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STUDYING HYDROCARBORE POTENTIALS OF ABPARDEH SAROUD ANTICLINE IN NORTH WEST OF SHIRAZ

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A B S T R A C T

The area of this study is North West of Fars and South East of Ardakan (Sepidan). Abpardeh, Saroud, Khalar and Shoul anticline have the same process of Zagros folded-thrust that are among anticlines with the probability of having gas hydrocarbore reserves. Upon fulfilling geophysical study and in case of positive results, it is possible to dig discovery well for east part of Abpardeh and Shoul. Western Planzh of Abpardeh, Saroud have higher altitude than eastern Planzh. There is high probability of transferring hydrocarbore to western sections which has abundant hydrocarbore. In this study first of all geological and topographical maps of aforesaid area is collected and related articles and reports, structural maps of this area and collection of assessment data from satellite and aerial images is considered. Then by desert survey the structural and geometrical status of survey was studied and by using structural width cut based on data obtained of desert, information of available map the anticline of this area is drawn and the effect of Karebas fault on anticline is analyzed.

INTRODUCTION

The area of this study is located at part of Zagros fault that with respect to civil division is in Fars province and 45km North West of Fars and South East of Ardakan (Sepidan) between north width of 29°0'5 to 30°5' with eastern length of 52°' to 52°10'. Iran is one of the world's enrichest countries with respect to hydrocarbore reserves that folded-thrust and width faults have influenced geological structure of this area (Furst 1990, Hessami *et al* 2001). The Kareh fault that is ended to north west and south east as sample of width fault of Zagros folded-thrust belt have influenced structures including: Abpardeh and Saroud anticline in north west of Fars. In this research in addition to studying geometrical evolution and width fault of Kareh, its influence on Abpardeh and Saroud anticline is analyzed. In this way, geometrical analysis of aforesaid anticlines is inevitable.

Stratigraphy:

Zagros active mountain belt is regarded as part of Iran from geographical point of view; nevertheless, from geological point of view it is among north east of Arabic plain with 2 stable platforms of central Iran (at north east) and Arabic (south west); consequently, convergence of these platforms leaded to formation of Zagros active seismic belt with north west and south east process (Colman- Sadd 1978). Zagros belt from north west is limited to main folded-thrust fault of Zagros which begins from Tarous mountains in east of Anatolin fault at south east of Turkey and continues toward east near to south west of Iran and finally is ended to east-west process and Oman line at Barafrishi Mokran prism and north of Hormoz strait (Sadd 1978, Stoclin 1968, Alvai 1994). Most of gas hydrocarbore reserves is available at east section and most oil hydrocarbore reserves is available at central and western part of aforesaid belt.

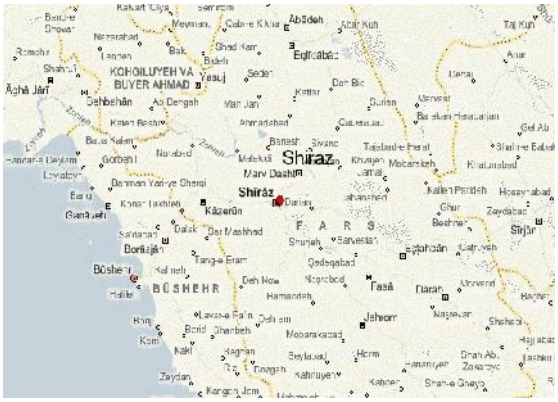

Figure 1 Location of study area

Sediment Cover

The foundation of Arabic plain north eastern crystal rock is covered by sediments with thickness of 6-15km with

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age of Cambrian-Tertiary that the highest thickness is related to sediments of Fanozoic (Sadd 1978, Alvai 1994, Berberian 1995, Bahroudi & Kuyi 2003, Oveisi *et al* 2008, Takin 1972. The material for most of sediment is carbonate and evaporate that creates suitable environment for collecting hydrocarbore reserves in this basin (Berberian 1995, Sepehr & Cosgrove 2004, Sherkati & Letouzey 2004). Upper Cretaceous, Paleocene and Asmar are regarded as groups containing hydrocarbon reserves at Zagros folded-thrust belt.

