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Characteristics of Gyeongju earthquake, moment magnitude 5.5 and relative relocations of aftershocks

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There is low seismicity in the korea peninsula. According historical record in the historic book, There were several strong earthquake in the korea peninsula. Especially in Gyeongju of capital city of the Silla dynasty, few strong earthquakes caused the fatalities of several hundreds people 1,300 years ago and damaged the houses and make the wall of castles collapsed. Moderate strong earthquake of moment magnitude 5.5 hit the city in September 12, 2016. Over 1000 aftershocks were detected. The numbers of occurrences of aftershock over time follows omori's law well. The distribution of relative locations of 561 events using clustering aftershocks by cross-correlation between P and S waveform of the events showed the strike NNE 25∼30 o and dip 68∼74o of fault plane to cause the earthquake matched with the fault plane solution of moment tensor inversion well. The depth of range of the events is from 11km to 16km. The width of distribution of event locations is about 5km length. The direction of maximum horizontal stress by inversion of stress for the moment solutions of main event and large aftershocks is similar to the known maximum horizontal stress direction of the korea peninsula. The relation curves between moment magnitude and local magnitude of aftershocks shows that the moment magnitude increases slightly more for events of size less than 2.0