

Recognition of Karkheh River Meanders with RS&GIS

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ABSTRACT

Rivers and fertile plains have the forming centers and human civilization development. Khuzestan plain, in Iran, is a low plain with mid steep. Karkheh River flows there. This river has had a special movement since the fourth age, Quaternary, it has been deviated frequently from its base route, and it has changed its direction to the other directions. It has changed the patterns besides the city center movements. This study has been done through library, field, and histories methods and based on systemic method and using satellite pictures. Karkheh River was identified through using ETM + MSS Land satellite pictures in (1974, 2000, 2008), topographic maps GIS techniques and GPS. According to knowing that four main factors as base surface changes, tectonic factors, climate changes (catastrophe) and human factors had main role, the Karkheh river route was traced which led to identify four old main route (abandoned meanders) including many side routes (66 routes).

KEY WORDS: Flood plain, Quaternary, Meander, Morphology, karkheh.

INTRODUCTION

A River is important for geomorphologies in space view and in different aspects such as the geometrical shape of flood way hydraulics and the space pattern. Thus, the morphological study of the rivers and their changes are very important for them. (Ramasht, 2001) rivers have had many changes in different ages as open systems. They have been come out from their primary route and deviated to the other routes. Since alluvium flood ways have been formed from resolvable sediments, and the pressure is stronger than the sediments because of the water force, the bed the wall of the water flood changes through the time. (Rangzan et al., 2010) on the other side, the conscious renewal and movement of the sediments show that the flood plain caused from. Mender flows don't have a permanent condition, but this plain is like a temporary warehouse of materials which moves to the low parts of the plain. (Khosravi, 2007) The numbers and proportions of the route change depend on different factors. Against the flood ways which have a permanent and organized situation, we can find the flows which are unstable and they react continuously to external changes like sediment a load or evacuation amount. The rivers showed significant response to the semimetal load changes, the evacuation amount and spectrally on the base level. (Shin, 1997) general, the rivers have had special movement at the fourth age. This movement has related to the sea base level changes, climate and tectonic changes. (Estakhri, 2009) Karkheh River is not expected from these facts because of being located in the flood plain in Khuzestan. Thus, the main aim of this article is identifying the change of routes of Karkheh River as one of the traces of Quaternary age in Iran. (Yamani, 2008)

Location of study area

Karkheh flood way domain is located in the west of Iran. its location is specified as H6 7 to 4 9 7 in east length and 3 pin to 34 s 8 in north width the location of this domain is showed in figure 1. (Khabazi, 2008)

This domain is 50768 km and the average yearly rainfall is 500 mm at Persian Gulf and Oman Sea Karkheh River, 700 km flows in Kermanshah, Lorestan, Ylam, and khuzestan province. The watershed basin the river includes s basins as Gamasyab, Ghareesu, Symreh, Kashkan, and Karkheh they are shown in table. (Jelodar, 2007)

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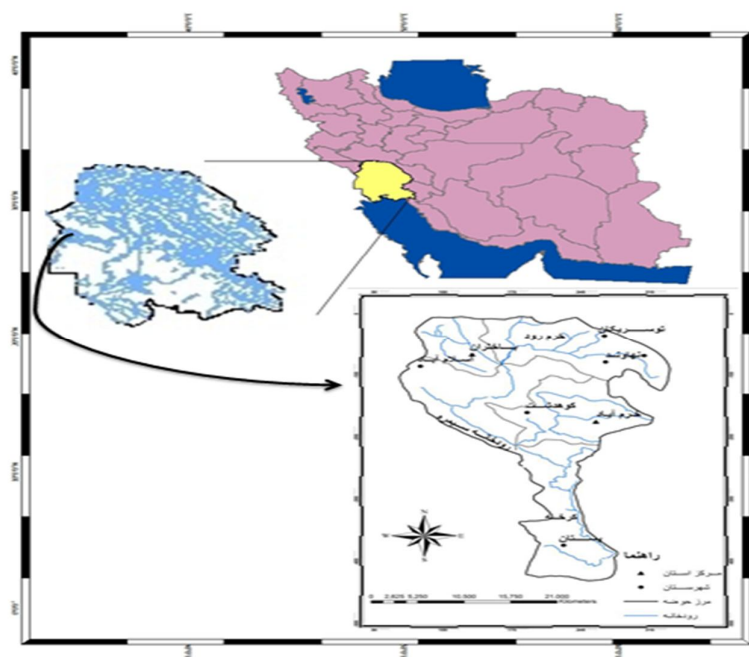


