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What if a larger earthquake would occur at the causative fault of the Gyeongju earthquake with ML 5.8 on September 11, 2016 in South Korea?

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A seismic source can be a capable tectonic source or a seismogenic source. A capable tectonic source is a tectonic structure that can generate both vibratory ground motion and tectonic surface deformation at or near the earth's surface in the present seismotectonic regime. On the other hand, A seismogenic source generates vibratory ground motion but is assumed to not cause surface displacement, covering wide range of seismotectonic conditions, from a well-defined tectonic structure to simply a large region of diffuse seismicity.

The M_L 5.8 Gyeongju earthquake on September 11, 2016 in South Korea is the largest instrumental one since 1978 that occurred in buried fault not exposed to the surface area. So to speak, there is no evidence of surface faulting till now. On the other hand, the geometry of the causative fault of the Gyeongju earthquake was revealed in detail from the distribution of foreshocks and aftershocks. Therefore, the causative fault of the Gyeongju earthquake can be treated as a seismogenic source corresponding to a well-defined tectonic structure as mentioned above.

What level of ground motions would occur at the site of interest if a larger earthquake would occur at the causative fault of the Gyeongju earthquake? To make a rough estimate of that question, we carried out a simple study of modeling the causative fault with the data available, and simulating strong ground motions with the stochastic and empirical Green's function techniques. The magnitude of the maximum earthquake potential on the causative fault is in the range of 6.0 to 7.0 and increased by 0.5. We do not claim the possibility of such a large earthquake in the region, but have a goal to evaluate the seismic safety evaluation of the site of interest from such an earthquake potential. This type of study may help us elucidate the seismic hazard in a low seismicity area such as South Korea and review the seismic safety of the site of interest.