Deformation history based on the brittle structures around the Morundae area in the Dadaepo basin, SE Korea

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Abstract

Morundae is located in the southeastern end of the Korean Peninsula. The study area geologically belongs to the Cretaceous Dadaepo basin located in the southern end of the Yangsan Fault. This study aims to understand the characteristics of the brittle deformation related to the formation and later deformation of the Dadaepo basin based on the geometrical and kinematic analysis of the geological structures around the Morundae.

The bedding of the Dadaepo Formation in the study area is generally developed striking NW-trend with NE-trend dip. There are some NW striking syndepositional growth faults, extensional strike-slip duplexes and negative flower structures. These structures might be associated with the formation of the basin when the Yangsan Fault and the Dongnae Fault have a sinistral slip sense. Fractures in the study area are divided into 4 sets based on the crosscutting relationship, we deduced the deformation history as follows.

According to previous studies, the Yangsan Fault was under the NW-SE compressive stress condition during the late Cretaceous, it is related to the subduction of paleo Pacific plate's under the Eurasian plate. The NW striking extension structures may indicate NE-SW tensile stress. NNE direction fractures with secondary fractures indicating sinistral sense and additional tensile fractures indicate later NNW-SSE compression. Also, NNE fractures and veins do not displace NE fracture and the NE fractures might be formed late. The NE striking tensile fractures and NNW striking fractures (dextrally displaced by NNE striking fracture), shear fractures in the NNE direction are considered to have been selectively reactivated by NE-SW compression. NNE and NE fractures are dextrally displaced by NW direction fractures indicating N-S compressive stress. Understanding of the deformation history in Morundae area may contribute in understanding of the deformation history of the Yangsan Fault.