



Crustal shear velocity structure beneath Cuddapah Basin, India

Abhilash Kumar Paswan, Ayush Goyal, Raju Kumar, and Kajaljyoti Borah

Indian Institute of Science Education and Research (IISER) Kolkata, India (abhilashpaswan@gmail.com)

Knowledge of the composition and thickness are two critical parameters to understand the origin and evolution of the continental crust. Most of the geophysical studies over south India are focused mostly on Dharwar craton and very small amount on the Cuddapah Basin. In the present study an attempt have been made to evaluate those parameters beneath Cuddapah Basin, a crescent shaped structure, which has been believed to be one of the largest intra-cratonic Proterozoic sedimentary basins of India situated in the eastern part of the Dharwar craton of the south Indian shield. Receiver function, a well known seismological technique to find the crust and upper mantle structure, have been calculated from teleseismic earthquakes recorded over 12 seismic stations in the Cuddapah Basin, and are modeled using a global optimization technique known as Neighbourhood Algorithm (NA) followed by joint inversion. The results show, crustal thickness variation from 34-41 km (with average of 36 km) and average $V_s \sim 3.55$ km/s beneath the study area. It is found that moho is deeper below the two faults Gudur-Cuddapah and the Veldurti-Kalva-Gani fault system, which separates Cudaapah basin into three different blocks. The overall crustal composition varies from intermediate to mafic ($V_p/V_s \sim 1.75-1.83$). Average V_s of upper, middle and lower crust varies ~ 3.45 , ~ 3.65 , 3.7-3.9 km/s, respectively, while high V_p/V_s (~ 1.8) are observed all over the crust. Our results also suggests the presence of Hales discontinuity at few locations beneath Cuddapah Basin.

Keywords: crustal structure, receiver function, Cuddapah basin, moho, inversion.