



1D Velocity Model For NW India in and Around Delhi

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Abstract

We derive a 1D crustal velocity model based on P- and S-wave residual time arrivals at the national seismological network maintained by National Centre for Seismology (NCS) for NW India around Delhi between latitude range 22°N to 33°N and longitude range 73°E to 80°E, which separates inter-plate area in the north and intraplate area in the south. Available models are mostly from regional studies having low crustal resolution. We use 413 earthquakes in all, which are chosen based on the maximum number of stations, minimum azimuthal gap, and root mean square travel time. We use VELEST code to invert the 1-D velocity model, hypocenter locations, and station delays. The Indo-Gangetic (IG11) model is used as a starting model and in this model, we further created 500 initial models by adding random perturbation +/- 10%. We also evaluate the effect of different Moho depths (i.e., 38, 43, and 48 km). We selected the preferred model based on how the models con-merge and on the travel time residuals. The minimum residual travel time of P and S-arrivals indicated crustal thickness as 43 km. Further, this model can be used for seismicity and 3-D seismic tomographic studies of the area.

Keywords: Earthquake location, 1-D crustal velocity model