Fig1. Location of Karkheh

Table 1. The specifications of Karkheh river basins

Average rainfall (mm)	Area(km ²)	Name of sub basin	Row
370	11255	Ghamasiyab	1
430	5630	Gharaso	2
432	12190	Simareh	3
555	9450	kashkan	4
200	10075	karkhe	5

Materials and methods

In this study, the natural specifications of this area such as topographic location, steep. Geology, the soil quality, sediments and climate were studied. Then, the topographic digital maps were provided (1:250000) and then were put in the AutoCAD software 2012. The pattern changes of the flood ways were identified from the source to the estuary of Karkheh. Thus, the digital topographic maps 1: 25000 were provided and were used in ArcGIS software and then the latitude digital model layer was made. The other layers, such as the steep layer and 7IN were provided from that layer. Then, the present, old and abandoned routes were identified through 1: 25000 layers, satellite pictures, Mss1974, 2000 Landsat ETM + 2008, air picture taken in 1355 (1:55000) and the flood ways layer. Thus, the cartographic methods were used to show the present traces in relation to change of the river route. In this way, historical and geographical texts helped a lot to identify the old routes. Finally, the field operations were done to adapt with air pictures, satellite pictures and the other sources using GPS.

Findings

The formic pattern of Karkheh River

Karkheh is in starches pattern in the northern parts about 5 km. It is shaped as mandri pattern from that place to seyedkhalph. Then it is spiral and straight from seyedkhalph to shakereh about 20 km. The river travels a directorate about 70 km from yalalieh to matbaat. Then the river is shaped in a quite manderyshope through the route but the sine coefficient of each district is different. The river makes a u turn in Mahdieh area.

In general, it is said that Karkheh river is in Braiding form in the north. There we can observe the mander type one it is pressed in the south besides Ahwaz arches and shaver typemander. Then it is changed in to type 2 and This shows the arch coming up. (fig-2). The pattern in snatches of Karkheh river karkheh river has had lot of route changes after Karkheh dam and entering to Khuzestanjolgeh because of steep deduction and sediment quality change. The old routes are horse shoe like and they have been got from 2, 4, 7 bands by satellite pictures 2008.

Comparing this picture with the picture in 1995, explicit changes are shown in 3 years which shows the activity and much movement of the river in the fourth age.

The route changes of Karkheh river can historically be studied.

This river has been shown as a direct line in khuzestan map in the fifth century which entered to Karoon from the south of Ahwaz, then it was flowed toward Howeizeh passing. Hamidieh dam till 1994, but the river changed its route to susangerd because the Elam was broken .it should be said that the active faults like Ahwaz and mishedagh exist in the district. Hamidieh dam is located in the east part of mishedagh fault.

There for, we can observe the achive history of this river in this area. The other old routes can be traced through an exact observation in the satellite pictures. One of the old routes of narkheh was branched from zughayeh river which is competed to karkheh river from west north – eastsouth in the low parts of sand hills .

