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Geomorphic study of Saryghamesh river basin emphasis coincidence of drainage network with earth structure

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Abstract

Sarygamesh basin one of the Bulhary Chay tributary take place in Moghan plain, northeastern Azarbyjan area in Iran and south edge of Kora- Araz zone. Aims of this research are study specificities and geomorphic evolution of Sarygamesh basin, survey rivers work on structure and geologic formation, and corresponding hydrographic with earth structure. Toward above aim is used to litologic, structural data, and water network data. The research method in this study are observer, filed, Descriptive and library method. Data and information of this research was Assemblage by 1- topographic maps in order to Primary Identification and topographic analysis,2- geology maps for recognition of rocks and formations and geologic structure, 3-aerial photograph and satellite image for identify geomorphologic landforms. Arc view and Arc GIS software used for drawing maps. This basin was belonging to three different structural zones in the names of crumpled Allah Yarlo-Havai zone, volcanic plateau and Moghan sedimentary basin. Internal processes are created anticlines and synclines with eastern- western trend. Process of external dynamic was impressed structural landforms and was created landform and different geomorphic phenomena. In some of area difference resistance of rocks was created reverse roughness in the basin for example hanging syncline. Misadjusting of river network with earth structure is chiefly antecedence and crate cluse. Erosion in the different forms was changing mountain landscape and changing forms of initial structural landforms. In the resent years atrophic erosion has justify important role in alteration of area landscape

Introduction:

Sarygamesh basin is located in northwest of Iran and northeast of Azarbyjan in Moghan area, this basin is occupy 38 degree & 50 minute to 39 degree & 16 minute northern latitudes and 47 degree & 47 minute to 48 degree & 7 minute eastern longitude (fig1). Sarygamesh River is originated from Germy and Khoroslo Daghi mountains; the sub branches of Sarygamesh River have northern- southern trend, but after jointed the sub branches in northeastern of Shah Tapasi village is become east- west direction. Sarygamesh River from Masjedlo village had southwest-northeast trend and between Nar Geshlagi and Moradlo village connected to Bulhary Chay in border of Iran and Azarbyjan republic and extremely jointed to Khazar Sea (Caspian Sea).

Environmental studies and identity of geomorphic landforms is prepared modern planning and stable. In these days geomorphology is counted principle of natural sources studies. Therefore study of geomorphic specialty can help to certificate the environmental patience and local planning. For this purpose we decision to study one of the poor areas in viewpoints of geomorphology. Sarygamesh basin is located in border of Azarbyjan and had important role in agriculture supplies people living in Iran and special Azarbyjan area. Therefore identity of geomorphic characteristic is essential.

In these days the role of geomorphology had been attentive in regional planning and environmental logistics. In environmental operation, at first must be

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attention to natural potentials; then enterprises to planning. Because none existence of primary geomorphic information, we are decision to study in viewpoint of geomorphology. As regard to above cases, in this study we are try to show the role of tectonic and morphogenesis systems in evolution of area in the past and present periods. In these cases is discussion below questions: is how much the role of folding? Or fault structure play basic roles in geomorphic evolution in Sarygamesh basin? Is how Effect of erosion in the basin? Is what the role of earth structures in hydrographic network replacing? Completely basis problem in this study is Sarygamesh basin geomorphic examination.

