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НАУЧНО-ТЕХНИЧЕСКИЙ ЖУРНАЛ НАМАНГАНСКОГО ИНЖЕНЕРНО-ТЕХНОЛОГИЧЕСКОГО ИНСТИТУТА

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INNOVATIVE TECHNOLOGIES IN EVALUATION OF PROCESSES IN BANK

Arifjanov Aybek Muxamedjanovich
DSc, professor of Tashkent Institute of Irrigation and Agricultural Mechanization Engineers
Tel: +99(871) 237 1971, e-mail: www.obi-life@mail.ru

Axmedov Islombek Gulomjonovich
Associate professor of Namangan Engineering Construction Institute
Tel: +99(899) 814 1226, e-mail: islombek.ahmedov@bk.ru

Atakulov Dinislam Ermaganbet o'g'li
Assistant of Tashkent Institute of Irrigation and Agricultural Mechanization Engineers
Tel: +99(871) 237 1971, e-mail: irrigator-atakulov@mail.ru

Umarov Isroil Isoqjon o'g'li
Assistan of Namangan engineering construction institute
Tel: +99(894) 138 0218, e-mail: isroilumarov92@gmail.com

Abstract:

Objective. *The article is devoted to the use of modern GAT (geographic information system) in the study of deformation processes in the valley. Today, the interest of various sectors in the GAT is growing. This information helps to draw conclusions about changes and events in nature. A detailed study of the changes has been made by many scientists through this program. Today, the GAT is widely used in water accounting in the world. It is possible to collect, analyze and deliver custom data to the user using GAT. That is, the GAT is a system of devices and software that serves to receive, store, analyze, and deliver Earth information to the user. The article evaluates and analyzes the deformation processes of the Sox River using data from the Landsat satellite. The research describes ways to achieve a rapid assessment of the processes in the valley.*

Methods. *We used the ArcMap application of ArcGIS in our research. Initially, images of the Landsat 8 satellite were downloaded for free from the official US website GloVis.*

Result. *This suggests that the average flow velocity is greater and more prone to leaching in large storages, whereas the average flow depth in large storages is greater than the risk of sedimentation of turbid particles due to the small velocity. This in turn causes deformation processes in the valley.*

Conclusion. *According to the results of the analysis, the use of GAT in the remote study of deformation processes in the valley allows to quickly identify the processes occurring.*

Keywords: *remote sensing, image analysis, satellite, method, map, water consumption, ArcGIS software.*

Introduction. One of the important issues is the assessment of processes in the river basin and the improvement of computational methods and technologies for the prediction of river deformation. Today, issues such as improving this work, accurate and reliable assessment of the situation, achieving economic efficiency are being studied. This requires the use of modern technologies as a development [1,2]. Today, the ability to analyze data remotely in the GAT without difficulty has increased its use in a variety of fields.

Problem statement. Satellite imagery can also be used to explore areas that are difficult for humans to access and explore. Because irrigation systems are relatively small, to date, only line maps have been created using GPS (Global Positioning System) devices [3,4]. Their losses and their operational status have been studied on the spot. In the last 10 years, the launch of satellites with ultra-high-resolution sensors has made it possible to conduct remote sensing in the water sector using images of them [5,6,7,]. This article presents the results of research on the assessment of processes occurring in the riverbed using GAT technologies, the determination of hydraulic and hydrological parameters of the flow and the riverbed [8,9,10,11].

Solution method. ArcGIS software plays an important role in this system. Special data contains properties about the object (statistics, maps, geometry, etc.). The prospects for the use of this program in science are developing rapidly due to its advantage of combining all the data [12,13,14,15].

Style and materials. In evaluating the processes in the stream, one of the key factors is the change in the parameters of the stream over time. We used the ArcMap application of ArcGIS in our research. Initially, images of the Landsat 8 satellite were downloaded for free from the official US website GloVis. Maps were made by date of each downloaded image. We used levels and GPS data to verify the accuracy of the maps created. Initially, geodetic surveys were conducted to study the existing parameters of the Sox River basin. 9 fixed storks were selected for each kilometer along the length of the Sox River. At the same time, we selected 7 fixed points in each set, and at these points we carried out measurements with the level and GPS device. We performed leveling work on each stvor and tabulated it (Table 1).

table 1.

