

The field work in the aspect of structural geology

Overview

This field work was held on 24th of October for the third student stage – college of engineering, department of petroleum engineering in the Iraqi Kurdistan region mountains, we specify here the Spi Rais anticline which part of major Bekhair anticline. Previous studies have shown that Bekhair anticline is approximately 80 km long, and has an average width of about 12 km, and an amplitude of about 530 -500 meters from the contact point between lower Faris and Pila spi formation to the top of Bekhme formation. Some sites have been drilled on the top of Shiranish formation near Badi village (Spi Rais anticline) and the other one near Linava village (Geri Baran anticline). Later, these sites have been ignored and considered as unproductive sites. However, some borehole sites have been successfully performed near Zakho city in Tawki. Bekhair anticline is divided into three minor anticlines; 1. Spi Rais Anticline. 2. Geri Baran Anticline. 3. Zakho Anticline.

The aim of the trip

This field was done in order to understand the fold dimensions which are important for petroleum geology studies, some data should be taken from the field by using the Silva compasses. The essential data are related to strike of beds and dip of beds in the field. Measuring the dip and strike of the beds enable the structural geologist to obtain the other fold elements concerning any anticline. The elements of a fold are the symmetry, fold axis direction, inter-limb angle, axial plane attitude, plunging, and the vergency. However, some data could be measured by using google earth such as the length of fold axis and elevations of studied locations. Recently, some techniques have been utilized from the google earth to calculate the dip and strike of the beds even without going to the field, the technique showed that the results can be more accurate in case if the beds show smooth surfaces on their planes.

The field work locations

The stations we visited in Spi Rais anticline – Duhok city, extends from Duhok Touristic valley heading off to north until Yak Mala valley. The duties were distributed in the following stations.

Southern limb locations:

1. Gali Duhok station (Touristic Duhok Valley) (Pila Spi Formation):

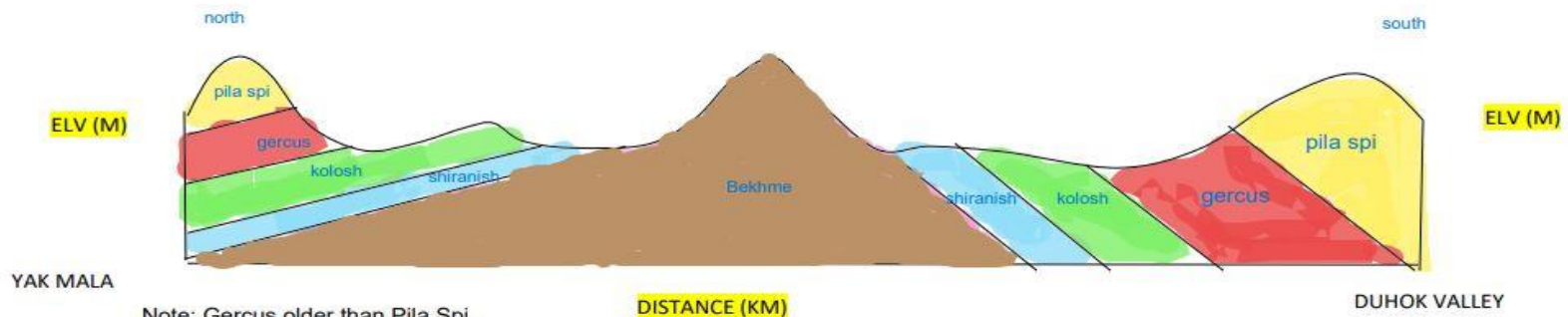
- a. Explaining the geographic direction of our location according to North by using Silva compass red needle (Red needle is pointing to North direction).
 - b. Explaining the lithology (rock type) of Pila Spi formation (Limestone and Dolomitic Limestone), and take samples.
 - c. Showing the uniformly dipping beds of Pila Spi formation (use mobile camera).
 - d. Explaining the dip angle, dip direction and strike (simply without compass).
2. Gercus Formation (Red Bed Rocks):
 - a. Explaining the lithology of the formation (clay, marl, shale and sand).
 - b. Explaining the dip angle, dip direction and strike simply.
 - c. Explaining the reasons behind the reddish color of Gercus, and take different samples.
3. Kolosh formation (Before Bajilor):
 - a. Explaining lithology of beds (sands), take samples)
 - b. Explain the reasons behind the grey to black color of Kolosh formation.
4. Bajilor crossroad (Shiranish formation):
 - a. Explain the lithology of the formation (marl, marly limestone), take samples.
 - b. Practicing the strike and dip angle measurements by using Silva compass (measure about 10 readings).
 - c. Explaining the fractures (joints) (fractures develop in rocks due to tectonic forces at which the broken rocks split from each other without any movement).

Northern limb locations:

5. Yak Mala village:
 - a. Explaining the Shiranish formation (northern limb).
 - b. Measuring the strike and dip angle of beds (10 readings at least) by filling out the table in given handout.
 - c. Describing the lithology of beds.
6. Yak Mala village:
 - a. Explaining the Koloah formation lithology. Gathering samples.
 - b. Showing the boundary (contact) between Shiranish and Kolosh formation.
7. Gercus formation:
 - a. Showing contact between Kolosh and Gercus formation.

Results

1. It was shown through the geological – section below that the fold consists of five formations from older to younger as seen in the note below the geological – section.



Note: Gercus older than Pila Spi.
Kolosh older than Gercus.
Shiranish older than Kolosh.
Bekhme older than Shiransih.

By: Field work staff.

We also have to know that these beds were horizontal, and because of tectonic forces, these beds had been tilted and formed Major anticline with several formation inside it. After folding, the erosion factor discovered these formations as seen in the section above.

2. The rocks consist of different types of rocks units. The Bekhme formation is older and the Pila Spi is youngest.
3. The anticline is asymmetric because the southern limb is 45° and it was higher than northern limb which was 25° .
4. The vergency of anticline is to south direction 190° .

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