Application of mobile frequency-resonance methods of satellite images and photo images processing for water accumulations searching

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SUMMARY

The results of additional experimental studies are presented with the aim of studying the possibility of using methods of frequency resonance processing and interpretation of satellite and photo images for the aquifers searching. Investigations of a reconnaissance character were carried out on a mineral water deposit, the territory of a summer cottage, the offshore of the Atlantic coast of the USA, in the areas of lakes and the Aral Sea, as well as in certain regions of longevity. Additional materials have been obtained that testify to the synthesis of water at a depth of 69 km in volcanic complexes of a certain type. A survey of longevity zones in various regions showed that all of them are located within volcanic structures filled with basalts. In these volcanoes, water is synthesized at a depth of 69 km and hydrogen migrates. Hydrogen-enriched water promotes longevity. The results of the developed direct-prospecting methods testing in various regions of the world testify to their efficiency, effectiveness and practical applicability in the search and exploration of aquifers, as well as ore and combustible minerals.
**Introduction.** Over the years, the authors purposefully conducted research and experiments with the aim of developing mobile and low-cost methods and technologies for the operative solution of a variety of geological and geophysical, hydrological and engineering-geological problems. In 2018, testing began of modified frequency-resonance methods for processing satellite and photo images, as well as a methodology developed on their basis for the integrated assessment of the prospects of various minerals (including water) detection within large search blocks and local areas. This technology has undergone extensive testing when conducting research from the ship in the Ukrainian Marine Antarctic Expedition of 2018 (Yakymchuk et al., 2019a). On the vessel, using photographs of chemical elements from the D. Mendeleev’s table, experiments were also carried out at many sounding points of the cross-section to determine which of these elements are present in the water. The results of the work carried out allow us to conclude that technology of frequency-resonance sounding (scanning) of the cross-section can be used for these purposes. This report presents some experimental results with the aim of exploring the possibility of using components of the developed methods for detection, tracking and localization of aquifers in different intervals of the cross-section.

**Research Methods.** Experimental studies were carried out using methods of frequency resonance processing and decoding of satellite and photo images, vertical scanning (sounding) of a cross-section in order to determine (estimate) the depths and thicknesses of various rock complexes and minerals sought, as well as methods of integrated assessment of oil and gas prospects within local areas and large blocks (Levashov et al., 2010; 2012; Yakymchuk, 2014; Yakymchuk et al., 2019a). These methods are based on the frequency resonance principle of useful signals recording (Levashov et al., 2012). The important components in the modifications of the direct-prospecting methods used are the bases (sets, collections) of chemical elements, minerals, oil and condensate samples, as well as sedimentary, magmatic and metamorphic rocks, the resonant frequencies of which are used during the satellite and photo images processing. The collection of oil in the database includes 117 samples, gas condensate - 15 samples. The base of sedimentary rocks consists of 12 groups, and the collection of photographs of igneous and metamorphic rocks includes 18 groups (Yakymchuk et al., 2019a). The photographs of the used sets of samples of sedimentary, metamorphic and igneous rocks are taken from an electronic document on the website http://rockref.vsegei.ru/petro/.

Some experimental results obtained with the used set of modified mobile direct-prospecting methods are presented in articles (Yakymchuk et al., 2019a-b; Yakymchuk and Korchagin, 2019a-e).

**The results of experimental work.** First, we note that the technique of frequency-resonance processing of photographs has been repeatedly used to determine the existence (or absence) in minerals, rocks, and also water of various chemical elements and parasites (organisms living on the surface or inside another organism). When testing this technique, it was found that the processing results were identical when using a sample of a mineral, rock, water or photograph of this sample.

**Aquifer searches and mapping.** "Zbruchanskaya" mineral water deposit. The field is located in the west of the Khmelnytsky region. The water of the deposit is used by numerous sanatorium in the area. At the initial stage of research, a frequency-resonance analysis of Zbruchanskaya mineral water was carried out using its photograph (Figure 1a). The results of the analysis showed that the water is “clean”: no harmful chemicals and parasites were found in the water.

![Figure 1](image-url)  
**Figure 1** Photographs of mineral water “Zbruchanskaya” (a), the location of the well with water (b) and the pump room of mineral water near the well (c).

