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New Metrics Developed for Our Complex Cepstrum Depth Program

We present research, which has recently been undertaken, to develop metrics for a semi-automated program to estimate the depth of a very shallow seismic event (depth less than 2 km) in near-real time, by using the Complex Cepstrum algorithm. This sophisticated program has been shown to provide a unique method for identifying, and separating multiple events. This method is particularly suitable for shallow event analysis because it provides information on the phase of the signal periodicity, and allows processing within a very narrow time window at the start of the signal onset. As part of this research, we have developed several metrics to evaluate statistical confidence limits which are described in detail. The metrics include correlations between the de-convolved and the original seismogram, and estimated and observed echo lag-time comparisons. Two other relevant parameters are investigated and reported in this paper: 1) the optimum windowing of the original seismogram that starts the process, and 2) the liftering of the Complex Cepstrum, used to remove the depth phase from the original seismogram. After the above two processes are completed, the total procedure is evaluated by applying the metrics, to the results achieved from the application of the windowing and liftering processes.

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