

INTRODUCING THE BASEMENT FAULT OF ZAHAB AND ITS BEHAVIOR IN CHANGING THE TREND OF THE ROTATION OF AXIS OF ANTICLINES IN KEREND-ZAHAB AREA BAKHTARAN PROVINCE, WEST OF IRAN

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ABSTRACT

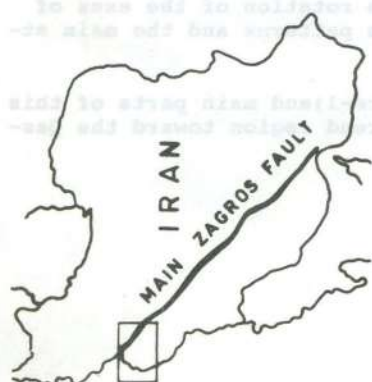
The observation of the trend of the rotation of axes of anticlines, and the drainage patterns also, in the Kerend-Zahab area (west of Iran) suggests some changes the trend of the rotation of axes of anticlines from "S" type to "Z" one. After the impression of some strike slip faults, toward the west, near Sar-e Pol-e Zahab area, there are the "Z" shape traces of fold axes, with left hand transpression behavior. Also, it is obvious that the "S" shape drainage patterns are belong to the anticlines that their axes rotated in "Z" shape. This is related to the function of at least on basement fault (Basement Fault of Zahab) that is located in the east of the city of Sar-e Pol-e Zahab. The numerous faults in the region of Patagh-Kerend are settled in en-echelon arrangement to the prevailed shear mechanism. So the reaction of the riedel shears is the main maker of the drainage patterns.

INTRODUCTION

A seismotectonic study for some understuding dam site in western Bakhtarn p-rovince (west of Iran), caused a morphotectonic observation in this region.

In this study the special attention is paid to the rotation of the axes of the folds, the type of the setting of the drainage patterns and the main structural and seismic trends.

The region is sited nearby Iran-Iraq border (Figure-1) and main parts of this paper is focused on the western Islam-Abad and Kerend region toward the Qas-r-e Shrin and Iraqi domain.