Three other main routes can be identified from hurolAzim place the east route come out from hurolAzim is connected to the route come out from the south. Ten it is connected to Arrandrood. The third route enters khuzestan plain from the west part of hurolAzim (6 km) and then it reaches Arvandrood.(Haghabi, 2010)

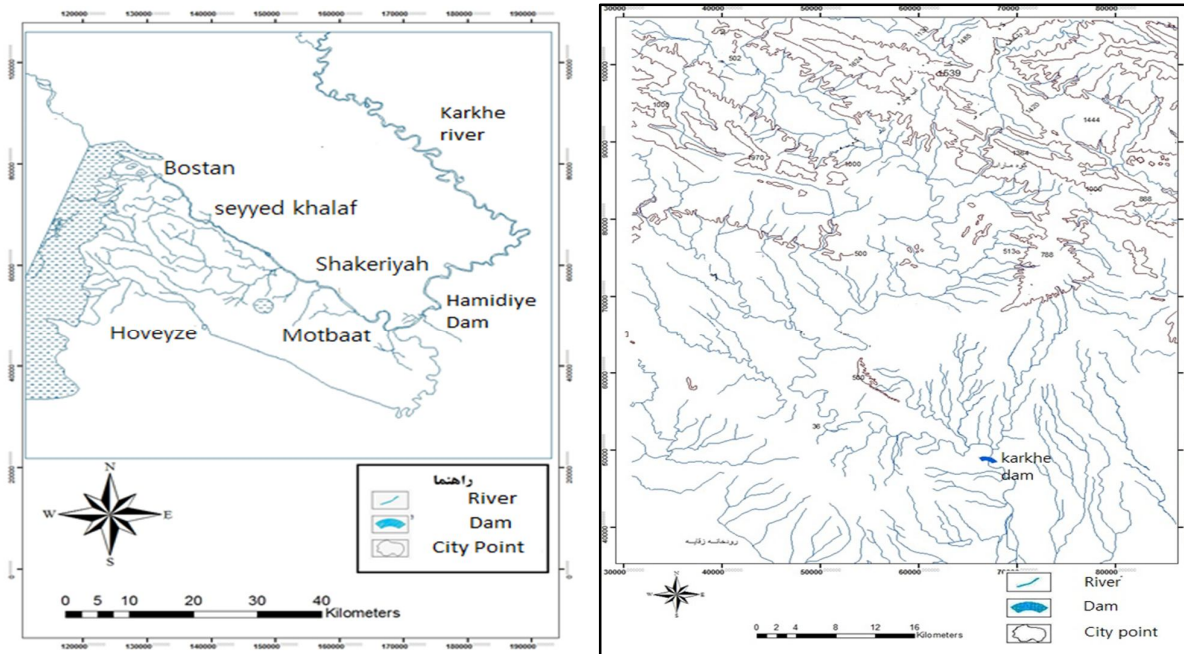


Fig 2- formic pattern of Karkheh river Fig 3- Braided pattern of harkheh river

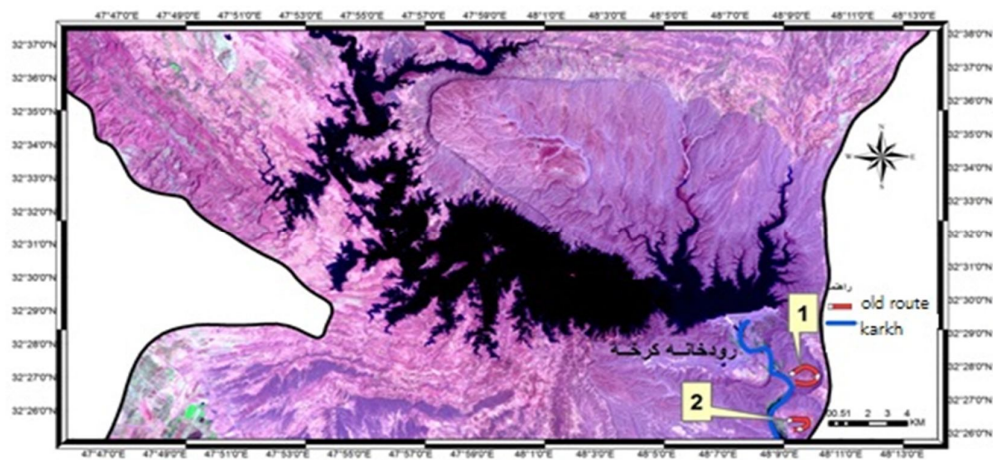


Fig 4- Bands color composite (ETM+, RGB, 2,4,7)- dam Karkheh

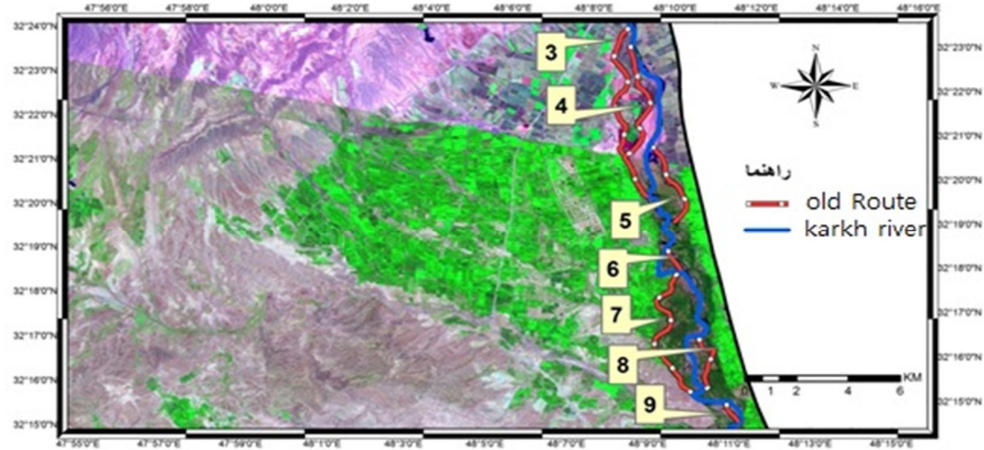


Fig5- Bands color composite(ETM+, RGB, 2,4,7)-

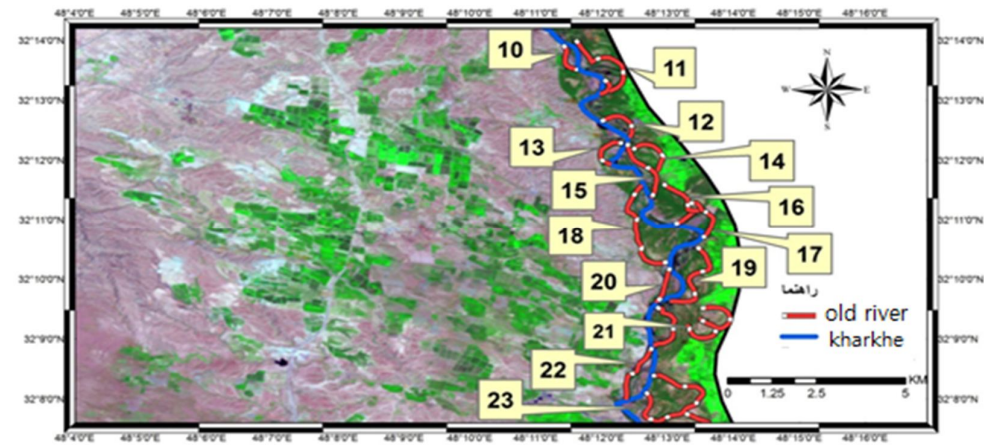


Fig6-Bands color composite(ETM+, RGB, 2,4,7)- Downstream of Karkheh

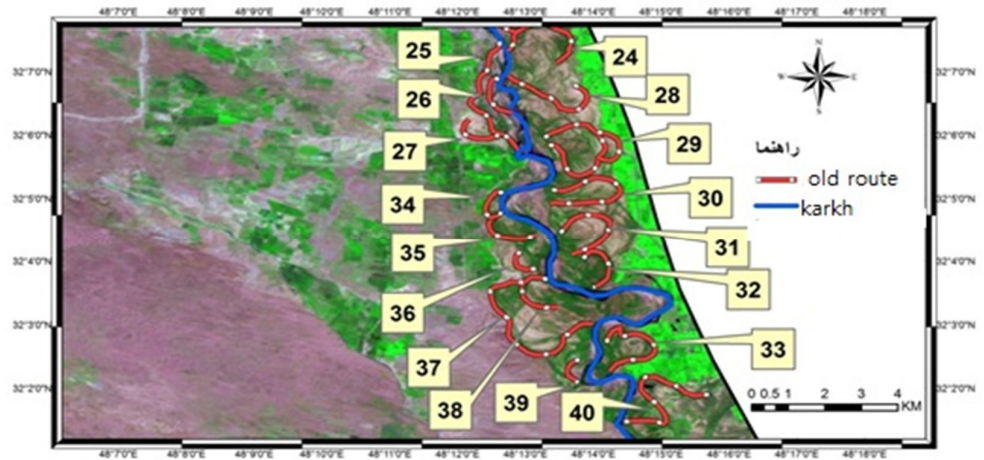


Fig7-(ETM+, RGB, 2,4,7) -The central part of the plain

