SEISMO TECTONICS OF BADRA-AMARAH FAULT, IRAN-IRAQ BORDER

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Keywords: Seismotectonics of Iraq, Focal Mechanism Solutions, Stress Analyses, Arabian Plate, Badra-Amara Fault.

ABSTRACT

The Badra-Amarah fault is located in the northeastern side of the Mesopotamian Zone at the Iraq-Iran border. This fault is the most seismically active fault in Iraq and it is located within the zone of the major damage. The goal of this study is to study the seismic history, focal mechanism solutions, and the recent stress analysis of the Badra-Amarah fault. The seismic history has been studied by using the source parameters of earthquakes from different catalogs, mainly from the IRSC catalog. The focal mechanism solutions were calculated from the CMT catalog, which were analyzed in this study to derive the principal stress directions and their regimes. According the seismic history of the study area, four seismic swarms occurred at the fault in August, 2008, June, 2009, August, 2009, and April, 2012 with magnitude of main shocks ranges from 4.4 to 5.7. The focal mechanism solutions show that the Badra-Amarah fault has a reverse movement with little strike-slip displacement. The dip of the fault is 60° with dip direction equals 226°. From the stress inversion of moment tensors, the principal stress axes are: $\sigma_1$ is 14°/217°, $\sigma_2$ is 10°/309°, and $\sigma_3$ is 72°/074°. The length of fault is about 200 km and its depth may reach the basement rocks which are about 10 km.

INTRODUCTION

Iraq represents part of the convergent plat boundary between the Arabian and Eurasian plats. The collision between these plates began after the closure of the Neo-Tethys Ocean in the Miocene and it continues to the present day (e.g. Dewey et al. 1973; Numan 1997). Iraq has two systems of faulting; these are the transversal faults and longitudinal faults (Najd system faults). One of the longitudinal faults is the Makhul-Hemrin fault. It trends from centerof Iraq and passing through the Makhul and Hemrin folds until Badra and Amarah cities at the Iraq-Iran border (Jassim and Goff, 2006). In this study, the Makhul-Hemrin