Geodetic measurements

№	Right			Medium	Left		
ПК 12	659	657	656,8	656,38	656,48	657,7	658,55
ПК 22	648,75	647	645,63	646,68	647,25	647,7	648,55
ПК 32	638,23	637,09	636,11	636,18	634,78	634,58	635,8
ПК 42	623,8	622,8	622,72	623,8	623,48	623,65	625,03
ПК 52	613,97	612,02	612,47	612,32	613,12	612,12	612.4
ПК 62	602,15	600,65	600,8	599,8	599,55	599,2	599,5
ПК 72	590,9	588,45	588,6	588,95	586,7	586,6	588,8
ПК 82	579	575,3	575,8	576	575,9	574,75	575,75
ПК 92	567	564.3	564.85	565.3	564.7	566.6	567

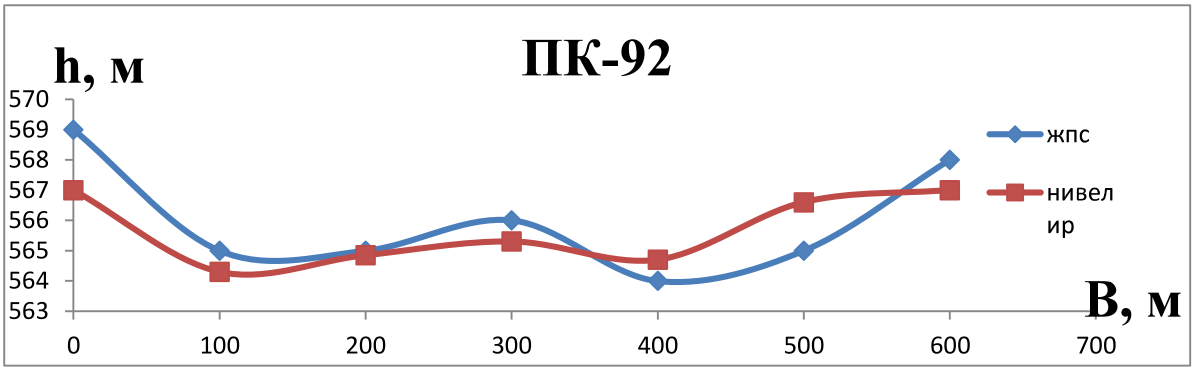
Then, with the help of a GPS device, we carried out measurements on each axis and plotted them (Table 2). There was a difference between the results obtained on the basis of levels and GPS device.

table 2.

Detected data by GPS

№	Right			Medium	Left		
ПК 12	659	658	656	658	655	656	659
ПК 22	645	643	641	643	643	645	646
ПК 32	634	633	635	632	632	632	633
ПК 42	624	620	621	623	620	621	625
ПК 52	611	610	611	612	612	611	612
ПК 62	600	600	600	601	599	599	600
ПК 72	593	591	588	590	587	588	589
ПК 82	580	577	577	578	575	578	580
ПК 92	569	565	565	566	564	565	568

Analysis phase. Based on the measured values in our analysis phase, the cross-sectional area of the stream was plotted on each stvor (Figure 1). The difference between the level and



GPS data is 1.5-2 meters.

