

# USE OF SATELLITE DATA FOR PLANNING OF NUCLEAR POWER PLANTS AND OTHER POTENTIALLY HAZARDOUS OBJECTS

Boyarchuck K.A., Chikina M.A., VNIIEM, Russia

Miloserdova L.V., Maloushina N.I. Russian Oil & Gas University, Russia

The problem of seismic – geological safety of large industrial objects is directly related to the tectonically instable areas of the Earth's crust, where the seismic events may occur. The specialized fracture maps have a regional character, so they cannot help to detect at the local level if a fault is ancient and inactive or "alive" and therefore dangerous.

The opinion that platform territories are stable is out of date. It is determined to the present time that not only seismically hazardous mobile territories but also platforms are broken into blocks by a regular network of faults reversely shifting related each other with velocities reaching centimeters a year.

Satellite imaging of high and medium resolution is a unique source of information for reliable detection of such fault-and block structure of a territory under study and for determination of rank relations between tectonic blocks. The existing experience of successful interpretation of medium resolution space images for geological prospecting may be also applied for revealing of tectonically instable structures, i.e. for detection of all "living" fractures of any mapping scale and in real time.

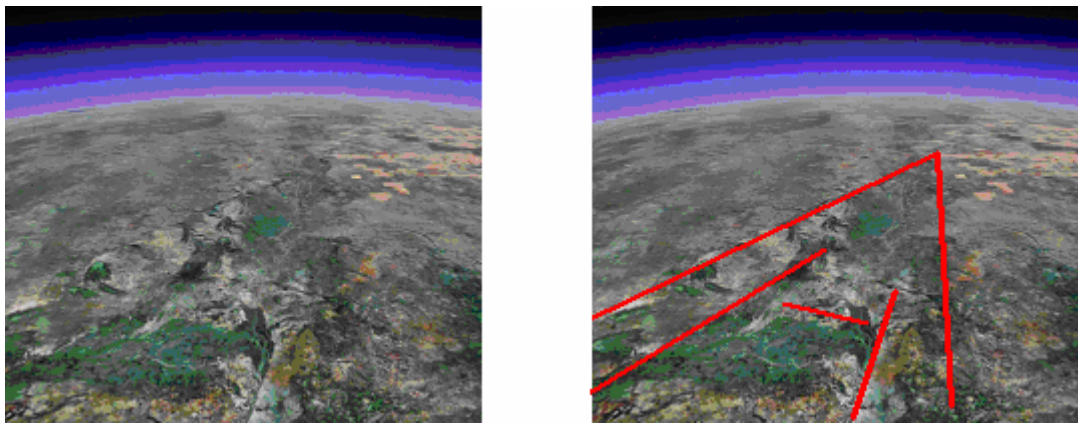


Fig.1 Left: uninterpreted image; right – interpreted one

In Fig.1, the oblique space image of an area in Central Africa is shown; the faults, which are up to now not presented in any existing geological map, are characteristically seen.

For image interpretation, the authorial modification of the standard method is used; its peculiarity is simultaneous work at several scale levels. The image interpretation is carried out on the base of the latest achievements of remote sensing techniques and computing image processing.

In the Fig.2, the results of interpretation of "living" faults by space images are shown for the territory around Armenian nuclear power plant. In the centre of the scheme, the Sevan Lake is shown for geographic referencing. The faults previously revealed by earth-based geological data are shown as dotted lines. The solid lines show the faults, which are only seen in space images.

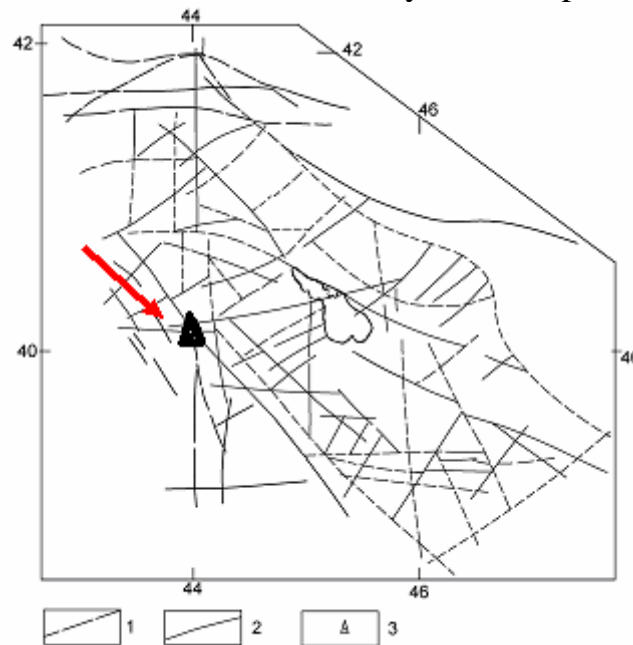


Fig.2. Scheme of fault interpretation for the Caucasus Minor by medium-resolution space images: 1 – faults revealed by geological and morphological data; 2 – "additional" faults revealed by satellite data; 3 – location of the power plant

It is easy to see from the image data that the Armenian nuclear power plant is located extremely inauspiciously in the cross-point of several faults. It has to be mentioned that by use of high-resolution space images it is possible to obtain the more detailed maps and to reveal reliably all the existing faults.

For record of the slow tectonic movements, so called creep, the "retrospective monitoring" is used, i.e. interpretation of space images obtained for the same territory during by-gone years, from the database of the Remote sensing center of FSUE "NPP VNIEM". Use of "retrospective monitoring" enables to detect the degree of movement and, therefore, the degree of seismic-geological hazard for any faults as in areas where construction is planned as around existing objects.