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Currently used fault monitoring systems: a review for the application in Korea

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Fault Monitoring System (FMS) is defined, here in this article, as a set of measuring instruments, transmitters and computer-based data processing/presenting systems connected in a systematic network to detect and present signals from the effects of faulting-related movements, eventually to provide early warning for hazardous crustal deformations at a target area. Well-known 'measuring instruments' are strainmeters, gravitometers, dilatometers, creepmeters, tiltmeters, EDM, magnetometers, gravitometers, pore pressure transducers, water-level monitors, seismographs etc. Precision of these instruments is of generally greater than a 'few millimeters-per-year' scale. The resolution of the measurement gets greater when combined with satellite or quasar-based geodetic technology, such as GPS, InSAR, SRL and VLBI.

Tectonically active Western U.S. and Japan started using FMS in the early'60s, optimizing the techniques and the record precisions with the development of the science and technology. There are numerous organizations and academic consortiums such as EARTHSCOPE, GSI, IVS, NGL, PBO, SOPAC, UNAVCO, USGS, etc., sharing their own geodetic data and relevant information through the websites.

Korea, located more than 1,000 km away from the nearest tectonic boundary, has been known as tectonically quiet place on earth, however, was 'active' during Tertiary and certain portions of Quaternary Period, according to the recent geological data. Quaternary faults have been found from more than 30 outcrops/trench sites around the southeastern part of Korea. These faults could be a potential risk to critical infrastructure facilities like nuclear power stations or oil refineries in the region except where definite evidences indicating there will be no additional fault activities in the region

exist, and hence we may need FMS in these regions of uncertainty.

Therefore, this paper presents a review of currently used FMS, suggests key items to be concerned for the successful operation, and finally discusses applicability of a FMS in Korea, currently quiet but active until the recent past, probably the late Quaternary.