

GEORGIA, GURIA REGION, FRAGMENTARY GEORADAR SURVEY OF THE FORMER TERRITORY OF THE SOVIET UNION RESEARCH INSTITUTE OF RADIATION PLANT AGRONOMY

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Summary: In Georgia, in the Guria region, the territory with signs of radioactive contamination was surveyed by the GPR method. Interpretation of crossed GPR profiles for possible subsurface underground objects revealed the existence of simple and mixed burial grounds.

Key words: georadar survey, Zond 12-e, GPR method, Prism-2.5 software

Introduction. The Research Institute of Radiation Agronomy of Plants was located and operated on the territory of Georgia, in the Guria region since the 1960s, at present, the remains of the institute building, the remains of the perimeter of the foundation, the remains of a number of demolished buildings have survived. Inside the ruins of the site of the institute and around it there were signs of radiation pollution, the sources of which could be located under the day's surface in more or less protected conditions.

Purpose. The purpose of the study by the GPR method [1, 2, 3, 4] was to determine the radio images of objects, their location, shape and location of possible underground objects [5,6,7] in pre-designated places.

Instrumental part. Georadar works were carried out by the Georadar "Zond 12-e" with its standard antennas at frequencies of 150 MHz and 75 MHz, the data were collected and processed using the "Prism-2.5" software.

Working environment. The work was carried out on the territory, the soil of which consists of red soil, it is located in the southwestern part of the humid subtropical zone (Adjara, Guria) at an altitude of about 100-300 m above sea level and occupies a hilly area. Red soil is characterized by heavy clay, clay texture and heavy clay. The red color is due to the content of ferric iron.



Fig. 1. Photo shows zone-2 of the study area. White lines mark the directions for conducting GPR profiles.

Results and discussion. Fig. 1 is a photograph of the surface of one of the sites in the study area, radiograms of transverse GPR profiles and the results of their interpretation.

The location of the boundaries of the cavity environment is indicated in the center of the profile-2a (Fig. 2) at depths of 1-4.5 m from the surface and at distances from 2 to 7 m. Some probable cavities are marked with white lines. The depth of their placement is 0.5-1.5 m, the distance is 5.5 m.

Clearly distinguishable from the environment, walls, floor, base. The radio image is obtained as a result of reflection and refraction of electromagnetic waves from the surfaces that form the cavity of the desired object.