LEGEND

- THRUST
- INFERRED
- FAULT (INGENERAL)
- MOUNTAIN FRONT FLEXURE
- ANTICLINE AXIS
- SYNCLINE AXIS
- BOUNDARY

EPICENTERS

- 4 < Mb 6.5
- 5 < Mb

- HISTORICAL EARTHQUAKES

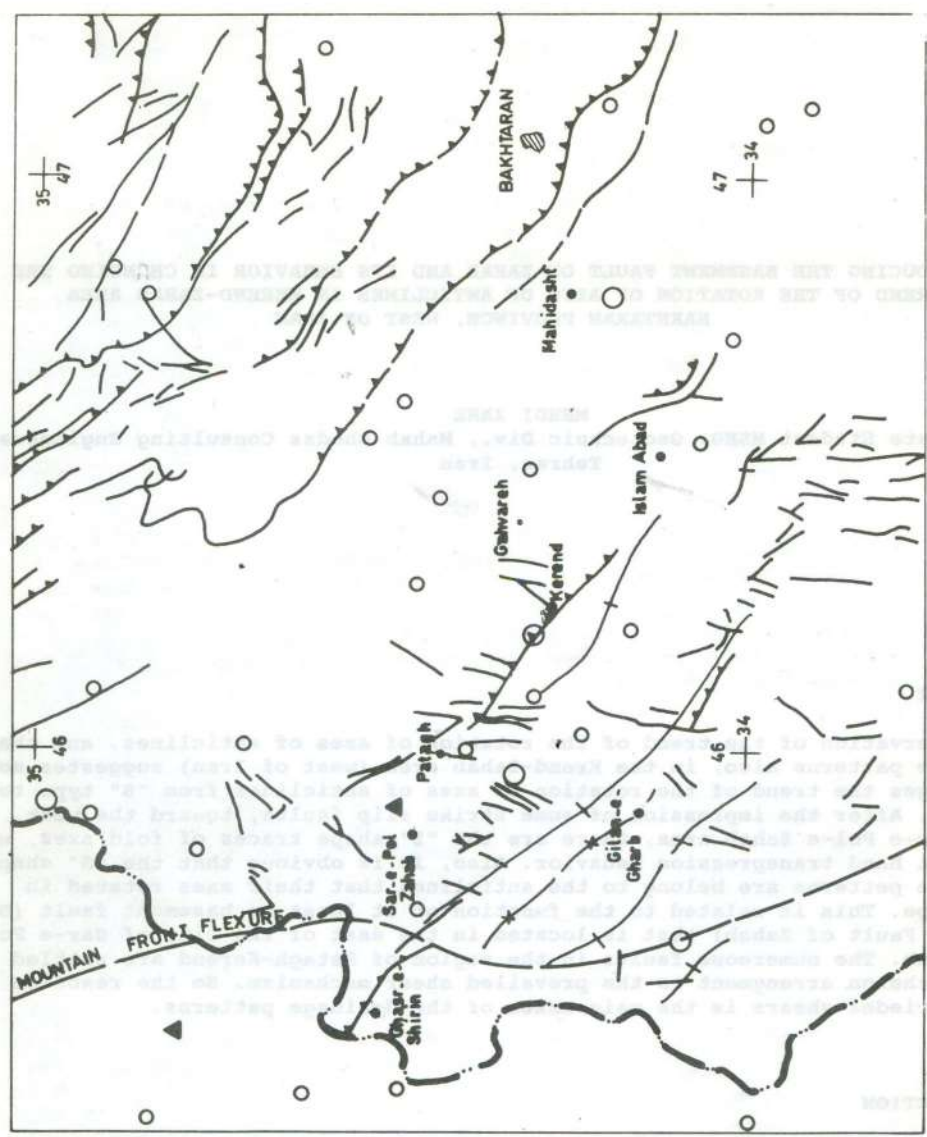


Figure-1: Seismotectonic and Location Map of the Studied Region.

This area is belong to the Zagros seismotectonic state, and from the morpho-tectonic units point of view, the flysh and radiolarite zone of Zagros system, is extended here along the Zimakani and Mahidasht rivers.

GEOLOGIC AND TECTONIC SETTING

The studied region is sited in Zagros folded belt, in the flysh and radiolarite zone. The Asmari-Shahbazan formation of the Kerend-Gahvareh-Islam Abad area reach to the Gurpi-Pabdeh outcrops of the anticline of Kuh-e Sarkush and the Aghajari formation exposures of the Qasr-e Shirin area. Remnants of the Aghajari formation extend into the Islam Abad area and red clastics west of Mahidasht plain.

Bakhtyari masses in the Qasr-e Shirin and Sar-e Pol-e Zahab regions correspond to the old fans of the rud-e Alwand.

The most important structural feature in the region is the Mountain Front Flexure, a basement superfault that specifies the edge of the Asmari-Shahbazan formation (Figure-2).

The Kerend thrust is the most important fault, and extend along the Kerend anticline. The Qasr-e Shirin fault that is a thrust fault too, is located in the northern parts of the city of Qasr-e Shirin, and extend along the anticline of Kuh-e Sarkush.

There is obvious an important seismic trend: The "Kerend Trend" that four destructive and damaging earthquakes occurred along it [5].

THE ROTATION OF FOLD AXES AND DRAINAGE PATTERNS

As it is seen in Figure-3, from the east toward the west of the Sar-e Pol-e Zahab, the type of the rotation of the anticlines axes is different. From the east, the Kerend anticline has a "S" shape rotation of axes. The type of the setting of the drainage patterns here, is in "Z" shape (Figures-3,4). Toward the north west, a fractured and faulted zone (Fault zone of Patagh) with some strike slip faults and thrusts has dislocated the surfatinal features. The rotation of the fold axes of Kuh-e Nuh, has a "M" shape, that is located in the western part of the Kerend anticline.

After passing from this changing zone, the Zangalin syncline, with a "Z" shape trace of axis, has some drainage patterns with "S" shape setting. Also the anticlines of Daneh-Khushk and Sarkush that are located in the northern parts of the city of Gilan-e Gharb and south western parts of the city of Sar-e Pol-e Zahab, have "Z" shape folds axes and the setting of the drainage patterns on these anticlines are in "S" shapes. This problem is also observed for the anticline of Kuh- Garreh (north of Sar-e Pol-e Zahab) and the anticline of Kuh-e Balaleh (south east of Gilan-e Gharb) in the west of the "changing zone of Zahab" with "Z" shape fold axes, and the anticlines of Kuh-e Warda and Kuh-e Sankul (in south west of Islam Abad) with "S" shape fold axes, that are located in the east of the Changing zone.



