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Assessing the Consistency, Quality and Completeness of the Reviewed Event Bulletin with Waveform Cross Correlation

The Reviewed Event Bulletin (REB) of the IDC includes more than 500,000 events with associated seismic phases. The quality of these events and its completeness depends on multistage automatic processing followed by interactive analysis. The IDC raw data archive allows to apply the method of waveform cross correlation (WCC) for assessment of the similarity between seismic signals associated with REB events, and thus, the overall bulletin consistency. For cross correlation, we create a global set of master-events (ME) in the areas where reliable seismic events are available in the REB. Using only events within 3 degrees from a given ME, we apply the Principal Component Analysis to signals at each associated station. The major components are used to build synthetic MEs. Using real and synthetic MEs, we process continuous data in a specified region with the aim to find new REB-compatible events, which are missing from the REB. Therefore, the developed method allows to test REB consistency, quality, and completeness in any specified region or globally. It can also be thought as an alternative to the manual spot check during an independent review of the REB in routine IDC event analysis or as an additional tool for the independent reviewer

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