Lacustrine varved diatomite and deformation structures in the Middle Pleistocene Hiruzenbara Formation

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The Middle Pleistocene Hiruzenbara Formation is distributed in Hiruzenbara Highland, Maniwa City, Okayama Prefecture. The formation comprises the upper fluvial gravel (Fig. 1) and the lower lacustrine banded diatomite units (Fig. 2). Lateral continuity and stratigraphy of the lower unit can be clearly observed in the mining pits of Showa Chemical Co., Ltd. The banded diatomite includes varves (1 to 2 mm in thickness) composed of a set of white and light gray colored seasonal sub-layers with slope failure induced- and flood-induced sediment gravity flow deposits (Fig. 3; Sasaki et al., in press). Deformation structures of various scales corresponding to the disappearance of Paleo-Hiruzenbara Lake can also be seen in the pits (Fig. 4; Cover Photo).

On the cover : Varved diatomite including flood-induced sediment gravity flow deposits (in middle) deformed by small faults. The width of the picture is about 40 cm.

Fig.1 : River gravel bed of the upper part of Hiruzenbara Formation and the overlying Kuroboku soil and ash beds from Mt. Daisen. The gravel bed uncomfortably overlies the lower part of Hiruzenbara Formation.

Fig.3 : Varved diatomite including flood- and slope failure-induced sediment gravity flow deposits. The varved diatomite comprises alternations of white and light gray colored sub-layers, whereas the flood-induced sediment gravity flow deposits (ex. dark layer in the middle) are composed of dark or gray silty beds. The slope failure-induced sediment gravity flow deposits, sometimes showing slump structure, include rip-up clasts of banded diatomite. The width of the picture is about 50 cm.

Fig.2 : Outcrop photograph of the mining pit of the Showa Chemical Co., Ltd. The coarse grained bed near the surface of pond is made of pumiceous deposits in the lowest part of the formation. The outcrop shows an approximately horizontal dipping. Most of the lines on the surface of the outcrop are flood-induced sediment gravity flow deposits.

Fig.4 : Deformation structure and thrust observed in the banded diatomite of Hiruzenbara Formation. The thrust extends from central right towards left in the picture. The coarse-grained bed above the thrust surface is the same as the pumiceous bed in Fig. 2. The upper block overlies from west to east. The height of the outcrop is about 10m.

中部更新統蒜山原層の湖成年縞珪藻土と変形構造 (石原与四郎・佐々木 華, 福岡大学理学部) 岡山県真庭市の蒜山原高原には、中部更新統蒜山原層が分布する。蒜山原層は上部の河川成礫層 (Fig.1) と下部の湖成縞状珪藻土 (Fig.2) からなる。蒜山原層下部は、珪藻土採掘ピットで連続的に観察できる。縞状珪藻土は厚さ 1~2 mm の濃淡の葉理のセットからなる年縞をなし、しばしば崩壊や洪水による重力流堆積物を含む (Fig.3; Sasaki et al., in press)。珪藻土中には、古蒜山原湖の消滅にともなって形成されたと考えられる様々な変形構造も認められる (Fig.4, Cover Photo)。

References : Sasaki, H., Sasaki, Y., Saito-Kato, M., Naruse, H., Yumi, M. and Ishihara, Y., in press, Lacustrine sediment gravity-flow deposits and stratigraphic changes intercalated in varved diatomite : an example from the Hiruzenbara Formation, Okayama Prefecture, southwest Japan, Quaternary International, doi: 10.1016/j.quaint.2015.08.032