LEGEND

THRUST

THrust

FAULT

MOUNTAIN FRONT FLEXURE

FOLD AXIS

BOUNDARY

EPICENTERS

○ 4 ≤ Mb ≤ 5

○ 5 ≤ Mb

▲ HISTORICAL EARTHQUAKES

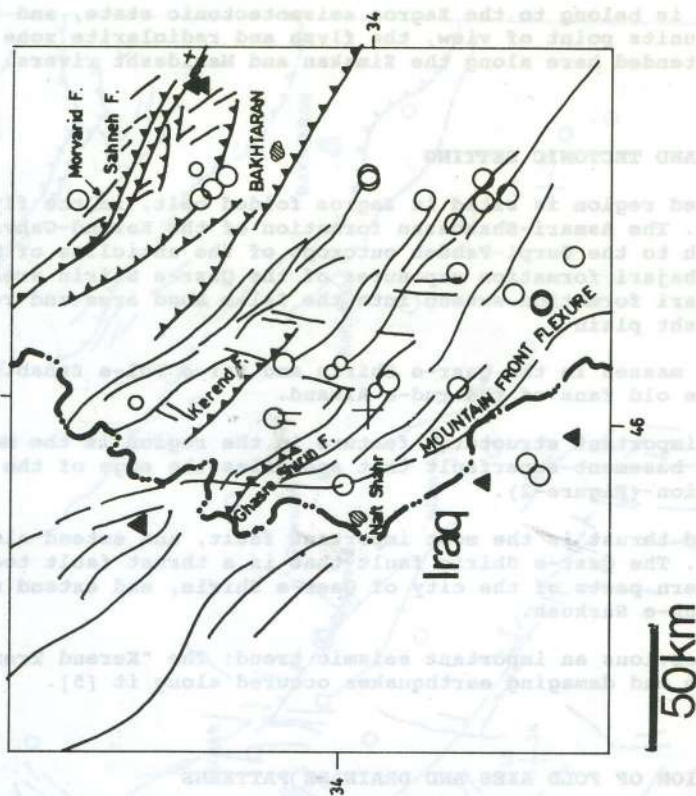


Figure-2: Seismotectonic Map with Special Regard to the fold axes.

MAIN STRUCTURAL LINEMENTS

According to the joint surveys in the north east of the Kerend fault, both sides of the changing zone, and east of the Sarkush anticline (Figure-3) the senses of the fault movements (that coincide with the "R1", "P" and "R2", the main riedel shear linements), shows a change of the behavior from right-hand transpression to left-hand one.

This left-hand transpression verify with the Qasr-e Shirin fault, settled in the northern parts of the Sarkush anticline. This is an important witness of the left-hand transpression behavior for the anticline of Sarkush. Therefore, it seems that the changing zone near Sar-e Pol-e Zahab coincides with a basement fault (Basement fault of Zahab). This fault is followed with some numerous faults in the surface, and change in the setting of the fold axes and drainage patterns.

With regard to the arrangement of the structural linements in the left-hand and right-hand transpression mechanisms and the setting of the drainages in these two cases (that is observed in the east and the west of the Sar-e Pol-e Zahab), it seems that the setting of the drainage patterns is related to the rotation of the folds axes. So that, the "S" shape drainage patterns are related to the "Z" shape fold axes, and the "Z" shape drainage patterns are related to the "S" shape fold axes (Figure-6).

SEISMICITY OF THE STUDIED REGION

According to the Figure-1, the epicenters of the 20th century and the historical earthquakes, remark an area with high potential of earthquake event in the changing area. The Kerend seismic trend that coincide with Kerend fault [5], and four destructive and damaging earthquakes (from VI to VIII M.MI) is one of the most important active faults of this region. This active fault, associated with the other minor faults, are located in the impression area of the Zahab basement fault.