The map displays the Karkheh River (blue line) flowing through a region with various land use patterns. Key locations marked with numbers include 57, 58, 59, 60, 61, 62, 63, 64, 65, and 66. The map also shows the 'old route' in red and the 'karkhe' river in blue. A compass rose and a scale bar (0 to 20 km) are included. The map is bounded by coordinates 48°0'0"E to 48°40'0"E and 31°30'0"N to 31°50'0"N.

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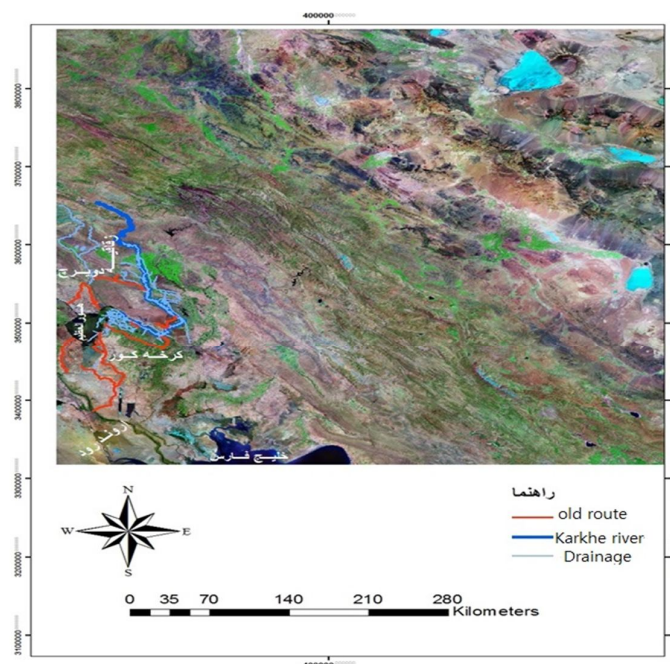


Fig10- old route in Khuzestan plan

Conclusion

River and its fertile plains have been the center of forming and developing the human civilization. Thus the never out skiver outskirts are a suitable place for agricultural activities, population settling, and civilization forming. Khuzestan Rivers and fertile plains have not been excepted from this matter. The river route their changes and tracing the old route and locating the old places can investigate the Nay of completing civilization centers in relation to natural factors (rivers, climate, ...) since every kind of change in the river limits could have wonderful effects on civilization movement .Therefore, the old roughs of Karkheh river have been identified during the fourth age based on historical .studies and satellite pictures and the following results were achieved.

- The first Karkheh old route was branched from Zughayeh River and it was connected to KarkhehRiver in the direction of west north – east south.

- Two other main routes have been divided from Doyrich and then they are poured in Hourolazim. Two main routes from Hourolazim, one to the east parl of plain and the other to the south. Then they aver connected to each other and then they go to Arvandrood.

- The other old route enters to low part of Khuzestan plain from the west of Hourollhoveizeh and then it is poured in to Arvandrood.

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