Characteristics and origin of the soft-sediment deformation structures within Chunbuk conglomerate

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Abstract

Soft-sediment deformation structures (SSDS) are the results of movement, where unconsolidated or semi-consolidated sediments are associated with liquefaction or fluidization. These SSDS could be an important indicator for paleo-earthquakes. SSDS forming mechanisms are various, and it remains challenge to recognize the differences between seismically-triggered structures and other origin structures.

Study area is located in Gyeongju Bomon basin, which is composed of Cretaceous sediment and Tertiary Chunbuk conglomerate. The age of the Chunbuk conglomerate has been reported as around middle Miocene based on fossils such as mollusk and ostracoda. Well-exposed SSDS occur in two study sections (A, B). In section A, convolute bedding along layer boundary and conglomerate wedge inside sand layer are developed. The vertical length of the conglomerate wedge is around 150 cm and the width is around 20 cm. Especially, the observed wedge in marine deposit are unusual and they probably developed by endogenic or exogenic force. In section B, huge size of convolute bedding is developed indicating thicker conglomerate layers than section A.

Interestingly, manganese dikes widely intruded inside sandy layer and along the boundary of conglomerate layers, which indicates some magmatism or mineralization occurred in the study area. According to previous studies, the Chunbuk conglomerate formed during the opening of the East Sea, and the SSDS developed in the Chunbuk conglomerate might be associated with seismic activity.