

Crustal structure of the northern Arabian platform inferred using spectral ratio method

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Abstract

The crustal structure of the northern Arabian platform is derived using the spectral analysis of longperiod P-wave amplitude ratios. The ratio of the vertical to the horizontal component is utilized to obtain crustal transfer functions for horizontally layered crustal models. Nine earthquakes recorded at the long- period stations Baghdad (BHD) and Rutbah (RTB) of the Iraqi Seismic Network (ISN) were selected for the analysis based on the following criteria: focal depths in the ranges 13 to 468 km, magnitudes greater than 5.0, and epicentral distances in the 67 to 86 range. By comparing the spectral peak positions of observed and theoretical values, the thickness and velocity can be resolved with in 1 and 0.2 km/s. The selection criterion for the final model in the forward modeling process was based on the correlation coefficient between observed and theoretical transfer functions. The crustal model suggests that the crust consists of three distinct layers. The upper crustal layer has a  $V_p$  range from 4.9 to 5.2 km/s and (h) range from 4 to 10 km. The intermediate layer has a  $V_p$  range from 6.0 to 6.6 km/s and (h) range from 11 to 14 km. The lower layer has a  $V_p$  range from 6.4 to 6.8 km/s and (h) range from 16 to 18 km/s. As to the MOHO discontinuity a depth of 36.5 km and a velocity of 7.8 km/s for the upper mantle are indicated. # 2002 Elsevier Science Ltd. All rights reserved.