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## Development of precise and longterm monitoring system of $V_p$ with magnetostrictive transducer

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Precise and continuous monitoring of  $V_p$  can be a measure for small stress change in rock [Reasenberg and Aki, 1974]. Piezo-electric transducers were employed as a transmitter by one of the authors for such a precise measurement. Based on the  $V_p$  change in situ and pressure dependence of  $V_p$  in laboratory, stress variation of the order of hPa was estimated at Kamaishi test site. In this study, a magnetostrictive transducer is employed as a transmitter, because of higher power than piezo-electric transducers. The newly developed measurement system is set at Mizunami test site of Nagoya University. Boxcar signal of 500 Hz is continuously applied to the transmitter. The applied voltage is 1000 V and 40 V for piezo-electric transducer and magnetostrictive transducer, respectively. The length of measurement path is 20 m and 100 m for piezo-electric transducer and magnetostrictive transducer, respectively. Based on the rock properties, in the rocks of higher quality than the rock at Mizunami, such as granitic rocks, measurement path of several kilo-meters should be available with the use of magnetostrictive transducers.

Keywords: stress,  $V_p$ , magnetostrictive transducer, precise monitoring, continuous monitoring