Preliminary study on paleoseismological history of the Cheongun-Dong trench site along Dongnae-Ulsan Fault System, SE Korean Peninsula

Hyeon Cho Shin*, Sambit Prasanajit Naik, Su-Ho Jeong, Young-Seog Kim

Active Fault and Earthquake Hazard Mitigation Research Institute,
Dept. of Earth & Environmental Sciences, Pukyong National University.
*Corresponding Author: geokopec@naver.com

Abstract:

The NNE striking Dongnae Fault is one of the major active strike-slip faults extended ~100 km along the SE Korean Peninsula by making distinct fault related landforms and topography. Some recent studies suggest that the fault was active during the Quaternary time. Due to the presence of heavy vegetation, highly rugged topography and human induced modification of landscapes, detailed trace of the fault and its paleoseismic data are very sparse along the Dongnae Fault. Because of the rare paleoseismic study, there are several unsolved questions on the rupture extent and the recurrence interval of large earthquakes along this fault.

To address these questions, we have incorporated detailed satellite image analysis with paleoseismic investigations to produce a better trace of the Dongnae Fault and to decipher the history of paleo-earthquakes. We have excavated 8 m (length) × 2 m (wide) and almost 7 m deep trench, which is located near Cheongun-Dong across the scarp. The trench exposed ~45-50º east-dipping fault plane that juxtaposes weathered footwall granitic bedrock and overlying fan gravel with scarp-derived colluvium. From the units exposed in the trench and their crosscutting relationship with the fault, our preliminary interpretation indicates that the fault has experienced at least four Quaternary events.

Initial luminescence age for fine sand and silt layer displaced by the last faulting event is 2.2±0.4 Ka indicating the Dongnae-Ulsan Fault is active during the Holocene time. Comparison of our paleoseismic interpretation with previous age data from the exposed fault outcrop along the Dongnae Fault will help to resolve the Holocene earthquake history and slip rate along the fault, which will be helpful for the proper seismic hazard estimation for the area.