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Enhancement to detection performance of regional arrivals at NOA

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The International Monitoring System (IMS) station NOA at the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) has 7 subnets with an exceptional large aperture (ca 58 km). This station was initially designed to detect teleseismic signals. However, regional signals can be well observed at this station. Due to the incoherence of regional arrivals between the different subnets (caused by large distances between the subnets), many regional arrivals were not detected by the automated system at the International Data Centre (IDC). These missed arrivals had to be manually added by analysts during the interactive processing. To enhance the detection performance of regional arrivals at NOA and reduce the work load of analysts, configurations and software of Detection Feature Exactions (DFX) were modified to allow only using the data at the subnet NB2 for detecting and measuring the features of regional arrivals. Studies for designing the detection beam recipes of regional arrivals based on the coverage of array response for 3 dB energy loss, and for selecting an optimized filter band and a reasonable SNR threshold, will be presented.

To validate the modifications made by this study, regional arrivals in a period of fifteen days were carefully reviewed by analysts in the Seismic Specialist Group at IDC. Testing results for this reviewed data set and the results on run-time system both showed significant improvements.