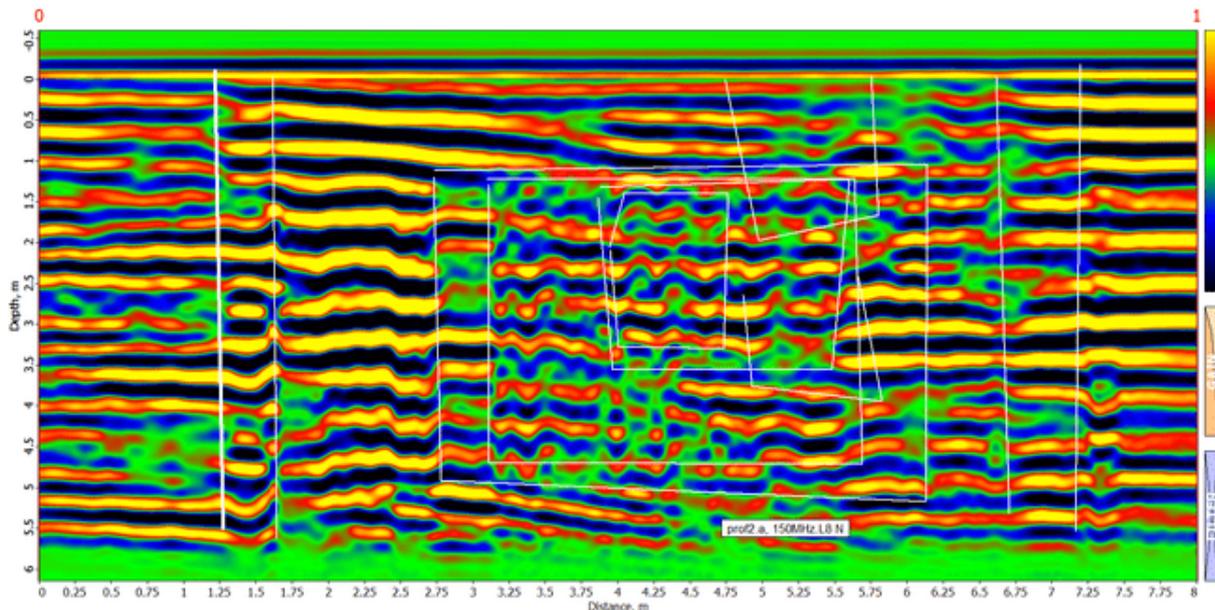


Fig. 2. The radarogram shows a GPR section (profile-2a) 6 m deep and 8 m long, made by the Zond 12e GPR with its standard 150 MHz dipole antenna.

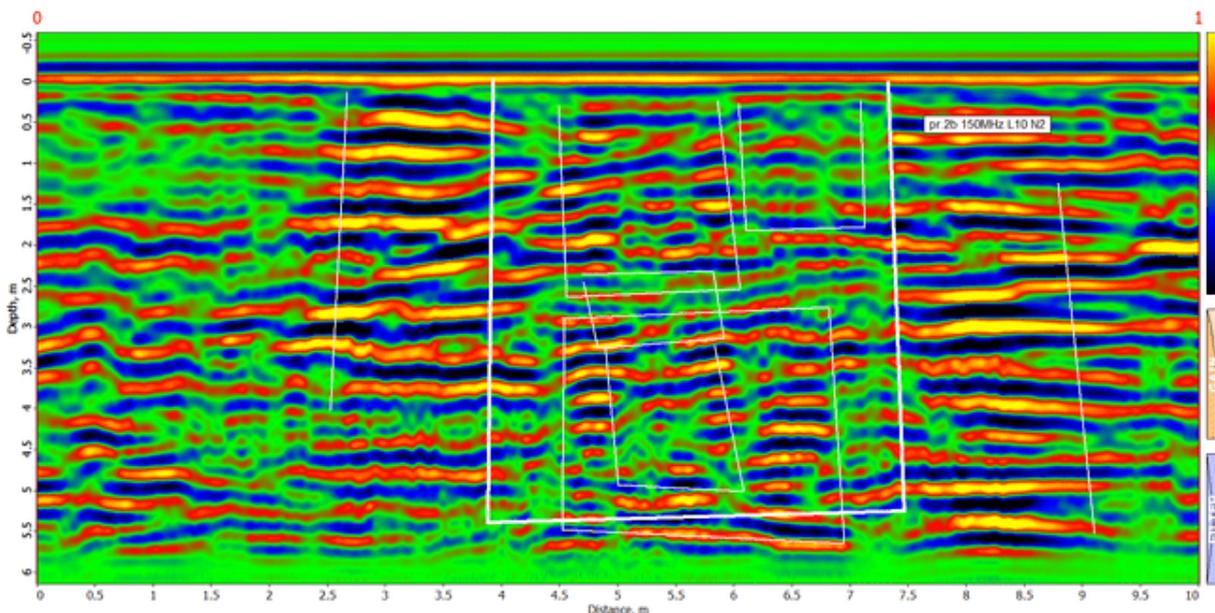


Fig. 3. Shows a GPR section (profile-2b) 6 m deep and 10 m long, made by the “Zone 12” GPR with its standard 150 MHz dipole antenna.

A probable cavity is indicated in the center of profile-2b (Fig.3), an approximate depth at a distance of 4.5-5 m from the surface and at a distance of 4-7 m, possible cavities are marked with white lines in the center of the radarogram. The walls of the cavity are at distances of 3-4 m and 8-9 m.

Profiles 2a and 2b are in good agreement with each other and clearly distinguish the marked cavity.

Conclusion. Fragmentary GPR studies [8, 9] in the marked areas of the former territory of the Research Institute of Radiation Agronomy of Plants revealed a variety of radioactive images, indicating the existence of various types of burial grounds and underground structures for the protection of radioactive waste. The location, shape and, in some cases, identification of possible underground targets have been determined.

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