



The preliminary study of damage patterns related to Pohang Earthquake (Mw=5.4), Republic of Korea

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The Pohang Earthquake (Mw=5.4) occurred on 15th of November 2017 produced many building damages including tilting, cracking, and distortion. The south-eastern part of the Korean Peninsula is affected by E-W to ENE-WSW direction of horizontal compressive tectonic force resulted from the subduction of the Pacific plate under the Japanese island arcs. The Pohang basin is one of the Paleogene basins located in the south-eastern part of the Korean Peninsula, which is composed of Paleogene to Quaternary sedimentary rocks over the Cretaceous igneous rocks. NE-SW to NNE-SSW directions of lineaments are observed in LiDAR image of the study area. The focal mechanism of this seismic event indicates thrust movement with two nodal planes of N-S to NNE-SSW strike. Although surface ruptures have not been reported in the study area, many building damages related to this earthquake have been detected. Also, secondary earthquake phenomena such as liquefactions and lateral spreading are reported. Interestingly, several different types of building damage patterns are observed in the study area based on our investigation. We classified these damage patterns into three classes based on their characteristics such as simple cracking, tilting, and conjugate fracturing. Based on our analysis, we inferred several probable factors of these damages such as 1) seismic shaking, 2) surface deformation caused by liquefaction or ground motions, 3) loading and direction of the buildings, respectively. However, we need more detailed study to decipher the reasons for the different damage patterns.