S231-010 **Room: 302** **Time: May 24 11:30-11:45**

Deriving time-evolving transfer function with better reliability from the raw data of ACROSS

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Background: Whereas there have been several indications of time evolution of the deeper horizon of the Earth's crust in the transfer function acquired by recent ACROSS observation (Kunitomo, 2006), it has not been demonstrated well without any skepticism due to the noise or uncertainty involved. Whereas basic strategy is the weighted stacking of raw data with an optimum weight (Nagao *et al*, 2004) in the primary data processing, there are several different approaches how the overlapping noise of various types are processed under the demand of lower computational load and the level of reliability required. (e.g., Kunitomo *et al* and Yoshida *et al*). When we are to trace any subtle temporal variation of the underground states, suppression and evaluation of noise level is most essential, since the resolution improvement in level and time is twice the extent of the noise reduction. Noise reduction is largely dependent on how we understand the noise to remove and suppress.

Previous approach: We used several criteria of evaluating the optimum weight in data stacking in the previous methods. When an observed value at a point in time domain is too large for the ordinary data, for example, the data point is regarded as an outlier, to which we assign zero for weight (equivalent to discard the data point). While this appears reasonable, we do not have subjective criterion of threshold to classify a data point to ordinary one or outlier. When an estimated noise level in the frequency domain is used to evaluate the weight for stacking, it contains the effect of removable noise in time domain. Further prior information has not been used in the previous approach.

New approach: All the coherent and quasi-coherent components (spikes in frequency domain) are removed as far as possible by using their coherency and prior information. Random noise is classified into two: one is the stationary noise originated both from environment and instrument, and another is eventual noises originated from traffic, local earthquakes and so on. Assuming that statistical properties of stationary noise do not change during a time period of stacking unit (time segment of usually 100 sec or 200 sec for seismic ACROSS), we estimate the statistical parameters of both stationary and eventual noises within the stacking unit. Then we can give a probability of contamination by eventual noise to each of the data points in time domain, thereby a reasonable weight can be assigned to every point in data sequence. The time domain stacking of the time segment units for 1 or 2 hours with this point-wise assignment of weight leads to better results.

Results: A numerical experiment of the new noise processing is made and its usefulness confirmed, although the level of improvement of S/N depends on the nature of data themselves by case. This new stacking method is applied to the ACROSS signal acquired by Hi-net stations. The results obtained for the temporal variation of the transfer function data will be reported and we shall demonstrate how the present method is potential in identifying a subtle temporal change in the transfer function data and their derivatives in comparison with the previous approaches.