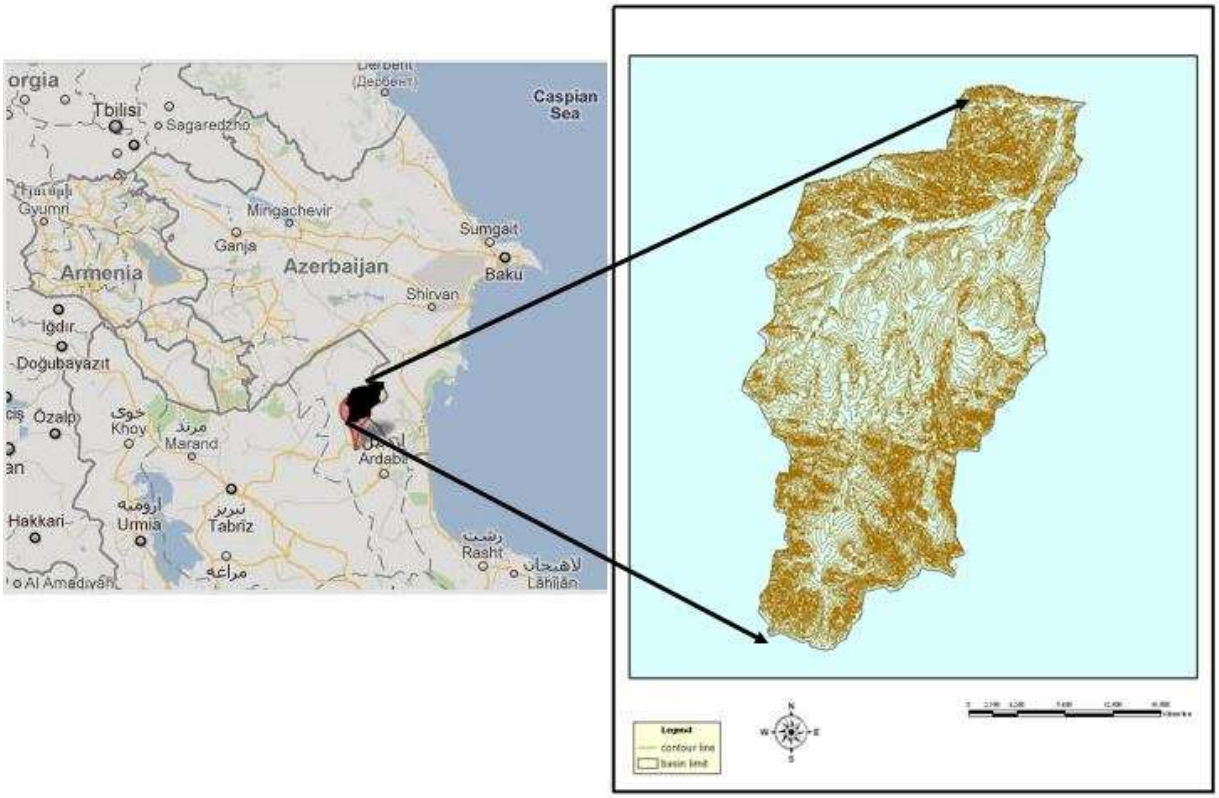

Fig 1: geographic situation of Sarygamesh basin in northwestern of Iran.

Materials and methods:

For above purpose we are used observation, filed, descriptive and library methods. Tools of this research are topographic maps (1:250000 & 1:50000) for primary identity and topographic analyses, geologic maps (1:250000 & 1:100000) for formation certificate and earth structure, Arial photograph (1:55000 & 1:20000), satellite images for geomorphic landforms recognize and Arc view & Arc GIS software for drawing of maps.

Results and discussion:

Paleogeomorphology: in this area volcanic activity was continued from late Cretaceous to late Eocene period. These activities were arrived highest point in middle Eocene and gradually decreased until late Eocene. In initial Paleocene was establishment subsidence sedimentary basin (Moghan sedimentary basin) in the northern area that was deposition several thousand meter sediments (Babakhani et al, 1991). Northern sedimentary basin was active until initial Neocene and volcanic activities was very low in this part. At this time southern part of Sarygamesh basin was sitting under intense volcanic activities. Initially this activity has been under marine but gradually it was exited from water and has been spared surplus diameter of basaltic, andesitic and latite lava in earth surface.

Study area is part of Azarbyjan structural zone and located southern edge of Kora- Araz subsidence

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zone and northern edge of Ahar- Kheyo uplifted zone in view point of structural. This area separated from Caucus and Tallish mountains by structure turquoise.

In Caucus and Tallish, mountains orientation is northwest- southeast; but in Moghan (study area) mountain orientation is western-eastern. Because of Conformity deposition in Eocene to upper Miocene periods, may be argument that this duration sedimentation was continued proximately. Conglomerate creation of Zeyva formation (OMzc1 & OMzc2) and or sandstone in the area, were reason of continual uplifting in south of basin influence of epirogenesis and volcanic activates and subsiding sedimentation basin in the north of basin(Rahimzadeh, 1996). Confined of Eocene outcrop rocks on southern area and lack outcrop this rocks or ancient rocks into northern area (Moghan) is showed that Eocene to cretaceous rocks is constituted this sedimentary basin bedrock(fig 2). Also in North West of this area at Azarbyjan republic was lie Neocene sedimentary on Caucus Mesozoic metamorphic rocks; that was showed an important geologic event in bedrock at Araz river tension and neighbor area. This process was Lead to Horst consisted in southern part of area (Khyo-Ahar area).

