Origin of chaotic deposits in shallow part of accretionary prism in southernmost Boso Peninsula

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In the southernmost Boso Peninsula, the late Miocene to early Pliocene Miura Group, is thought to be an accretionary prism which is deposited in the Paleo-Sagami trough. Besides, it has been known that the southernmost Boso Peninsula went through clockwise rotation by the collision of Tanzawa block and the Izu-Bonin island arc with the Honshu island arc based on paleomagnetism. In Nishikawana to the southeast of Sunosaki in Tateyama, it has been reported that the chaotic deposit is rare in this area.

However, a remarkable chaotic zone was found to have the following characteristics. First, the lithofacies in the chaotic zone are not correlated to those in the neighboring area (coherent zone); second, faults and liquefied blocks are found at the boundary between the chaotic zone and the coherent zone; third, the chaotic zone has many complex deformations, for instance folds, beds overturning and boundins etc.; and forth, many faults in parallel to bedding plane and liquefied layers crosscut bedding plane are in the chaotic zone. In the coherent zone, the chaotic zone, 20 m in width, and 100 m in length, appears suddenly. In order to identify the origin why this chaotic zone formed, the critical observation was held. As a result, the deformation structures are formed by subaquaeous mass movement.

The chaotic zone is divided into five domains based on distribution pattern, for instance, combination of key beds, and style and attitude of deformation. The attitudes of bedding plane in each domain are different, and each domain is characterized by specific deformation structure. Some domain has symmetrical folds, sheath folds, sandstone boundins and drag folds. Some beds have synformal-anticlines, some overturned. As the chaotic zone is enclosed by the coherent zone, it is considered the chaotic zone had been also rotated with the coherent zone. Therefore, assuming that the sliding occurs before accretion and collision, the original direction was oftained toward N or NW.

In addition, many liquefied blocks and laminations with sand grains are developed in the Nishikawana area. By field observations and thin sections, flow is the chief mechanism for these structures. This fact indicates these structures were formed under semi-lithified conditions. Furthermore, the brittle deformations by faulting crosscut these structures, showing that such deformations occur after lithification. Normal fault which is the boundary between the coherent zone and the chaotic zone, and between the domains was also formed by the same process. The direction of normal faults is E-W, the thrust direction is NW-SE, based on stereonet analysis at the present position.

In conclusion, the stages of this study area are as follows. 1) Sedimantation: the deposit that forms the chaotic zone piles up. 2) Slump and slide: subaquaeous mass movements occur on slide plane by earthquake and associated liquefaction etc. And, the chaotic block formed according to the deformations, folds, thrusts, normal faults and etc. 3) Past 2) stage sedimentation: past 2) stage sedimentation occurs above the chaotic blocks. 4) Thrust movement: thrust movement occurs according to accretion, and the stratum is repeated. 5) Fault development: rotation around stratum occurs by the collision of the Tanzawa block and the Izu-Bonin island arc with the Honshu island arc.