rise.

The Shiramizu and Yunagaya Groups respectively consist of a depositional sequence formed by a series of relative sea-level changes. Three transgressive-regressive cycles observed in the Iwaki Formation may be equivalent to parasequences.