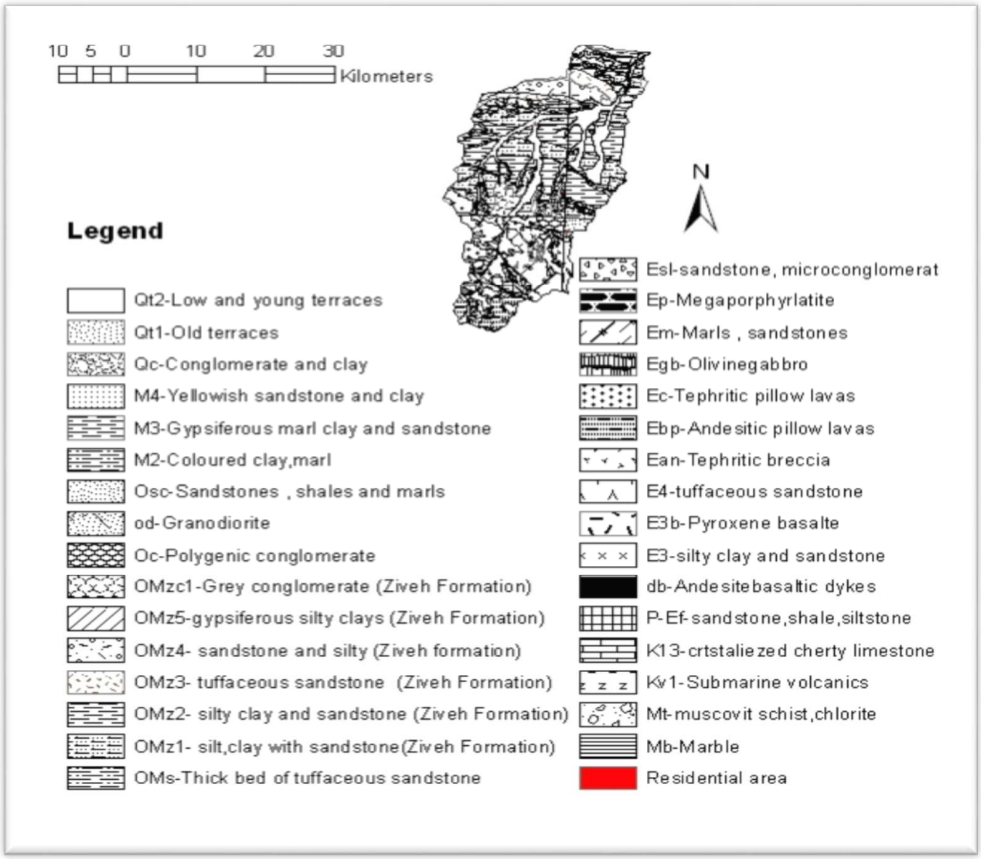

Fig2: sarygamesh basin geology map

Important orogeny activates was occurrence at peleocene prioed. Lack of stratum from late Miocene to initial peleocene and unconformity between Aghcha Ghil & late Miocene sedimentary is conclusion of this orogeny. Most folds of this activates have high gradient limp and sometimes northern limps of those are inverse. Superlative of folds have be wide synclinals and narrow anticlines and those axis are western-eastern mostly. Major faults are linear and reversed.

Sarygamesh basin is divided three different structural zones. 1- narrow belt named by crumpled Allah Yarlo-Havai zone in the south of Sarygamesh basin ; this area is formed by anticlines approximately with

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eastern- western trend in the upper Cretaceous period limestone sedimentary and volcanic rocks. In the core of anticlines was outcrops complex of metamorphic and Ophhiolite rocks, along the great fault with eastern- western trend. Limestone sedimentary and volcanic rocks were folded by Laramie orogeny phase. Latest Kemiran orogeny phase have to cause weak metamorphism in this area. 2- Volcanic plateau: this area is forming by successively much of volcanic rocks; and is Steele oneself of Palaeogene flysch type sedimentary with gentle gradient. This area is belonging to eastern of Azarbyjan plateau in viewpoint of structural and is characterized with intense volcanic activity in Cenozoic Era. Alpine tectonical movement had intense function in the area by with transfusion intrusive massifs, metamorphic and hydrothermal. In this area Eocene era rocks were broke by northwestern- southeastern trend faults; these faults are connecting with middle Alpine orogeny movements. Volcanic plateau structural zone was located in the south of Sarygamesh basin. 3- Moghan sedimentary basin: Moghan sedimentary basin from structural viewpoint is folded area that was on impacted Alpine latest orogeny phase. This zone has crumpled strongly and broken severely by faults because of intensity of endogen forces. General trend of area fault is western- eastern was that to follow from folded trends. This zone is setting in the northern of Sarygamesh basin. All together this area was showed Jourie structural characteristic in viewpoint of structural geomorphology, form, order and regularity of folds; but in viewpoint of faults and fractures was showed broken structural geomorphology.

