

AE in rock under triaxial compression with small perturbation of confining pressure - Comparison with b-value variation-

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It is well known that seismic activity may be affected by small perturbation of crustal stress such as earth tide. Tanaka (2010, 2012) showed that the correlation between tidal stress and earthquake occurrence time had become significant since about 10 years before the 2004 Sumatra earthquake (Mw9.0) and 2011 Tohoku-oki earthquakes (Mw9.1), and it disappeared after the main shocks. The correlation was the highest around the hypocenter regions of these earthquakes. Nanjo et al. (2012) found similar space-time variation patterns of the b-value in Gutenberg-Richer frequency magnitude relation before and after these earthquakes.

In order to study effects of small stress perturbation on seismic activity, we have measured acoustic emissions (AEs) during triaxial compression experiments with small periodic perturbation of confining pressure (Pc). We reported so far experiments using granite samples drilled near the Nojima fault (Satoh & Lei, 2010), and that using a Westerly granite sample having artificial defects (Satoh & Lei, 2012). In this report, motivated by Nanjo et al. (2012), we compared the changes in the correlation between AE activity and Pc perturbation observed in these experiments with the b-value variation. It seems that the higher correlation between AE activity and Pc perturbation corresponds to the lower b-value, which is consistent with what observed for the M9 class earthquakes reported by Tanaka (2010, 2012) and Nanjo et al. (2012).

<References>

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