



## **Structural analysis and evolution of the Hadong-Sancheong-Hwagae area in the Yeongnam massif, Korea: a NS-trend tectonic frame in the Korean Peninsula**

Lee Deok-Seon and Kang Ji-Hoon

Department of Earth & Environmental Sciences, Natural Sciences, Andong National University, Andong-si, Republic of Korea(jhkang@anu.ac.kr)

The Hadong-Sancheong-Hwagae area in the Jirisan province of the Yeongnam massif, Korea, is mainly composed of Precambrian Hadong anorthosite complex (HAC), Precambrian Jirisan metamorphic rock complex (JMRC), Jurassic~Triassic granitoids which intrude them, and Cretaceous sedimentary rocks which unconformably cover them. Lithofacies distribution and tectonic frame of the Precambrian constituent rocks mainly show a NS trend, unlike a general NE trend of those in the Korean Peninsula. To unravel the geological structures associated with the NS-trend tectonic frame which was built in the HAC and JMRC, we researched the structural characteristics of each deformation phase based on the geometric and kinematic features and the forming sequence of rock structures of the multi-deformed HAC and JMRC. The results indicate that the pre-Late Paleozoic geological structures of this area were formed at least through the following three times of ductile deformation phases. The D1 deformation happened due to the large-scale top-to-the SE shearing, and formed sheath or A-type folds and a regional NE trend of tectonic frame in the HAC and JMRC. The D2 deformation occurred under the EW-directed tectonic compression, and formed a regional NS trend of active and passive folds and Hadong ductile shear zone over 2.3~1.4 km width, and transposed most of D1 tectonic frame into D1-2 composite tectonic frame. The extensive Hadong shear zone, which was formed in the mylonitization process accompanying the passive folding, was persistently developed along the eastern boundary of HAC and JMRC which corresponds to a limb of passive fold on a geological map scale. It produced a very strong mylonitic structure and stretching lineation. The NE-trend D1 structural elements were mainly reoriented into NS trend by the powerful active and passive folding. The D3 deformation occurred under the NS-trend tectonic compression environment, and formed EW-trend kink or open folds, and partially rearranged the NS-trend pre-D3 structural elements into (E)NE or (W)NW direction. Therefore, it suggests that the tectonic event, closely associated with the formation of the persistent and extensive Hadong ductile shear zone, played an important roles in the construction of the present NS-trend tectonic frame of the Jirisan province of the Yeongnam massif as well as in the formation of main geological structures in the Hadong-Sancheong-Hwagae area.