Quaternary faulting and fault inversion along Dongnae-Ulsan Fault system, Southeastern part of the Korean Peninsula

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Abstract:

Almost all large earthquakes occur due to reactivation of pre-existing active faults. Over the past decades world have witnessed several devastating earthquakes due to reactivation of pre-existing faults. Seismic hazard. From the reactivated faults is very difficult to assess because of their complex structure, reversal of slip sense across the fault with time and their concealment by young quaternary deposits.

Recent neo-tectonic studies in SE Korean peninsula revealed that NNE-SSW trending faults slipped during Cenozoic time associated with the opening of the East Sea, which have reactivated due to change on stress field with E-W or ENE-WSW trending maximum principal stress due to closing of the East Sea. The closing of the East Sea results in compression across the SE Korean peninsula and gives rise to several strike-slip and some reverse dominant faults. Recent studies on these faults suggest that some of the faults are active during Quaternary. However, their faulting mechanisms and evolutional characteristics have not been well understood.

In this present study, under the ongoing Korean Active Fault Mapping Project, we have identified a ~8 km along lineament along the Ulsan-Dongnae Fault system and detailed paleoseismic investigations have been carried out. From the paleoseismic investigation, several east dipping normal faults are observed within the Tertiary Granitic rock, which are covered by unconsolidated alluvial terrace deposits. Some of the Quaternary alluvial deposits and normal faults are displaced by reverse faulting, suggesting reactivation of the basement fault, which could be associated with the closing of the East Sea and ongoing deformation during the Quaternary time. The age of Quaternary faulting can be estimated by determining the age of the gravel unit, which is in progress. This study will help in understanding the ongoing tectonic process and the Quaternary activities of related faults in local scale.