In Figure 1b shows a photograph of the area on which the well is located (in a small structure in the foreground) for the Zbruchanskaya water intake. According to the personnel of the well servicing well located near the mineral water pump room (Figure 1c), the aquifer with Zbruchanskaya water is located in the depth interval 160-180 m (approximately).
Using resonant frequencies of water, a frequency-resonance scanning of the cross-section was carried out at the well location in order to determine the depth of the aquifer. When scanning in a local area near the well, the position of the aquifer in the depth interval of 162-180.5 m is directly determined. The integrated estimate of the depth of the aquifer (for the entire area in Fig. 1b) is 161-186 m.

**Research site in Dnipro city.** When processing a satellite image of the site (Figure 2) from the surface, responses (signals) from oil, condensate, gas, hydrogen and salt were not recorded. Responses were received from 1-7 (weak) groups of sedimentary rocks, as well as 1 and 7 groups of igneous rocks. By fixing the responses at various depths, it was established that the root of the channel (volcano) of the 7th group of sedimentary rocks is located at a depth of 723 km. Signals from the 7th group of igneous rocks were obtained at a depth of 150 km; there were no responses on a surface of 250 km.

Image processing of the estate No. 1 (rectangle 1 in Fig. 2) was carried out in order to determine the depths of aquifers by scanning the cross-section with a step of 1 cm. As a result, responses (signals) at water frequencies were recorded in the following intervals of the cross-section: 1) 13.5-14.5 m; 2) 19.5-23.0 m; 3) 30-34.5 m; 4) 41.5- (good signal) -48.5 m; 5) 55.7- (good signal) (very good) (strong signal) - 69.5 m; 6) 73.7- (strong signal) -77.5 m; 7) 82.5- (strong signal) -91.5 m.

When scanning the cross-section, responses from granites were recorded from 100 m. Since estate No. 2 (rectangle 2 in Fig. 2) is located near estate No. 1, a cross-section scanning with a step of 2 cm was carried out only in the interval of two horizons highlighted on the first estate. Responses from water are recorded here in the following intervals of the section: 5) 56.5- (strong signal) (strong signal) -69.5 m; 7) 82.2- (strong signal) (very strong signal) - 91 m.

It can be assumed that in the intervals 1-4 and 6, depths will be obtained that are very close to those recorded within the first estate.

**Figure 2 A satellite image of the site in a summer cottage (Dnipro city).**

**Figure 3 Map of the study area with freshwater reservoirs on the Atlantic coast of the United States (Gustafson et al., 2019).**

**Figure 4 Satellite image of a local site in the area of freshwater reservoirs study.**

Atlantic coast of the USA. We also note that the article (Gustafson et al., 2019) provides information on the detection of freshwater reservoirs on the offshore of the Atlantic coast of the United States. A map of the study area is shown in Figure 3. When processing satellite images of this region, water responses were also recorded up to 69 km.

At the initial stage of the survey, a satellite fragment of the territory located east of New Jersey was processed (Figure 4). Responses from water were recorded at the surface, as well as at a depth of 1000 m from the upper and lower parts of the cross-section.

By scanning the cross-section from 1000 m with step of 1 m, responses from water were recorded in the following intervals of the cross-section: 1) 1330-1970 m; 2) 2080-2240 m; 3) 2370-2710 m; 4) 2870-3450 m; 5) 4650-5180 m; 5 m step, 6) 5270-10650 m: 7) 12300-14700 m (up to 15 km traced). Water responses were obtained at a depth of 69 km.

On the surface of 69.8 km, responses from the 9th group of sedimentary rocks (marls) were also recorded. The root of the deep channel filled with marls is set at a depth of 470 km.

At the second stage of work, a frequency-resonance processing of a satellite image of a larger territory was carried out. Water signals in this area were recorded on a surface of 68.9 km. The root of the marl canal is also recorded at a depth of 470 km. There were no responses from igneous rocks in this area.

At the final stage, the image of a large area was divided into two fragments - the upper and lower. When processing the image of the upper fragment, responses from the water were obtained at depths of 5 km and 68.9 km. The root of the channel filled with marls is determined at a depth of 195 km. In the lower fragment, the root of the marl channel is set at a depth of 470 km.
Reconnaissance studies in the area of lakes. When conducting experiments in various regions, facts were obtained that indicate the possible formation of water at a depth of 69 km (approximately). Studies of this nature were also carried out in the areas of the lakes location.

Pulemets Lake (Figure 5a) is located northwest of Svityaz Lake, between the villages of Pulmo and Pulemets. When processing a satellite image of the lake (Figure 5a), responses (signals) from oil, condensate, gas and hydrogen were not recorded. Responses were received from water and the 10th group of sedimentary rocks (siliceous), no signals from igneous rocks. The root of the deep channel of siliceous rocks is recorded at a depth of 470 km.