Structural Properties of This Area

Anticlines with low wave length and narrow tight Syncline with high slope between Asmar anticline and southern part of Abpardeh are scattered and absence of northern section of Saroud anticline due to erosion and covering southern part of Saroud anticline at west of Kareh fault leaded to drawing structural cut on 3 sections of Khalar, Shoul and Abpardeh and to neglect Saroud anticline. The style of folded-thrust of the desired anticline is Concentricity with same thickness for each formation and Hormoz series is regarded as main separation surface (lower part). It is to be noted that Abpardeh anticline is located at south of this area and there is possibility of having Dashtak non-resistant formation as middle separation surface. Whereas northern anticline and Shoul and Abpardeh anticline is able to turn Dashtak and non-resistance formation to resistant formation of Ahakkhane Kot, due to near distance of these 2 northern anticlines it is possible to have high thickness for Kazdom non-resistance formation and its continuation in Darian formation which acts as middle separation surface for Khalar and Shoul formation. Therefore, in Hormoz series Abpardeh anticline the middle separation surface of Dashtak and Pabdeh and Gorpi formation is regarded as middle separation surface and within Shoul and Hormoz series Khalar anticline the lower separation surface and Kazdom and Pabdeh formation is regarded as middle separation surface. The entire Zagros rocks are divided into 2 groups of Precambrian and sediment on cover of rock (Oberian 1950). Based on studying behavior of rocks the Zagros sediment rock is divided into foundation rock

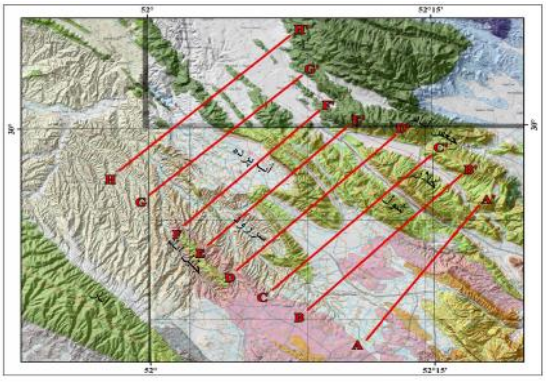

Figure 2 The map and sections of the studied anticlines

Precambrian and Group moving lower consisting of Hormoz series with age of Late-Cambrian by thickness of 4thousand meters, resistant group consisting of Cambrian and Miocene formations by thickness of 6 to 7 thousand meters and Group moving lower consisting of formation of Gachsaran by thickness of 1600meters and non-resistant group consisting of Mishan, Aghajari and Bakhtiari formation by thickness of 3 to 4 thousand meters and the area of this study is from time of Cretaceous until present time. The sequence stratigraphy study of Zagros shows that this part of Iran within Precambrian-Cretas was part of gondovana continent. From middle Triassic with young Tethys and intersection of Zagros and central Iran fault some sediment environments simultaneous with Orogenic was formed. Although the maximum phase of Orogenic was during Pliocene the deformation was imposed to Zagros. Through deep study at stratigraphy properties of different units of rock it is possible to find out information about most of sediment basins and finally compatibility of such mechanism on geology. The area of this study is located at south west of Iran, Zagros. Zagros folded-thrust belt is located at north west and south east of 2000km of Alp Mountain Himalayas that begins from Anatoli east fault in east of Turkey (Alavi 1994) and continues until Oman line in south of Iran (Falcon 1967). This area is limited to Iran from north and to foreland of Persian Gulf and Mesopotamia from south (Berberian 1995, Bahroudi & Koyi 2003). Zagros folded-thrust belt based on tectonic and morpho-tectonic properties is located from north east to south west including: high altitude zone of Zagros, simply folded zone, Zagros foredeep and coastal plain (Falcon 1967, Stocklin 1968b, berberian 1995). The border between zone is based on active folded-thrust fault and deep rock that its main part is on visible land and other part is on blind land. The high Zagros from north is limited to east and Zagros main thrust and main recent fault that is regarded as border of Sanandaj-Sirjan folded thrust from central plate of Iran. The high Zagros border and simple folded zone is compatible with high Zagros fault. The border of simply folded Zagros and foredeep Zagros with mountain front fault and Zagros foredeep border is determined by Zagros foredeep fault. In Zagros foredeep there are 2 main Embayment or fallen one of them is Dezful, Iran and the other one is Karkuk Iraq (Berberian 1995). Changes at sediment appearance and structural properties in Zagros zone have divided this zone into different parts i.e. north west and south east consisting of Lorestan, Khuzestan basin, Fars basin and hinterland in Bandarabbas (Motiei 1993, Agha Nabati 2004). Each of these basins is divided into smaller parts. Lorestan basin is divided into Lorestan north east, central and south west. The Khuzestan basin is divided into Ize, Dezful and Abadan zone. The Fars zone is divided into interior Fars and exterior Fars (coastal Fars and out of coastal Fars). From tectonic division point of view this zone consists of Zagros imbricate zone and Zagros simply folded zone. Although high Zagros and simply folded Zagros is not obvious in most of regions, these 2 zones are identified by Khoramabad thrust fault that covers some part of high Zagros (Hesami *et al* 2003, brberian 1995). Zagros imbricate zone with high mutation is very obvious at Chaghalvandi (Mola Ali *et al* 2006). The north limit of high Zagros is out of area of our study that is identified by Doroud fault as part of main Zagros recent fault. In this area there the absence of right displacement with length of 197km at Zagros reverse fault is obvious that are formed on main Zagros recent fault (parts of Doroud and Nahvand) (Berberian 1995). Different rock and sediment units from past until recent time are including: Gorpei, Asmari, Gachsaran, Aghajari

and Bakhtiyari formation, sediments and Quaternary alluvial terrace. Abpardeh anticline has 7.5km length that are located with Pasmoulak anticline on ladder basis; nevertheless, in lower parts including: Bangestan it seems that there are 2 Hump and performance of this fault leaded to formation of 2 Hump toward each other so that Purple shale hump East is located next to Asmari Western and southern edge of the hump.