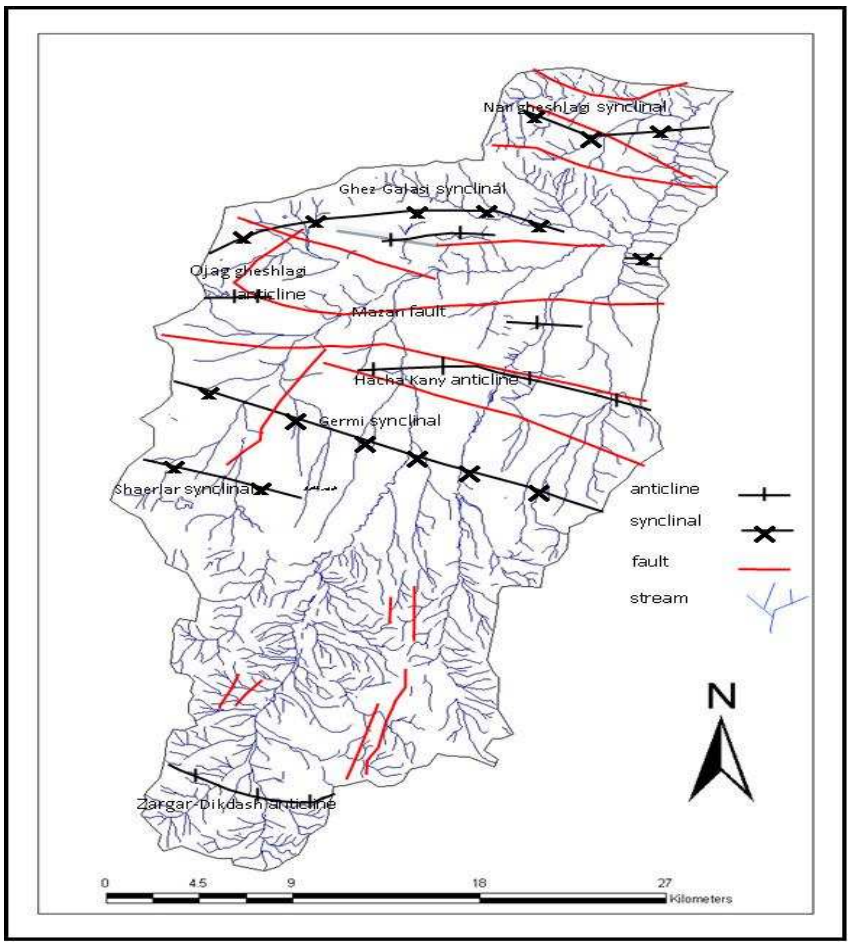

Fig3: Sarygamesh liner structure and relationship between drainage network with geologic structure

Discussion and conclusion

Sometimes relief evolution was severity and rivers levels lay downer than that from base of synclinal rocks, in this condition formed reserve reliefs (Derruau, 1992:217 and Ahmadi, 1995:187). When was destructed anticline completely by anticline valleys, in this time base of synclinal was verge to emptied anticline, and formed hanging valley (Derruau, 1992: 217 and Ahmadi, 1995: 187) In Sarygamesh basin has been formed inversed relief spatially hanging valley; Simple of hanging valley was constructed in Barzand sub basin. This part of study area constructed from alternate sand stone, silt and clay.