When processing a satellite image of Svityaz Lake (Figure 5b) signals from siliceous rocks with a root at a depth of 470 km were also recorded, there were no responses from salt and igneous rocks.

Another situation was observed during processing of a satellite image of Svityaz Lake on the Republic of Belarus territory (Figure 5c). A granite channel with a root at a depth of 996 km was discovered here. Signals were obtained from 10 and 11 granite samples from the used collection. No response from salt and hydrocarbons were detected.

Water signals were recorded from the surface and at a depth of 68 km.

Qinghai Lake (China). When processing a satellite image of the lake (Figure 5d), no responses from oil, condensate, gas, amber, or salt were received from the surface. Signals from hydrogen, 8 groups of sedimentary rocks (dolomites) and 6th group of igneous (basalts) were recorded.

By fixing responses at various depths (50, 150, 250, 350, 450, 550, 650, 750 km), the root of the basalt channel was determined at a depth of 723 km. The lower boundary of the dolomites rocks is set in the range of 4-5 km. By scanning the cross-section from the surface with step of 50 cm, responses from basalts were obtained from a depth of 90 m, and from hydrogen, from 160 m.

By scanning the cross-section with steps of 1 and 5 cm, responses from water were recorded from the surface up to 90 m. On the surface of 91 m from the upper part of the cross-section, responses were received only from water, and from the bottom, only from hydrogen and basalts. There were no responses from water on the surface of 68 km.

Balkhash Lake. When processing a satellite image of Balkhash Lake (Figure 6) responses from 1, 6 (very weak) and 7 (weak) groups of igneous rocks were received; there were no signals from sedimentary rocks, hydrocarbons, or amber. Responses from the water were recorded from the surface and traced up to 69 km. The root of the channel (volcano), filled with rocks of the 7th group, is determined at a depth of 470 km.

Aral Sea. Figure 7 show two images of the Aral Sea (with and without water). During frequency-resonance processing of the image with water (Figure 7, left) signals were obtained from the 7th group of igneous rocks; there were no responses from sedimentary rocks, hydrocarbons and amber.

Water signals were recorded from the surface and traced up to 69 km. We also note that when scanning the cross-section, responses from water were recorded from the surface up to 280 m, as well as from 857 m to 69 km. Signals from salt were obtained by scanning from the interval 0-855 m.

When processing a sea image without water (Figure 7, right), responses from water was recorded only in the range 34.5–69 km. There were no signals in the upper part of the cross-section.

Survey sites in areas of longevity. We draw attention to the fact that the book (Druzyak, 2007) [6] provides information on areas of longevity. In order to study the features of the deep structure in these areas, a frequency-resonance processing of satellite images of local areas within them was carried out. Currently, there were investigated the known sites of longevity on the islands of Okinawa (Japan),

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Figure 5 Satellite images of lakes Pulemets (Ukraine) (a), Svityaz (Ukraine) (b), Svityaz (Republic of Belarus) (c) and Qinghai (China) (d).

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Sardinia (Italy), Icardia (Greece), on the Nikoya Peninsula (Costa Rica), in the Hunza Valley (Pakistan), in the Kodori Gorge (Abkhazia), as well as inhabited points Lerik (Azerbaijan), Loma-Linda (California, USA), Oymyakon (Yakutia).

As a result of the work carried out, it was found that all these examined sites in which centenarians live are located within deep channels (volcanoes) with roots at a depth of 723 km and filled with basalt rocks. Water is forming in the contours of these volcanoes at a depth of 69 km. In almost the entire basalt interval in the volcanoes, responses from hydrogen are recorded. It can be concluded that the use of hydrogen-rich drinking water contributes to longevity.

_Estate of W. Churchill (Great Britain)._ It is also known that the long-lived is the prominent British politician Winston Churchill. So, it was suggested that his estate is also located on a basalt volcano. To verify this assumption, a processing of a satellite image of the estate location site was carried out. During the experiments, signals from basalts and hydrogen were recorded. The root of the basalt volcano is determined at a depth of 470 km. Signals from the water were recorded up to 69 km.

**Conclusions.** The results of experimental studies indicate of information content of satellite and photo images, as well as the efficiency of frequency-resonance technology for their processing. Mobile methods of this technology can be used for aquifers searching, as well as to quickly establish the presence (absence) of various (including the desired) chemical elements in water, in samples of minerals and rocks, in core samples, in sediments of cross-section at various depths.

**References**


