

The Crustal and Upper Mantle Structure of the Interior Arabian Platform

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Abstract

The crustal and upper mantle velocity structure of the interior Arabian platform has been derived using the spectral analysis of long period P-wave amplitude ratios. The ratio of the vertical to the horizontal component is utilized to obtain crustal transfer function using the " Thomson- Haskell " matrix formulation for horizontally layered crustal models..

Twenty nine earthquakes recorded at RYD long-period station between azimuths N 20⁰ W and N 150⁰ E were selected for the analysis based on the following criteria : focal depths range between 5 and 215 km , body-wave magnitudes greater than 5.0 and the epicentral distances range from 7 to 97⁰.

The selection of the most suitable model was based on the identification of theoretical model which exhibits the highest cross correlation coefficient with the observed transfer function ratio. The model suggested that the crust consists of five distinct layers. The upper crustal layer has a P-wave velocity of about 5.6 km/s and is about 2 km thick. The second layer has a velocity of about 6.3 km/s and 10 km thick. The third layer shows a velocity of 6.6 km/s and 8 km thick. The fourth layer shows a velocity of 6.9 km/s and 15 km thick. The lower layer has a velocity of about 7.6 km/s and 10 km thick. The Mohorovicic discontinuity indicates a velocity of 8.2 km/s of the upper mantle and upper mantle and 45 km depth.