

SEISMICITY OF THE SOUTHWESTERN REGION OF THE ARABIAN SHIELD AND SOUTHERN RED SEA

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ABSTRACT

Historical and instrumental seismicity in the southern Red Sea region has been examined in relation to tectonics and structures indicated by geologic and magnetic data. One hundred and seventy earthquakes recorded during the period 1913 - 1994 had body-wave magnitudes of between 3.0 and 6.6.

The majority of seismic activity is clustered on or near the transform faults of the deep axial trough in the southern Red Sea. The seismically active area between latitude 16.3°N and 17.4° N. is believed to extend northeastwards to the Arabian Shield. The apparent low level of seismicity in the shield area might be due to the lack of detection of small events.

The frequency-magnitude analysis indicates that events above body-wave magnitude 4.2 are reliably determined in the southern Red Sea region. Estimation of constants a and b in the Richter relation of occurrence yielded 6.22 and -0.91, respectively.

This study and historical data support the mechanism of sea-floor spreading and indicate that the seismic activity in the shield area and the southern Red Sea may be attributed to stresses resulting from subsurface magmatic activity and the spreading centers , respectively.