River misadjusting with earth structure is explained basis on epigenesis theory. Base of genesis conditions inverse streams divided two tape inclusive antecedence and surimpostion (coque, 2007:106 and Mahmmodi, 2006:131). In study area it was seem inverse network was antecedence condition; because for surimpostion conditions are require an unconformity surface; that this unconformity is not exist in Sarygamesh basin. In antecdance condition defiant is conclusion river course preference in upstream to relief in downstream (coque, 2007:106 and Mahmmodi, 2006:132). In the other words river had be located itself before superficial folding, when earth does to the folding, river does retain itself motion curse and had become similar to valley that it is cut sheet, in this conditions if sheet had been uplifted , the valley was continued to cutting (Derruau, 1992: 232). In the study area surplus probably Sarygamesh, Barzand and other rivers had been flowed from south to north. Rivers had preservation previous course contemporary with low Orogeny activities in the Pliocene- Quaternary; therefore have been formed transverse valley in the basin. All of instances showed that transverse valleys are antecedence. Creation of antecedence has several condition; 1- tectonic activities must be very low, because intense activities was diverted primary course of rivers (coque, 2007:106 and Mahmmodi, 2006:132). This condition is loyal for study area, because calm tectonic activities were caused gentle mountainous from Pliocene to resent. 2- Water flow must be powerful that eliminate mountain uplifting (coque, 2007:106 and Mahmmodi, 2006:132). Probably, this condition was exist in study area; presume, transverse valleys in Sarygamesh basin were created by drastic stream from upstream to Balhari Chay and Caspian Sea. Because in Pliocene- Quaternary era was dominant pluvial periods, and was cased watery, in result rivers can stultified tectonic uplifting. 3- Mountains of stream course must be very yang tectonic activities efficacy (coque, 2007:132, Mahmmodi, 2006:106, Zomorrodian, 2002: 234, Stokes, 2008:210). This condition was existing in study area; because of folding in Pliocene and Quaternary period in Moghan area. As the Agchagil formation (Plag) contain: Pliocene conglomerate rocks with round and flat fragments and sandy grey cement, Apsheron formation (Qap) contain: Quaternary gravel and sand layers, and Baku formation (Qb) contain of Quaternary fresh water sandy limestone, clay & silt with interbeded acidic tuff & gypsum were folded by recent tectonic activates. 4- Antecedence was made in devastation and deformation Neocene and Quaternary formations; and it was located external part of Alpian folding chain usually. This condition was existent study area.

All together this area divided to three parts characteristic in viewpoint of structural geomorphology. 1- narrow belt named by crumpled Allah Yarlo- Havai zone in the south of Sarygamesh basin ; this area is formed by anticlines approximately with eastern- western trend in the upper Cretaceous period limestone sedimentary and volcanic rocks. In the core of anticlines was outcrops complex of metamorphic and Ophhiolite rocks, along the great fault with eastern- western trend. Limestone sedimentary and volcanic rocks were folded by Laramie orogeny phase. Latest Kemiran orogeny phase have to cause weak metamorphism in this area. 2- Volcanic plateau: this area is forming by successively much of volcanic rocks; and is Steele oneself of Palaeogene flysch type sedimentary with gentle gradient. This area is belonging to eastern of Azarbyjan plateau in viewpoint of structural and is characterized with intense volcanic activity in Cenozoic Era. Alpine tectonical movement had intense function in the

area by with transfusion intrusive massifs, metamorphic and hydrothermal. In this area Eocene era rocks were broke by northwestern-southeastern trend faults; these faults are connecting with middle Alpine orogeny movements Volcanic plateau structural zone was located in the south of Sarygamesh basin. 3- Moghan sedimentary basin: Moghan sedimentary basin from structural viewpoint is folded area that was on impacted Alpine latest orogeny phase. This zone has crumpled strongly and broken severely by faults because of intensity of endogen forces. General trend of area fault is western- eastern was that to follow from folded trends. This zone is setting in the northern of Sarygamesh basin. All together this area was showed Jourie structural characteristic in viewpoint of structural geomorphology, form, order and regularity of folds; but in viewpoint of faults and fractures was showed broken structural geomorphology.

Misadjusting of river network with earth structure is chiefly antecedance and crated narrow valley (cluse). Erosion in the different forms was changing mountain landscape and changing forms of initial structural landforms. In the resent years atrophic erosion has justify important role in alteration of area landscape.

Conclusion:

All together this area was showed Jourie structural characteristic in viewpoint of structural geomorphology, form, order and regularity of folds; but in viewpoint of faults and fractures was showed broken structural geomorphology. External dynamic Process was impressed structural landforms and was created landform and different geomorphic phenomena. In some of area difference resistance of rocks was created reverse roughness in the basin for example hanging syncline. Misadjusting of river network with earth structure is chiefly antecedance and crate cluse. Erosion in the different forms was changing mountain landscape and changing forms of initial structural landforms. In the resent years atrophic erosion has justify important role in alteration of area landscape.

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