Rapid Earthquake Magnitude Detemination with Strain Analysis on Fourier Domain

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In order to apply observation records in the field of natural science to disaster prevention, it is important to increase the accuracy of information. For this purpose, it is important to reference many results that derived from different observed diversely. In this study, we developed new earthquake magnitude estimation method by using dynamic strain records to contribute the improvement of RAPiD (*e.g.*, Ohta *et al.*, 2012). In this method, extract deformations purely affected by source process by strain analysis in the frequency domain. And by re-synthesizing source time function and moment release function from these strain spectra, the scalar moment will be obtained.
Strainmeter is a crustal deformation observational instrument detects deformation that is the spatial differential of displacement, which will be observed by GNSS. Strainmeters' responses can be improve up to higher frequency range (20Hz ~) adept for seismic ground motional deformation, because those mechanism of strainmeter is quite simple.
Dynamic strain analysis for seismic motions to understand source process of a great earthquake is being made taking advantage of these frequency responses of strainmeter (Okubo *et al.*, 2007; JpGU, Okubo, 2007; TRIES report). Generally, plane strain analysis requires three observational components on the same plane. If we could use observatories have more than four horizontal components, we can extract the principal strain amplitudes, those azimuth and observational errors from strain records (Okubo, 2005; SSJ). Additionally, strain analysis can also be applied to spectra in frequency domain, converted from strain records (Okubo, 2007; SSJ). Strain analysis in the frequency domain (Fourier Strain Analysis; FSA), is possible to separate very long period variations and influence of disturbance near the observatory. Since strain is a spatial distribution, it can be easily affected by fluctuations strongly dependent on observatory such as responses for precipitation and groundwater level change. Thus we require a systematic approach to eliminate those undisireable variations.

Keywords: Fourier Strain Analysis, Scalar Moment, Multi Components borehole strain meter

