AENSI Journals

Advances in Environmental Biology

ISSN-1995-0756 EISSN-1998-1066

Journal home page: http://www.aensiweb.com/AEB/

Syllogistic Comparison of Morphological levels of Miniature Model of Groundwater Aquifer with seams and Gaps in the Yazd Field

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ARTICLE INFO

Article history:
Received 26 September 2014
Received in revised form 20 November 2014
Accepted 25 December 2014
Available online 2 January 2015

Keywords:
subsidence, crack (Shagh), surface patterns, active tectonic, the underground water table

ABSTRACT

Although the natural movements of the earth's crust have been noteworthy by the researchers from long time ago, but human power has had results in the Environmental, Widespread and profound changes which has been unbelievably appeared in different forms. As an example of such a process, it can be mentioned the slow sinking which are known as subsidence. Subsidence is one of the morphological phenomenon on which a part of earth's crust gradually is subsided. In other words, the regional subsidence of earth's surface includes the collapse toward the lower earth's surface which can be also included a little horizontal shift. It is said that some gaps are appeared by this subsidence which are called "SHAGH" in localism. The goal of this research which is from an empirical research in Esfahan University is more focus on the presented views which are about the mechanism and the reason of developing of the morphological results of the subsidence phenomenon. It was tried to explain the syllogistic comparison of Morphological levels of miniature model of groundwater aquifer with seams and gaps in the Yazd field depending on model behavior. The results showed that the subsidences which are result from the excessive water-laden from the groundwater aquifer are very little and cannot create a subsidence on the field surface. The superficial morphological change in minimized static model differs from the Yazd field and it shows the difference in the origin of this phenomenon.

To Cite This Article: Alireza Shahbazi and Mohammad Hossein Ramesht., Syllogistic Comparison of Morphological levels of Miniature Model of Groundwater Aquifer with seams and Gaps in the Yazd Field. ***Adv. Environ. Biol., 8(25),*** *35-39, 2014*

INTRODUCTION

The model can be considered as the best tools to test the theories and scientific presumptions. Thus the models are the bridges between empirical levels (visible) and theoric levels. It can be to simplify the facts, to decrease the effects of different factors, to accurate in the method of effecting of factors, to do different tests, developing the variables, explaining the data and findings, theorizing and explanation.

In another definition of the model, it deemed to be a simplified aspect of our understanding from an objective or subjective reality. And then, based on this point of activities, every model is made according to a theory. In fact one a model is considered as a deed or methodic plan which is specifically used in the Inductive systems to forecast the results of a series of activities.

One of the phenomenons which need modeling and its span and un-empiric necessitates us to minimize and to model the nature and its components.

The geomorphology of different models are offered in the field of changing of earth's crust and includes relatively a large spectrum of the geomorphology subjects in the field of water, water flows, erosion and movements of the surface.

In this way it is trying to remake the natural reality and to control the variables which are involved in subsidence and SHAGH by using the modeling of groundwater aquifer in small and miniature scale.

The subsidence phenomenon is one of the geomorphology phenomenon on which a part of the earth's crust is sinking and it has been taken into consideration of the domestic and foreign researchers.

In other words, the regional subsidence of earth's surface includes the sinking of the lower layer of the earth's surface which can also has a little horizontal shift.

It is said that some gaps will be appeared because of it which is known as SHEGH in localism.

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Although the most of researches attribute the appearing such phenomenon to the irregular water-laden from groundwater but some of researchers have expressed doubt about the total reason and its relation to the water-laden from groundwater.

Somebody like [9,10] has expressed doubt about this matter and believes that the main reason of the earth's surface subsidence and appearing the SHEGH can be other components such as active tectonic and faults.

This phenomenon has been taken into consideration of foreign researchers like [16,7,22].

Different researchers have considered it in the country like [14,2,8,20,25,3].

MATERIALS AND METHODS

This research is constant on syllogistic comparison between morphological levels of miniature model of groundwater aquifer is accordance with the natural remaking of a groundwater aquifer and comparison it with the seams and gaps in the Yazd field.

Making the model in scale of miniature and laboratory was done and the syllogistic comparison of morphology levels of miniature model of the groundwater aquifer in static condition with seams and gaps in the field of Yazd was performed.

