# 二軸圧縮試験機を用いたSlow Slipに伴う透過波の振幅変化の検出
# Response of Transmitted-wave Amplitude to a Biaxial Compressive Experiment

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Active and passive seismic monitoring approaches, such as active seismic survey and seismic interferometry, for phenomena on subducting plate interfaces, especially slow earthquakes, are one of technically feasible ways to measure strain accumulation and release in subduction zones. A laboratory experiment is one of the effective approaches to unravel the mechanism. Some previous studies, reporting on laboratory experiments using rocks, have described results on the response of amplitude and velocity reductions to failure occurrence (e.g., Lockner et al., 1977; Yoshimitsu et al., 2009). Additionally, some previous studies, which imitated slow slip events in the laboratory setting, have reported on velocity reductions before and after a slow stick-slip event (Nagata et al., 2008; Scuderi et al., 2016). Here we show a response of amplitude in transmitted waves to the occurrence of slow slip in a biaxial compressive experiment.

We used three stainless steel blocks (a center block and side blocks) and held $Ca^{-}$ montmorillonite powder as simulated fault gauge between each of the center blocks and the side one. We used piezoelectric elements as transmitters, putting them on the center block, while putting three receivers on the side blocks, which are aligned along the loading direction and placed at an interval of 10 mm. We ran a series of slide-hold-slide experiments. In the initial run, the center block slid first at 1.5 $\mu$m/s for 5 mm, and the block was then held stationary for 1000 s. In the second run and the third run, the block was held stationary for ~3600s and ~32500s on second and third runs, respectively. The sliding was resumed with the same velocity and the same displacement as the first run. After the third hold, the sliding was continued with the same velocity until reaching 2mm of displacement, thus achieving 17 mm displacement in total. We recorded the transmitted waveforms for every 1mm displacement during the sliding period, and every 100 seconds during the holding period, as well as just before and after the holding period.

The preliminary results show that the transmitted-wave amplitude recovered in accordance with the logarithm of the elapsed time during the hold, and that the rate of amplitude reduction is on average about ~10% just after holding periods at all the receivers. The recovery and reduction of amplitude observed for the transmitted waves could be due to change of frictional contact on interface due to the occurrence of sliding.

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