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Overview of Detector Tuning Methodology at the United States National Data Center

Upon the acquisition of a new station, the United States National Data Center (US NDC) employs a standardized detector tuning process with the goal of identifying station specific parameters for the automated detection of regional and teleseismic signals. These parameters include: filter passbands, beam deployment, detector configuration, array configuration, and detection threshold. Detector tuning is performed using a station specific ground truth dataset, which includes a series of data days that have a sufficient number of events. This dataset is scrubbed by an experienced analyst to ensure all possible regional and teleseismic arrivals are picked and archived. The Detection and Feature Extraction (DFX) application systematically runs over the dataset using a subset of possible detection parameter configurations. The automated detections from each run are then compared to the archived arrivals from the ground truth dataset where valid and false detections are determined. The set of automated processing parameters that provide the best trade-off between the probability of detection and false alarm rate are selected.

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