

Analysis of shell beds from Yabu Formation in Semata, Ichihara City, Chiba Prefecture, Japan.

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This is study of shell beds in the Middle Plesitocene Yabu Formation of the Shimousa Group. Many studies have been done for the Yabu Formation(e.g. Aoki and Baba, 1970 ; Nishikawa et al. , 2000). However, these literatures didn't focus on detailed scale of shell beds in the Yabu Formation. So, we studied detailed analysis of the shell beds using oriented block sample.

In Semata, Ichihara City, Chiba Prefecture, a part of Yabu Formation(ca, 3m thick) has been exposed. The Yabu Formation is composed of sandstone. The exposed strata can be classified into lower and upper parts. Boundary between upper and lower parts are 1.3m above the bottom of outcrop. There are HCS and SCS in the lower part,shells parallel to their bedding planes. Shell beds are frequently intercalated in the upper part. We took oriented block sample (40cm*40cm*30cm) from the outcrop. The Yabu Formation is not enough to consolidate for block sampling. Thus, we made wooden frame(called " GOSSON ") to prevent collapsing of the strata. Base of the sample is same as boundary of upper and lower units.

We brought oriented specimen in the laboratory, and carefully removed sediments parallel to the bedding plane from upper side of the sample. On this occasion, we defined section as that a layer including shells, i.e. boundary between each section is a layer with no fossils. We described following information; a convex-up/down of bivalve, horizontal position, species, apex orientation, maximum shell length(=L),articulation. In addition we calculatate convex-up rate, number of individuals, area density of fossil (=the area that a fossil accounts for / whole area in each section), size distribution(three demarcation: $L \geq 40\text{mm}$, $40\text{mm} > L > 20\text{mm}$, $20\text{mm} \geq L$) in each section.

Totally 60 section were recognized in the sample. The thickness of each section was 3 ? 12mm. 427 specimens(425 specimens with 13 species for bivalve, 2 specimens with 2 species for gastropod and 2 specimens with 1 species for scaphopod) have been identified from the sample. All the bivalves were disarticulated. Thus, the all shells were transported from their original living place. The convex-up rate was more than 80% in 48 sections. The results suggest that the shells were deposited not under influence of turbulent flow, but unidirectional flow. In contrast, the convex-up rate in section 10, 58, 59 was less than 50%. It indicates that shells didn't deposit by unidirectional flow in this horizons. The number of individuals and area density of fossil increased from section 01 to section 44. It tends to decrease above section 44. The results indicate that conditions of transportations and sea floor were changed several times during the shell accumulated beds were forming. According to shell size distribution, i.e. the large ($L \geq 40\text{mm}$) shells are rare when the small ones ($20\text{mm} \geq L$) are abundant in the section, the shells are well sorted during transportations.

It is concluded that 1) by using the abovementioned method, it is possible to take oriented block samples even from the unlithified sandstone. 2) as a careful and detailed analyses within a shell bed revealed that the shell bed was formed by a multiple sedimentation event.

Keywords: oriented block sampling, shell beds, Yabu Formation, taphonomy