

CRUSTAL STRUCTURE AND SEISMICITY OF ZUBAIR SUBZONE, SOUTHERN IRAQ

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ABSTRACT

Zubair subzone represents the southern part of the Mesopotamian Zone of Iraq and Kuwait. It is bounded by the Takhadid-Qurna Fault in the northwest and the Jal Al Zour Fault in the southeast. Data from five broadband seismic stations in southern Iraq (BSR1, BSR2, AMR1, AMR2, and NSR1) were archived and used in this study. The BSR1 and BSR2 were used to study the crustal structure because they are located within the Zubair Subzone. The other three stations were used for the relocation and focal mechanism solutions. Beside these stations, we have used data from the Iranian Seismological Center (IRSC) and the Kuwait National Seismic Network (KNSN). For the crustal structure, joint inversion of P-wave receiver functions and surface wave dispersion curves were calculated from the available data of BSR1 and BSR2 broadband seismic stations. The results show that the thickness of sedimentary cover is 12 km and the depth of Moho is 44 km under BSR1 and BSR2, which are separated only by 5 km distance. HK-Stacking of P-wave receiver functions were also applied to give very similar results which are 43 ± 1 km depth of Moho beneath the two stations. The velocity of upper-mantle for P-wave is 7.84 km s⁻¹ and for S-wave is 4.40 km s⁻¹. The velocity model of this study was compared with velocity model of Kuwait that was derived by Pasyanos et al. (2007). Focal mechanism solutions by moment tensor method of 4 earthquakes with magnitude equals or more 4 were estimated and the results show that the predominant fault movements are reverse and strike-slip.

Keywords: Mesopotamian Zone, Zubair Subzone, event relocation, receiver functions, surface wave dispersion, joint inversion, velocity models.