

## ***Evidence of base Level Changes of Mighan Playa in Quaternary and its Effects on Morphology and Alluvial Fan Sequences***

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Received: 10 December 2013 Accepted: 17 January 2015

### **Introduction**

Interaction between internal and external processes of the earth during time plays an important role in formation and landforms transformation. We can identify course of their process changes with landform survey. In the middle parts of Iran, there are several geomorphologic evidence of arid and rainy climate changes. Playae and lakes or generally internal holes had an important role in climate balance and ecological changes in the quaternary on its surrounding areas. Therefore, previous studies have always attempted to determine past climate. Morphology and alluvial fan deposits contain traces of past environmental changes. The key issue is that which tectonic factors determined changes in alluvial fan processes and climatic and or geomorphological conditions of alluvial fans.

### **Materials and Methods**

To conduct this research from fieldwork, we have used sediment core data of wells and further satellite imagery and digital elevation data with different scales in different software. In this research, sediment core of wells on surrounding areas of Mighan hole were compared with interpolation of their common areas to determine maximum spread of the lake. The extraction of alluvial fans, according to region morphology, are compared and analyzed with geological structure and location, region drainage basins, base level changes and alluvial fans sequence in northern part of pit (Ashtian's alluvial fan) and the southern part of the pit (alluvial fans of Arak, Tamar Abad, Mehr Abad).

### **Results and Discussion**

Finding from this research are presented as follows:

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Investigation of clay deposits of the region and interpolation of core wells of Velashjerd, Taremozd and Mashhad Mighan represent about 57 meters of water forasmuch as the same formation area for clay layers of 90, 80, 120 meter for Mighan lake in the quaternary.

Evidence of sediment cores and clay sediments is abundant in the west and south. This proves that maximum deep of lake has been in western and southern slopes of craters and about 8000 to 16000 in last year extent of clay sediments. This also indicates wetter climate conditions and reflects the development and progression of the lake at that time. With study of the region geological conditions and tectonic evidence, it should be stated that clearly visible function of Talkhab and Tabrateh faults and also the effects of craters subsidence on the drainage basin and alluvial fans surrounding the hole have caused asymmetry on the northern slopes. This should also be stated that this region has been affected by the impact of Neotectonics.

With existence of same climate conditions for sedimentary basin of Mighan, we determined five base level changes on the northern slopes of the well (hole) for the Ashtian cone. Three base levels are related to river redirection and resulted from neotectonics activities. This is not sensible for the next two levels in detection of impact of climate and neotectonics function.

Including evidence of base level changes available evidence on the Ashtian alluvial fans indicates considerable activity of neotectonics processes during quaternary. These processes are:

1) Creation of mound hills on the formations of quaternary epoch that are represented by tectonic movements.

2) The effect of Talkhab fault line on quaternary sediments and quaternary landforms.

3) Existence of thick alluvial deposits that starts from 50 meter to 100 meter at the bottom of the cone. Base level changes in southern slopes has not been caused alluvial fans sequence, existence of large mound hills, fraction of alluvial fans and being abandoned cones level.

### **Conclusion**

The results of the study show that the sequence of fine-grained sediments of silt, clay, sand and gravel in the core of exploratory wells indicate environmental changes, particularly climate changes in the quaternary. Likewise the causes of climate change on morphology change of alluvial fans surrounding Mighan hole (Ashtian, Arak and etc) has played a major role. Neotectonics was more effective on deformation and development of Ashtian alluvial fan than the other alluvial fans. In that, it is measurable in the northern part of five old cones to new cones with 700 meters height difference while this sequence cannot be found in the alluvial fans of southern part. Base level changes of Mighan hole and hole gradual subsidence with rising marginal part indicate existence of asymmetry and morphotectonic activities for this hole. These affected the morphology of around alluvial fans. In other words, neotectonic evidence has been more effective on climate change in base level changes of Mighan hole at this region and caused asymmetry in North domain. According to the geomorphological evidence, it can be concluded that this Playa has been placed in dynamic tectonic area. Climate change, especially neotectonic, has caused base level changes in Mighan Playa.

**Keywords:** *alluvial fan sequences, base level change, climate change, Mighan Playa, Neotectonic.*