

## FAULT PLANE SOLUTION OF HARER EARTHQUAKE OF 24 JULY 1991, NORTH OF IRAQ. Emad A.M. Al- Heety - Al- Anbar University.

### ملخص:

تم تعيين حل مستوى الصدع لهزة حرير التي وقعت في ٢٤ تموز ١٩٩١م في شمال العراق. رسمت معلومات الحركة الاولى للموجة الضالوية في مسقط متساوي المساحة وفي نصف الكرة الاسفل. فسرت الحركة كصدع معكوس في اتجاه شمال شرق. هذه النتيجة تتسجم مع حلول مستوى الصدع لهزات ارضية حدثت في مناطق مختلفة من نطاق زاكروس.

### ABSTRACT:

Fault plane solution(FPS) for Harer Earthquake of 24 July 1991, was determined . The first motion of P-wave data were plotted in a lower hemisphere equal area projection. The first motions were interpreted as NE trending reverse fault. This result is consistent with previous (FPS) studies for earthquake occurred at different regions in Zagros- Belt.

### INTRODUCTION:

Iraq is located in a relatively active seismic zone, and most regions of the country were subjected to a seismic activity in the past and may be subjected to seismic activity in the future(1). Most events are concentrated along the Zagros- Tauros belt, especially in the simply folded belt in rectangular area of few hundred kilometers width.

All focal mechanism solutions carried out for the events located

on the Iranian side from Zagros-belt region (see.2).Alsinawi and Al-Heety (3) investigated the Composite Faults Plane Solutions (CFPS) for microearthquakes that occurred in certain region in North of Iraq.

The well calculated and documented data on focal mechanism solutions that carried out by several investigators (e.g.,3,4,5,6,7,8) show that Zagros region as compressive tectonics region, and this appears as reverse

faulting with a dextral strike-slip component.

The purpose of this investigation is determination of the fault plane solution for the Harer Earthquake that has occurred in the Harer region in North of Iraq at 24 July 1991, (fig.1).

#### DATA ACQUISITION

The data about this earthquake is given in Table 1. From 64 readings recorded by the global seismic stations, only first arrival readings from 12 seismic stations were selected for detailed study, and records having high signal to noise ratio, with sharp first arrivals were chosen.

Table (1): Data of Harer Earthquake.

Date			Origin Time			Epicentral Location		m	Depth Km
D	M	Y	H	M	S	Lat.(N)	Long(E)		
24	7	1991	18	37	02.6	36.49	43.94	4.7	42±7.5

Source of data: International seismological center (ISC).

#### DATA ANALYSIS AND RESULTS

The first motions of P-wave were plotted in a lower hemisphere equal area projection (fig.2). This plot was examined to check, if the data permits its separation into compressional and dilatational quadrants. The first motion data were interpreted as a NE trending reverse fault. This fault, regardless of the faulting character, is in good consistent with AB fault trending (Fig.1). Figure 1. shows that Harer

Earthquake occurred at the AB fault. This fault, on the map, is described as fault of unknown character. The important contribution of this study is determination of the faulting character of AB fault.

#### CONCLUSIONS:

The first motions of p-wave data were interpreted as NE trending reverse fault. This result is consistent with the focal mechanisms solutions for Zagros-

Belt region. The suspected NE trending reverse fault coincides with the uncharacterized fault (AB), therefore it may be a solution of this fault.

