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SPACE MONITORING OF MAN-MADE HAZARDS IN CENTRAL KAZAKHSTAN

[1]Ibatov M.K., [1]Yavorskiy V.V., [2]Mozer D.V., [1]Sergeyeva A.O.

[1]Karaganda state industrial university, Temirtau;
[2]Karaganda state technical university, Temirtau,
e-mail: yavorskiy-v-v@mail.ru

In article features of data processing of space monitoring of territories with the purpose of prevention of technogenic emergencies are condsidered. Here is the interferogram, settling in the region of Karaganda region.

Space monitoring is the continuous multiple getting information about qualitative and quantitative characteristics of natural and man-made objects and processes with the exact geographical position at the expense of processing the data received from the satellites, Earth remote sensing (ERS). Space monitoring allows to obtain uniform and comparable quality information at a time for vast territories, which is almost unattainable for any of ground surveys. Based on this definition, we can distinguish a number of basic requirements to space monitoring: the ability to monitor large areas and long features; high spatial resolution (up to 50 cm) and precision, including without ground anchor points; high frequency of surveys, the efficiency of obtaining the original and processed RS data; the possibility of building digital elevation models (DEM) and of localities on the stereo images from the SPACECRAFT (SC) remote sensing; the ability to take the picture in a large number of spectral channels; possibility of use of materials of space monitoring directly in all standard GIS.

Operational space monitoring of natural and technogenic emergencies and disasters in recent years has become the most important and necessary component of information provision services respond to emergencies. Every day we receive space data is widely used for providing information for audit and predictive models security areas and hazardous production facilities. Using the modern GIS-technologies, allowing to unite the diverse information with space data. This allows you to automate the calculations of the risk of disaster (fires, droughts, floods etc). Possibilities of space monitoring zones of emergency from space are determined by the availability of imagery, spatial resolution of observed objects, availability of images.

Data processing of remote sensing – the process of the operations of aerospace images, including their correction, transformation and improvement, interpretation, visualization.

The main stages of space images processing: the preliminary processing, the thematic.

Preliminary processing of multispectral data is the correction and improvement of satellite images.

The pre-processing includes the geometric correction of satellite images, the radiometric calibration of images, the radiometric correction of influence of the atmosphere, the restoration of the missing pixels, the contrasting, the filtering. Geometric correction includes the elimination of the image geometric distortion (orthorectification), the geographical location.

Photos, originally received from satellites that have been recorded in the so-called "raw values" brightness DN (Digital Number). The data in this format cannot adequately be compared with the data of other surveys. The task radiometric calibration is adjusting these values in physical units.

Image contrast is the difference between the maximum and minimum values of brightness.

Weak contrast – the most widespread defect images.

Filtering is a transformation that allows you to enhance the reproduction of certain objects, suppress unwanted veiling, to resolve other random interference (noise). The essence of objects is useful to define at the image in natural colors, but to share and delineate objects easier on the image in false colors. Choosing the right scale allows the

operator to visually identify objects that are a little different in brightness on a gray scale image. In such images more Yaro and contrastly allocated objects compared to the original image. Principal component analysis is a method of multispectral analysis of correlated data. Classification of computer image interpretation or process automated units of all pixels of the picture into groups (classes), which correspond to different objects. To monitor vertical distortion underworked areas Kostenko mine (Karaganda region) was used satellite radar interferometry.