Figure 1. PK-92 cross-sectional area of the Sox stream

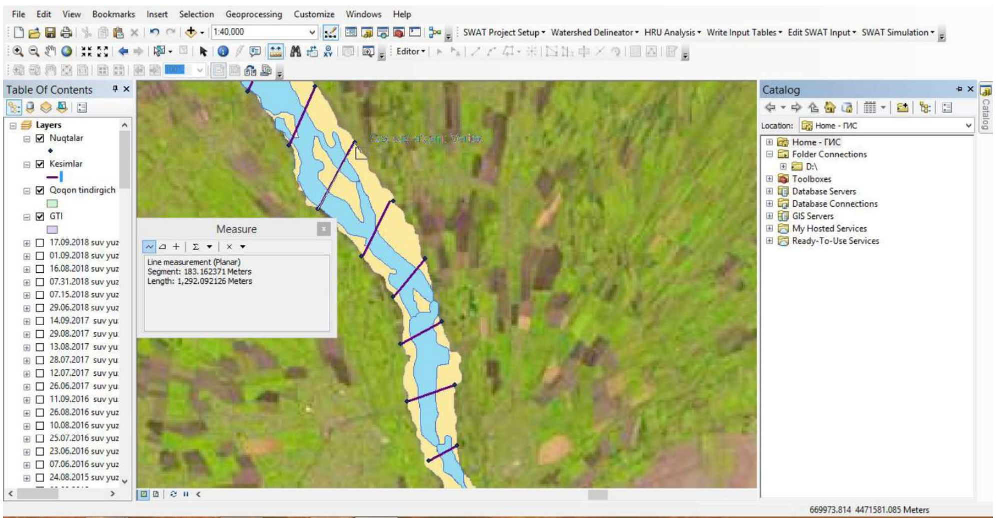


Figure 2. Measure the length and width of the Sox stream in the ArcMap application

The accuracy of the map created on the basis of this data was checked. In this case, the length and width of the stream were measured using the ArcMap application of the ArcGIS program (Figure 2) and compared. The results of field experimental studies with satellite imagery had the same index.

Image data for the last 4 years of the Landsat 8 satellite has been downloaded for free from the official US website GloVis. Based on these data, water flow maps for the last 4 years have been made. Based on the maps, the water flow area and the flow width at the pickets were determined (Table 3). Based on the average width of the Sox River in the identified pickets, the average depth at each picket was determined from the correlation equation for the width of the rivers and the average depth. Bunda V.S. The formula proposed by Altulin, taking into account the morphometric connections of rivers, was used [16,17,18,19,20,21]:

$$\frac{B}{h_{\text{ўр}}} = \left(\frac{Q}{d^2 \sqrt{gd}} \right)^{1/8} \tag{1}$$

where: d is the average size of the particles in the stream (d = 5.5 mm).

table 3.

Table of river morphometric connections

Date	Pickets	Water consumption m^3/s	Water surface area hectare	Average width m	Actual width m	Slope	Average depth m	Cross-sectional area m^2	Average speed m/s
6/29/2018	12	28	127.1	149.5	93	0.011	2.74	254.55	0.11
	22	28	127.1	149.5	138	0.011	4.06	560.49	0.05
	32	28	127.1	149.5	75	0.011	2.21	165.55	0.17
	42	28	127.1	149.5	127	0.011	3.74	474.70	0.06
	52	28	127.1	149.5	106	0.011	3.12	330.69	0.08
	62	28	127.1	149.5	182	0.011	5.36	974.89	0.03
	72	28	127.1	149.5	120	0.011	3.53	423.81	0.07
	82	28	127.1	149.5	115	0.011	3.38	389.23	0.07
	92	28	127.1	149.5	115	0.011	3.38	389.23	0.07

Conclusions and discussions. Based on the data in the table, it can be observed that the flow in the selected stumps varies with the cross-sectional area, average depth and average velocities. Where the average depth is relatively large, the average velocity is small. This suggests that the average flow velocity is greater and more prone to leaching in large storages, whereas the average flow depth in large storages is greater than the risk of sedimentation of turbid particles due to the small velocity. This in turn causes deformation processes in the valley.

Table 3 above is for one-day data only. Such a data table is available for the last 4 years. Based on these data, it is possible to remotely observe the deformation processes occurring in the valley in any case for the future. All we need for this is daily water consumption data.

Conclusion. In our study, using the data from the Landsat images, images were obtained based on observations of the processes in the river over a five-year period, and the formation of the river was assessed. According to the results of the analysis, the use of GAT in the remote study of deformation processes in the valley allows to quickly identify the processes occurring. This allowed to save time and resources, create a reliable and high-quality database. It is possible to build maps using perennial data from landscape images and develop a database with these maps and make predictions for the future.

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THE IMPORTANCE OF DIGITAL PAYMENT SYSTEMS IN THE DIGITAL ECONOMY

Rashidov Rakhmatullo Alojonovich
PhD of Namangan Institute of Engineering and Technology
Tel: +99(893) 498 9684, e-mail: r.rashidov84@mail.ru

Rustamov Azamjon Bahromjon ogli
Student of Namangan Institute of Engineering and Technology
Tel: +99(893) 947 9998, e-mail: mcdonald0498@gmail.com

Abstract:

Objective. *Advances in the field of digital payment methods have fundamentally changed their operation. These technological progressions have helped bring safer, cheaper, more stable and all-inclusive payment systems to the world. This paper provides a brief overview of digital payment systems. It also argues that government identity managements systems have*