



## **Analysis of kinematics and basin-fills of the Yeonghae pull-apart basin, eastern margin of South Korea**

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Kinematic and sedimentological analyses of pull-apart basins are important to reconstruct the tectonic evolution of a pull-apart basin. The Yeonghae depression has been interpreted as a pull-apart basin developed in the stepover zone between the Yangsan and Yeongdeok faults. The reconstruction of the tectonic evolution of the Yeonghae basin is important to enhance our understanding of the Yangsan fault system.

For this study, we carried out remote sensing data analysis and geological fieldwork. Digital Elevation Model (DEM) was used to determine the basin depression, fault margins, and major structures in the study area. Geological fieldwork was performed to understand the basin fills and to collect structural data from the study area, especially along the depression boundary faults. The result of remote sensing analysis reveals that the study area is clearly depressed in comparison to the surrounding area. The depression is bounded by two major faults, Yangsan fault from the east and Yeongdeok fault from the west. The depression is extending in NNE-SSW direction with 17 km in length and 7 km in width.

The structural data reveal that the Yangsan fault is striking in N to NNE direction and dipping steeply to the west, whereas the Yeongdeok fault is striking in N to NNW and dipping steeply to the East. The kinematics indicators along the two major faults demonstrate that the Yangsan fault and the Yeongdeok fault have experienced both sinistral and dextral strike-slip movements.

The basin fills are composed of two major groups separated from each other by an unconformity. The ancient group is the Tertiary sedimentary rocks which are followed by Quaternary alluvium. The basement rocks in the basin belong to the Cretaceous and include the sedimentary rocks of Hayang group which is separated by unconformity from relative younger rock units of Yuchon volcanic group and volcanic intrusions of Bulguksa granite.

The outcomes of this study enable us to understand the structural setting and stratigraphy of the Yeonghae pull-apart basin. Moreover, two opposite strike-slip movements along the major bounding faults indicate multiple deformations along the Yangsan fault system developed along the east margin of the Korean peninsula.