

Strong teleseismic ($\Delta > 20$) earthquakes (e.g. $> M6$) provide network operators unique opportunities to verify the integrity of their metadata and the quality of waveform data at their stations. For global networks, this is routinely done by comparing co-located sensors or using long-period synthetic seismograms (e.g. greater than 100 s period). Such options are usually not available for regional networks (e.g. lack of co-located sensors and limited resources) making it necessary to consider other approaches. For this reason, we develop an approach to verify station amplitudes, detect significant timing errors, and assure signal fidelity by making use of direct P-wave arrivals for several nearby stations ($\Delta < 2$). For all stations in a regional network we compare the amplitude, cross-correlation, lag, as well as other parameters for a stacked (e.g. time-shifted and averaged) waveform produced by all station pairs that have a cross-correlation coefficient of at least 0.8. Figure (a) shows an example of such a comparison for the September 24, 2013 M7.7 Balochistan earthquake. In this case, our network is the New England seismic network (network code: NE). The network stack is plotted in grey under each station trace. Using statistics from many events, we are able to identify continuously problematic stations. For example, Figures (b) and (c) shows stack inclusion percentages (based on 69,836 station pair measurements), for the Central Eastern U.S. Network (network code: N4), for the vertical and radial components, respectively. This is an example of a larger network where we have tried this method. In this case dark blue circles (e.g. southern Tennessee) indicate stations that are consistently dissimilar from nearby stations, indicating a potential problem. Such summary statistics can help station operators identify potentially problematic stations as well as stations that show highly dissimilar waveforms for nearby stations (e.g. poorly characterized metadata or stations with problematic locations).

