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Seismic response of paleo-tectonic structures to ambient stress field and great earthquake

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The Korean Peninsula is located in the far-eastern Eurasia plate, and experienced complex tectonic evolutions including continental collision and rifting. The paleo-rifting is responsible for the separation of Japanese islands from the Eurasian plate. Also, the paleo-continental collisions formed a current shape of Korean Peninsula. It was observed that the plaeo tectonic structures associated with the paleo-rifting and paleo-collision are spatially correlated with high seismicity regions. Historically dozens of devastating earthquakes with magnitudes greater than 6 appear to occur in the regions. Thrustal earthquakes occur primarily in the paleo-rifting zone, and normal-faulting earthquakes occur dominantly in the paleo-collision zone, as a result of response of paleo-structures to the ambient stress field. The ambient compressional stress field causes reverse activation of the paleo-rifting structures. Similarly conjugate tensional stress field activate normal faulting in paleo-collision structures. In addition, it was observed that the paleo-tectonic structures respond to the M9.0 2011 Tohoku-Oki earthquake, and seismicity has been increased after the earthquake. We investigate the seismotectonics from geological features, seismicity, fault-plane solutions and seismic tomography. Also, we discuss the influence of the 2011 Tohoku-Oki earthquake on the seismicity in the Korean Peninsula.