In this research it was attempted to test the way of subsidence and the results of morphology of this phenomenon by considering the importance of subsidence phenomenon in Iran's fields with making miniature model of groundwater aquifer.

Therefore the present research tries to test the theory about the reason of subsidence by making a minimized laboratory model.

In other words, the main goal of this research is to perform an empirical test on decreasing of the groundwater in case of subsidence.

Findings And Discussion:

To test the static model, first a place was selected in Esfahan University and the following tools, equipment and facilities were used to make and to test the static model:

1- First, the impervious layer was prepared like bedder on the bottom of the model by bole and then was completely insulated by a plastic sheet.

Create a Inscrutable layer:

2- In order to pump and injection the water during the test procedure, the recording equipment piezometer and water pump was installed in the center of the model.

3- Then the watery layer was made by sand and gravel.

4- In this phase the alluvial deposit layers which its designing manner was done by benchmarking from the erosive procedure of running water in the nature, the sedimentary material was prepared and then was scattered on the model surface by running water as the sorting of sedimentary material in the nature.

After making the model in static condition, injection the water into watery layer was done and pumping the water was performed in the next phase.

The general features of the level changes of the model can be summarized as follow:

1- Generally after pumping the water and dropping the piezometer, the initial bole networks will get form and in the initial procedures their numbers will get lesser and will get more in next procedures.

2- The result of surface changes in static condition (lack of crustal movement) is creation the Polygons and a pattern on the model surface which their number will get increase by pumping the water and drying the model. The dimensions of the cracks and polygons will get smaller from margin to the surface.

3- By continuity of water-laden from the miniature aquifer, the model surface shows specific changes as it causes the wrinkling and changing in the surface and volume which these changes are not out of boles behavior.

4- The distance changes to the base level are lesser on the margin and more in the center.

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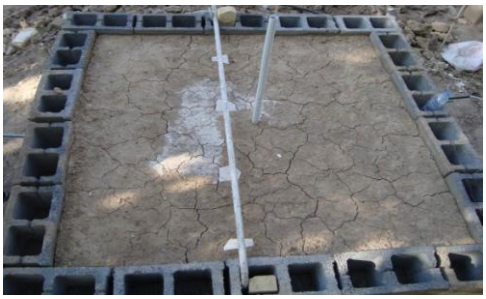
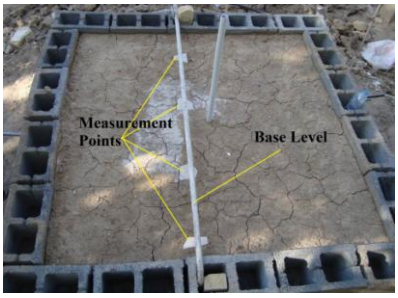
The appearance of the first polygons in the model surface.



The Increase polygons in statically Status.



Points Measurement and base level.

Features of seams and gaps in the fields of Yazd and Ardekan:

By studying the subsidence of fields of Yazd and Ardekan and checking the radar images and Geology and hydrology studies Aamigh and et.al [1] attributed the main reason of subsidence and appearing the seams and gaps to the excessive water-laden from the groundwater aquifer. They stated that the excessive water-laden from the aquifer has caused the dropping of piezometer pressure.

This dropping pleasure causes disturbing in the balance and increasing the pleasure from the loads of upper sediments aquifer as the porosity of the sediments get decrease by resorting and the subsidence is occurred because of increasing the density.

Features of seams and gaps in the fields of Yazd and Ardekan.

Conclusion:

Whatever happened in the static model (non crustal movement)represents that if the rate of crustal movement is assumed zero after pumping water and drying model, the surface changes and the pattern of

molecular created gaps are bole and it shows that there is no any relation between created polygons and SHEGHs in the fields, and their origins are different.

Water-laden from the miniature model of aquifer and decreasing the water level have just caused appearing the bole cracks on the model surface.

The morphology comparison of static model and fields of Yazd-Ardekan shows that the origin of the seams and gaps in the fields of Yazd-ardekan is more focus on the tectonic movements as the subsidence which is resulted in water-laden from the groundwater aquifer, is not as much as size to be created at the levels of seams with such features.

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