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P - 100

Deconvolution of 3-component Teleseismic Data from Southern Tibet using the SVA Technique

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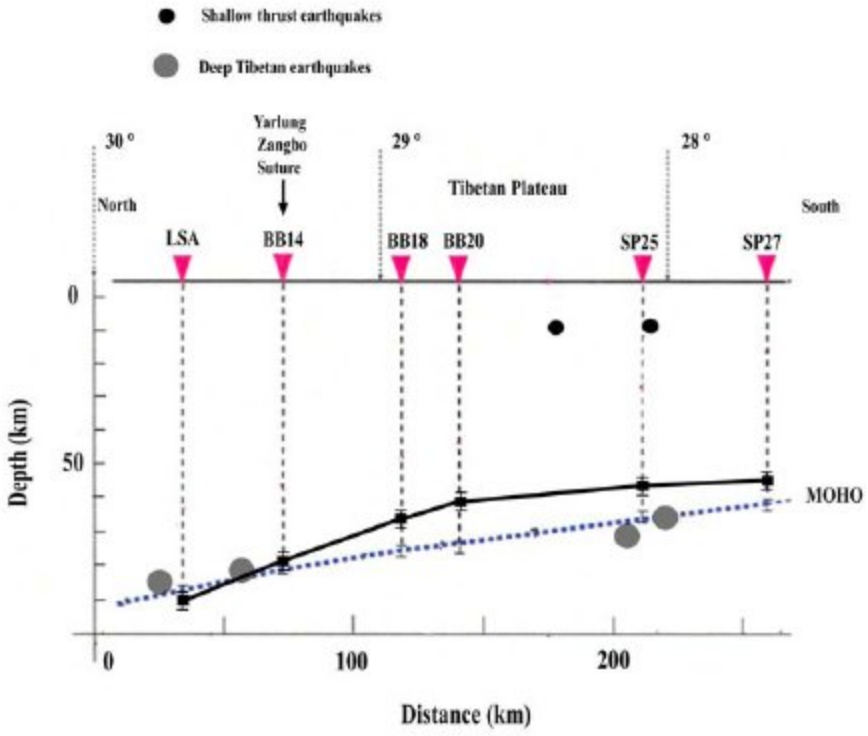
Summary

In this study, three-component P-wave data from selected INDEPTH II and CDSN stations in southern Tibet were deconvolved using the SVA technique of Dasgupta and Nowack (2006). The SVA technique involves constructing an estimate of the source and distant earth signature from the autocorrelation of the SV component and using this to deconvolve the data. The deconvolved vertical components were then used to invert for crustal P-velocity structure. Prior models for the inversions of the deconvolved vertical components at these stations were based on the S-velocity results obtained from the inversions of radial receiver functions by Mitra et al. (2005) assuming an initial Poisson solid. The Moho depths obtained from inverting the vertical components in the north of the study area compared very well to the depths obtained by Mitra et al. (2005). However, the Moho depths were similar but somewhat shallower beneath the stations to the south of the study area. This could result from the lateral heterogeneity in the region and that the piercing points at depths for the Ps and PpPp phases are different.

Keywords: seismic deconvolution, SV autocorrelation, receiver functions



North-South profile from southern Tibetan Plateau adapted from Mitra et al., 2005

Figure A north-south profile of the southern Tibetan Plateau adapted from Mitra et al. (2005). The inverted triangles show the locations of the stations used in this paper. The vertical dashed lines show the locations of the velocity functions under the individual stations. The solid and dotted lines indicate the variation of the Moho depths from the inversion of the deconvolved vertical components and the Moho depths from inverting receiver functions as obtained by Mitra et al. (2005), respectively. The black circles are shallow thrust earthquakes and the grey circles are deep Tibetan earthquakes from Mitra et al. (2005).