DISCUSSION

Underground Structures

In this area the shale for well of Sarchahan and Siyahou is regarded as origin rock and Dalan alluvium is regarded as reservoir rock and Dashtak evaporation formation is regarded as rock cover. Based on 5 structural cut the Abpardeh and Shoul anticline has the highest vertical dependency for reservoir of Derham group nearly 500meters (GG') and the highest horizontal dependency of nearly 80km and volume of reservoir rock of 40km/m^3. In order to estimate volume of reservoir in addition to volume of reservoir rock the level of porosity with other factors is also considered. In cut of DD', EE', FF', GG', HH' Hormoz is regarded as low separation surface and Dashtak formation and Pabadeh-Gorpei leaded to create fish tale structure. This deep cut of rock foundation is located at depth of 8500m. In this cut there is Abpardeh and Shoul anticline at top of dehram pyramid under middle separation part of building; meanwhile, the highest vertical dependency in structure of Abpardeh is 'GG cut. Abpardeh anticline has complicated tectonic that is mainly consist of rough topography which prevents from performing geophysical studies.

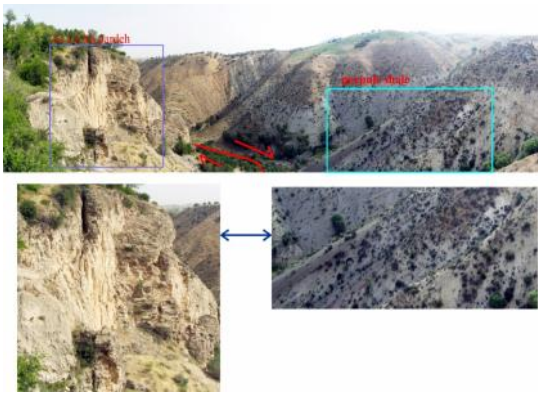

Figure 3 Purple shale gurpi water curtain in front of the asmari anticline located in the lateral fault - right on the korean cease

Recommendation

Abpardeh and Saroud anticline is influenced by right sloping fault. Kareh fault displaces from middle Abpardeh and Saroud anticline and moves toward right slope fault nearly 1.5km so that Purple shale is located at Abpardeh anticline next to Asmari. The western Planzh of Abpardeh and Saroud anticline are in higher altitude than eastern Planzh. There is high probability of immigrating hydrocarbore to western part; since, this zone has abundant hydrocarbore. Due to significant difference at Zagros simply folded belt and importance of this belt with respect to hydrocarbore reserves, this zone was in center of attention for carrying out numerous studies. It is recommended to deeply study Shoul anticline for determining final dependency and taking some seismic line at Saddle area. Due to wavelength of Shoul, Khalar anticline there is high thickness from middle separation part of Pabdeh-Gorpei in 1200m and the shape of structure may not follow from surface of Pabdeh-Gorpei. On the other hand, having lake sediment and 2 seismic low quality lines requires more complete geophysical studies about this zone. It is to be noted that eastern Hump of Abpardeh should be studied with Shoul anticline; since, these 2 folds due to having smaller wavelength than lower horizon like Derham group may probably establish a fold together. Therefore, upon repeated geophysical study it is possible to obtain more exact and positive results about eastern Hump and Shoul that are in lower horizon and to dig a discovery well in this zone.

CONCLUSION

1. Eastern Hump of Abpardeh with Shoul anticline form a fold in Derham horizon that the highest vertical dependency is related to structural cut of GG'
2. The highest horizontal dependency is 80km and the volume of reservoir rock is 40km
3. Geophysical studies are determining; since it is not possible to obtain real geometrical shape with respect to surface Upon positive response of geophysics the excavation is very determining for other structures of this zone including: Khalar, Jafarabad and Saroud; since, the size of reservoir, type of hydrocarbore (nitrogen-kerosene) is specified and there is some ambiguities like small nitrogen production reservoir with respect to estimate role of Kareh fault Sarchahan formation is regarded as hydrocarbore rock stone for Dashtak andradite formation as rock and lime cover of Kangan that is famous as reservoir rock.

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