CONCLUSION

The sense of the structural linements change from a right-hand transpression behavior to a left-hand one, from the east of the changing zone of Zahab toward the west of it. The witnesses for this problem are:

1. Changing in the type of the rotation of fold axes, from a "S" shape in the east to a "Z" type in the west.
2. Changing in the sense of the faults and the structural linements, (in the strike of the riedel shear linements).
3. Differentiation of the setting of drainage patterns in the east and the west sides of the changing zone, from a "S" type to a "Z" one.
4. Presence of one active seismic zone, according to the event of earthquakes in the 20th century.

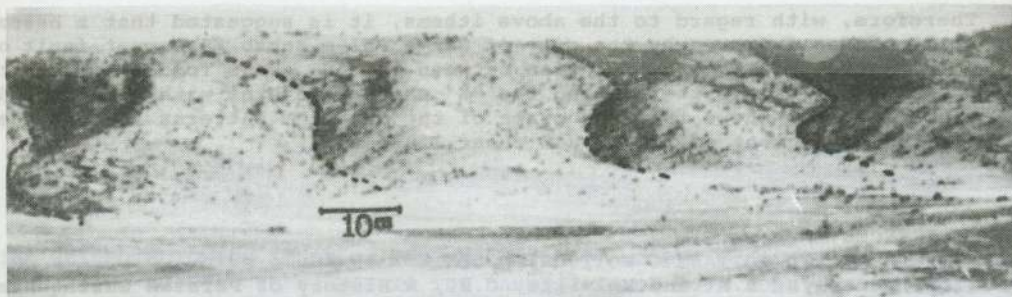


Figure-4: The "Z" Shape Drainage Patterns, Kerend Anticline.



Figure-5: The "S" Shape Drainage Patterns, Zangalian Syncline.

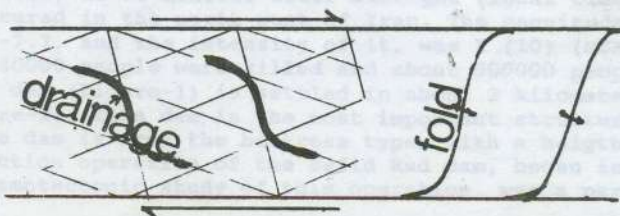
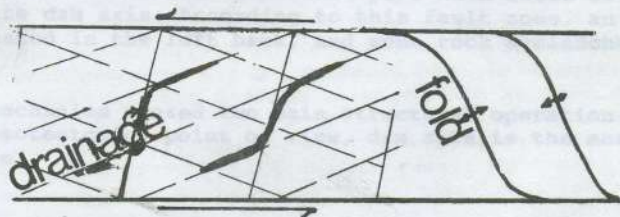


Figure-6 The Model of the Relationship between, Left-Hand and Right-Hand Transpression Mechanism with the Setting of the Drainage Patterns and Fold Axes.

Therefore, with regard to the above items, it is suggested that a basement fault passes from nearby the city of Sar-e Pol-e Zahab (Basement fault of Zahab Figure-3). Also the relation between the "S" shape fold axes with the "Z" shape drainage patterns, and the "Z" shape fold axes with "S" shape drainage patterns, shows that the shape of the drainage patterns is concerned with the arrangement of the riedel shear lineaments.

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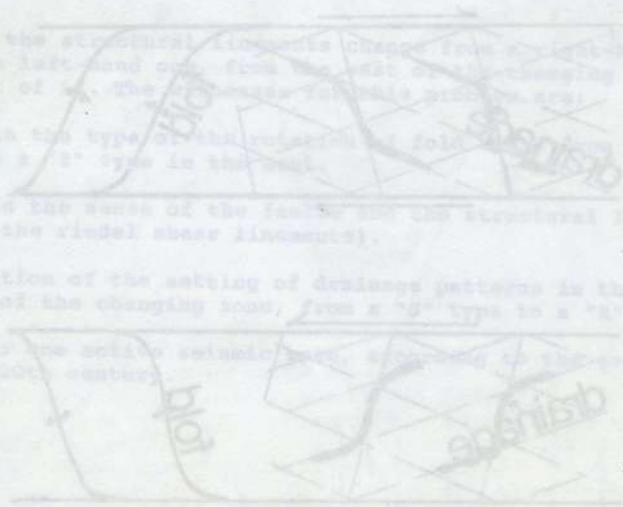


Figure 4. The Model of the Relationship between Left-Hand and Right-Hand Transpression Mechanism with the Setting of the Drainage Pattern and Fold Axes.

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