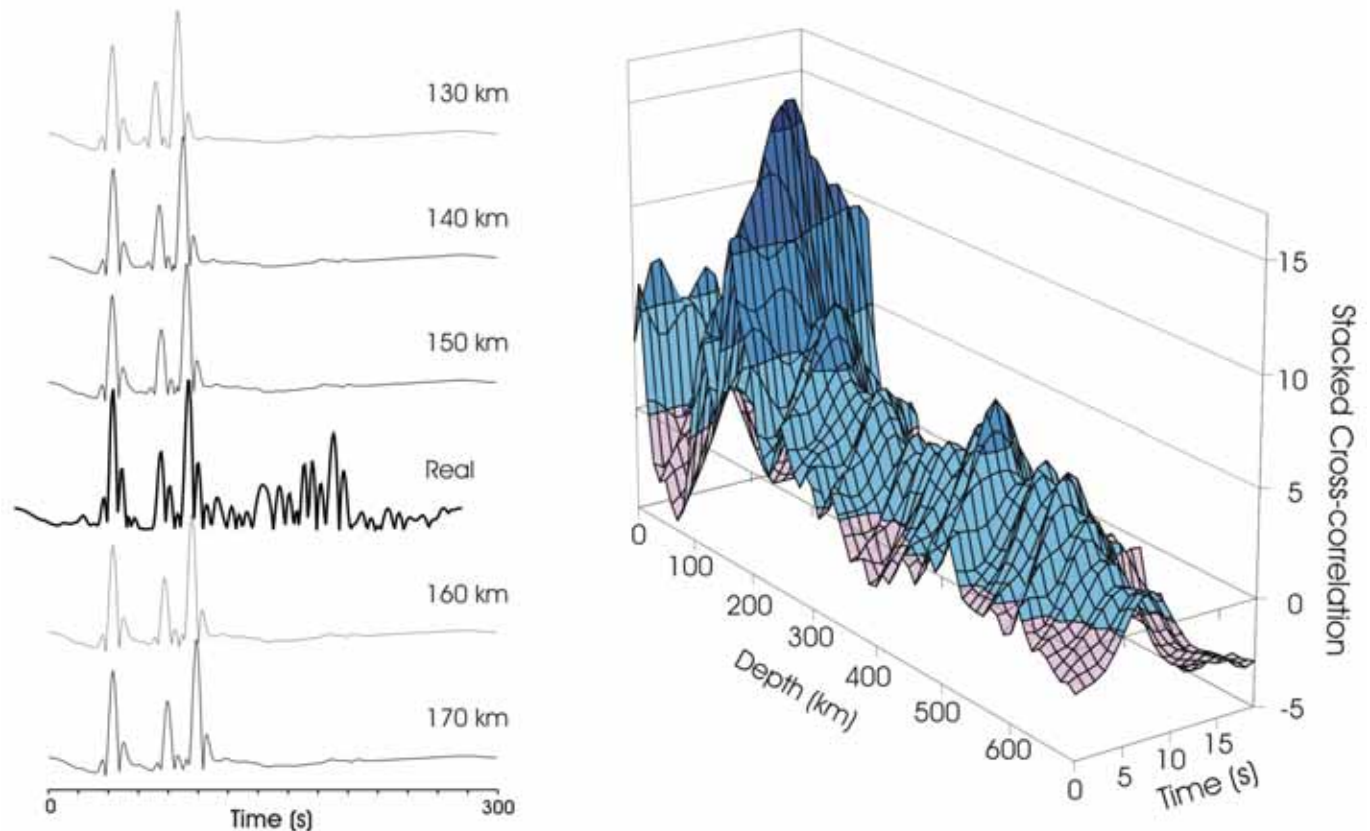


The Use of Waveform Shapes to Automatically Determine Earthquake Focal Depth

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Earthquake focal depth is an important parameter for rapidly determining probable damage caused by a large earthquake. In addition, it is significant both for discriminating between natural events and explosions and for discriminating between tsunamigenic and non-tsunamigenic earthquakes. For the purpose of notifying emergency management and disaster relief organizations, as well as issuing tsunami warnings, potential time delays in determining source parameters are particularly detrimental. We present a method for determining earthquake focal depth that is well-suited for implementation in an automated system that utilizes the wealth of broadband teleseismic data that is now available in real-time from the global seismograph networks. This method uses waveform shapes to determine focal depth and is demonstrated to be valid for events with magnitudes down to approximately 5.5.



Example using a magnitude 6.1, intermediate depth (150 km), earthquake that occurred on 15 November 1997, in the Hokkaido, Japan region. (Left) Absolute values of synthetic seismograms computed for an epicentral distance of 40.6° and focal depths ranging from 130 to 170 km, and the corresponding seismogram recorded at station WMQ. (Right) Stacked cross-correlation, using 17 GSN stations, as a function of lag time and assumed depth.

Sipkin, S.A., The use of waveform shapes to automatically determine earthquake focal depth, *Bull. Seismol. Soc. Amer.*, 90, 248-254, 2000.