#### **ACKNOWLEDGMENT**

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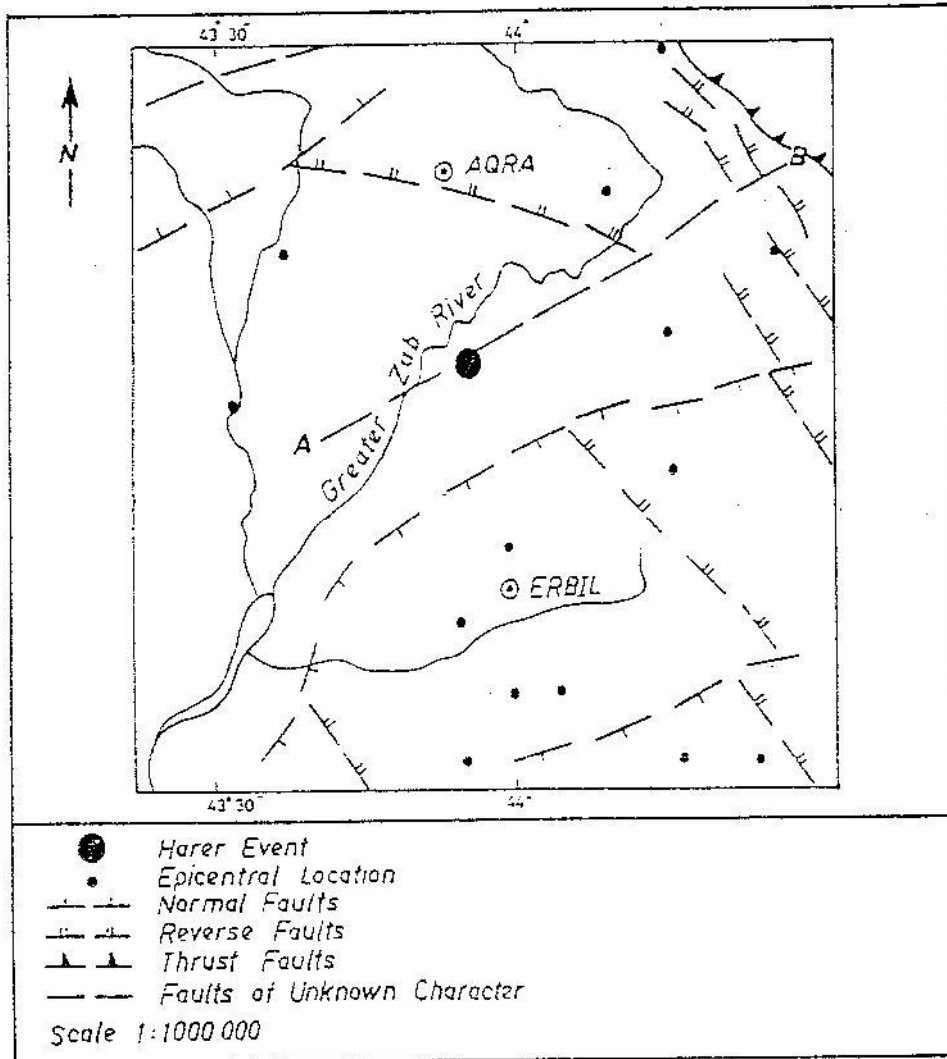


Fig. 1. Simplified Seismotectonic Map of Studied Area.  
 (Modified of Seismicity and Tectonic Map of Iraq).

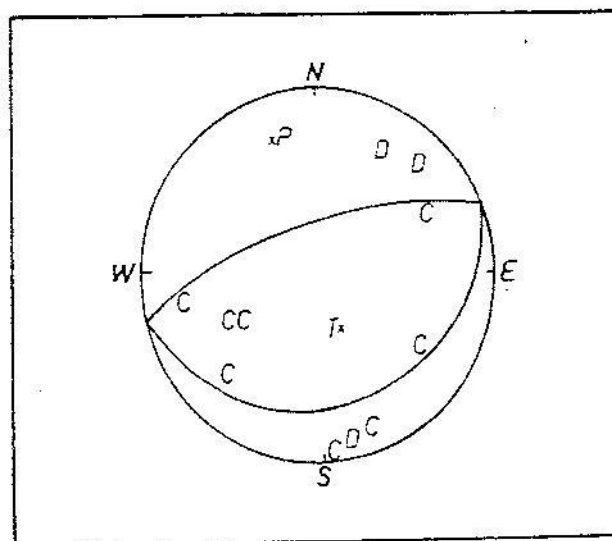


Fig. 2. Fault Plane Solution for Harer Event. An Equal Area Hemisphere was used. P-wave Compression and Dilatations are represented by (C) and (D) respectively.