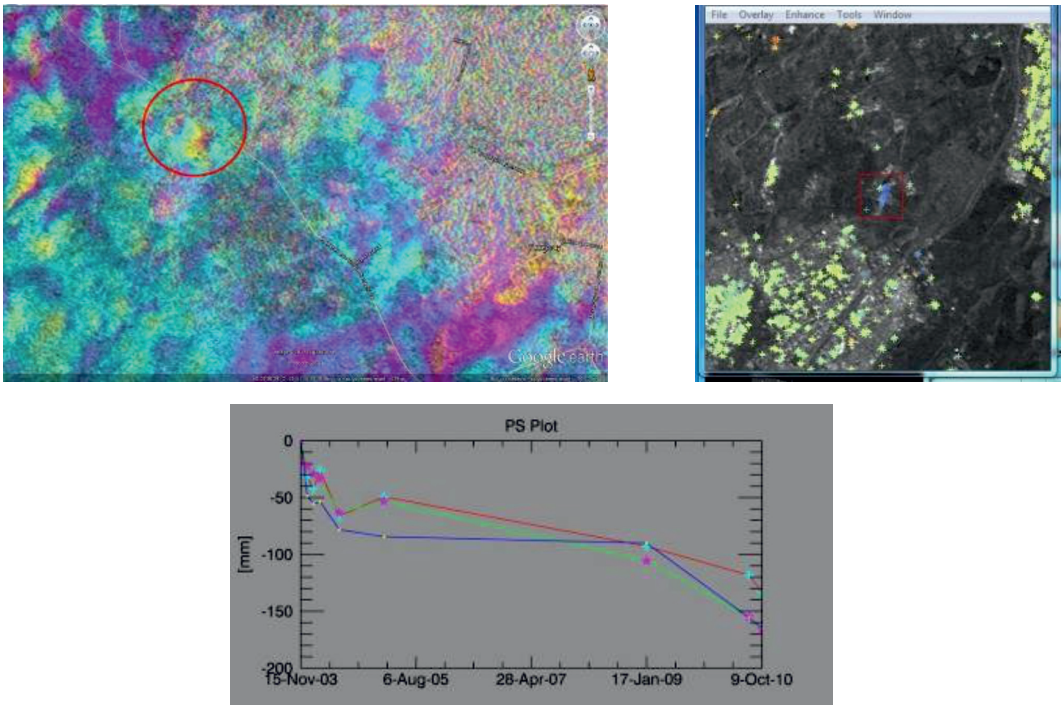

Fig. 1. Sedimentation in the area of mine it. Kostenko

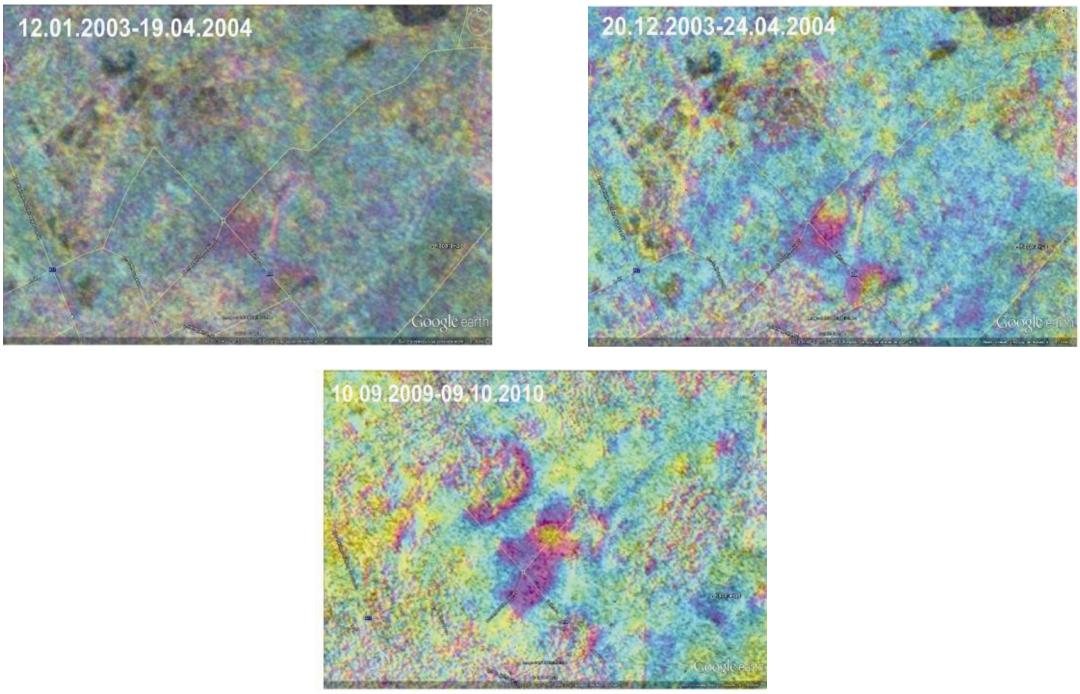

Fig. 2. Building a differentiated interferogram

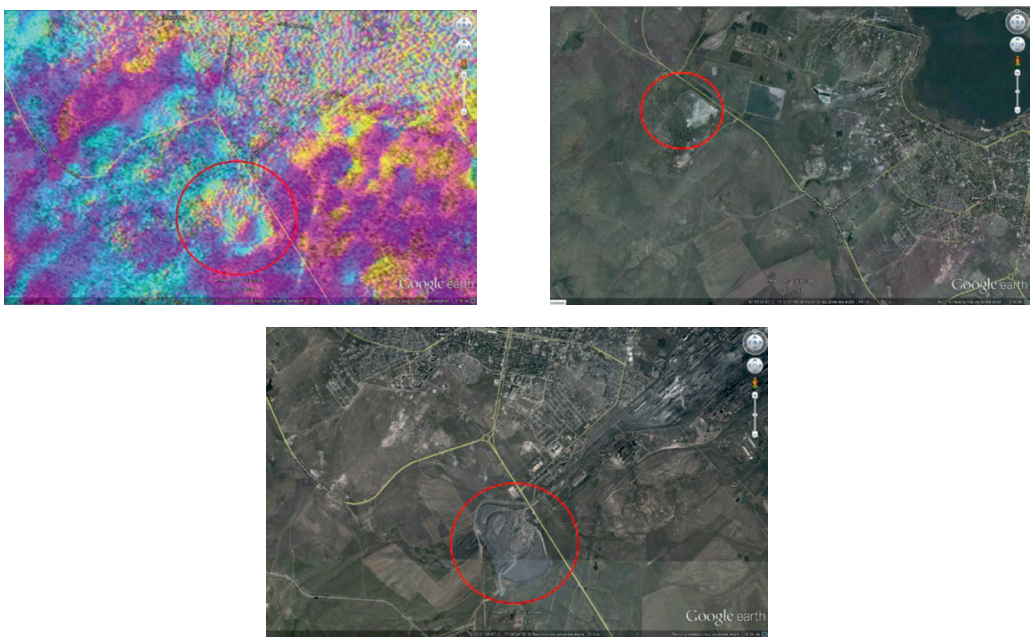

Fig. 3. Settling between water store and the village of Aktau

The main output file when calculating the displacement of the Earth's surface is differential interferometer graph representing the result of subtracting the synthesized phases of the topography of integrated interferogram. Geocoding and calibration are relative been obtained earlier digital elevation model of the city of Karaganda. The calculations showed that in 2003 in the mine area Kostenko have started to form 2 of the mould of subsidence. Up to 2010. mould concretion only increase. Sedimentation are on average 2,5 cm during the reporting period, i.e. approximately 30–50 days.

On mine Kostenko currently conducted the work on formation K1 on the lava 45 K1-C capacity removable reservoir made up 2,m/ Subsidence of a terrestrial surface is calculated by the method of PSI, also showed subsidence in Kostenko mine area (fig. 1). According to the schedule, sedimentation are active character from 2003 to 2004-up to 80 mm 2005 to 2009 there is a small settlement in the region of 40 mm With 2009 is actively mining layer, which leads to an active process of displacement of the Earth's surface and subsidence of the mould displacement.

The interferogram of the Karaganda region shown in fig. 3. (Processing of satellite images ENVISAT 2010/07/31 and 2010/10/09, subsidence of up to 5 cm).

Found subsidence on the undermined territories of the city of Karaganda indicate geodynamic processes, which may further lead to the destruction of asphalt pavement, paludification or flooding of land, and ultimately to failure. In this area it is necessary to monitor the state of the earth's surface to predict the parameters of deformation and detection of potentially dangerous zones.

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A NEW COMPUTATIONAL PACKAGE FOR USING IN CFD AND OTHER PROBLEMS

Mohammad Reza Akhavan Khaleghi

The Office of Counseling and Research Fluid Engineering and Aerodynamic, Mashhad, e-mail: rfemcfd@gmail.com

First, I should mention that this is a basic package and is not limited to CFD, it can also be used for other problems.

Finite Element Method (FEM) is a powerful numerical method which has been used successfully