



## **A new quality control for f-k solutions to improve automatic processing**

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It is well known that a large number of false events degrades the performance of an automated system and increases the workload during the interactive analysis. A new development to effectively identify detections as noise, lower the false detection rate at seismic arrays and therefore reduce the number of false events will be demonstrated.

Effective quality controls applied to arrivals with poor quality f-k azimuth and slowness results are essential to improve an automated network processing. The current f-k quality control procedure at the International Data Centre (IDC) of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) is based on parameters related to the ratio of the maximum and the minimum normalized f-k power, and the normalized maximum power estimated by f-k analysis. This approach can effectively remove noise arrivals with low maximum power or with multiple small power peaks but it has problems to identify noisy arrivals with power greater than a defined threshold. An additional f-k quality control capable procedure of recognizing arrivals with high noise power is being developed at IDC. SNR is measured on a beam created using the azimuth and slowness estimated by f-k analysis (f-k beam). A noise-screening function is added to the phase identification processing by comparing the SNR measured on the f-k beam with a station-dependent threshold derived from extensive off-line tests. Arrivals are identified as noise if this SNR is lower than the defined threshold and are not considered during network processing. Data in a ten-day period were used to select the SNR thresholds on the f-k beam for 20 arrays, attempting to remove the maximum number of false events while losing as few valid events as possible. Re-running network processing off-line for these 10 days produced 18.2% fewer false events while the number of valid events remained the same. Integration testing for four weeks confirmed these findings compared to the Operations REB (Reviewed Event Bulletin).