RAPID CHANGES OF SOME GEOPHYSICAL PARAMETERS IN THE NATURE

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Abstract

A many years research of radon in soil and air, gamma-background in different energy intervals of γ-rays, temperature variations in soil and cosmic rays in gallery near Black Sea has been conducted. In addition, the radon measurement in Temruk, Anape, Abraudurso, the Northern Caucasus, started now. Data are registered automatically every 5 min and stored at the computer.

A new Rn-measurement site at Jankhot near Gelendgik (the Black Sea coast) was created. Simultaneously temperature and hydrogen concentration in soil at a depth of 1 m were measured. At the Jankhot station data were registered every minute. The data recorded are described. They may be used to study high Sun-Lunar tides, to predict earthquakes and to conduct some gravitation research.

Results and Discussion

During many years we have observed in the Northern Caucasus variations of the gamma rays background, radon concentration, cosmic rays and soil temperature in the surface soil layers and in galleries. Recently we started measurements of chemical elements and anions in water and gases of mud volcanoes, wells, surface and sea waters. “Bursts” of temperature up to several degrees above background which lasted for tens of minutes and more were observed in soil in a gallery of Novorossiysk (Figure 1). These “bursts” apparently coincided with large scale earthquakes.

We propose that high temperature source may be due to underground chemical phenomena. The hydrogen combustion may be one candidate. For this reason a study of hydrogen concentration in soil in gallery and surface has begun. Because hydrogen is very mobile, measurements were conducted every minute.

One-minute-variation of radon, hydrogen and temperature in soil at the depth of 60 cm are shown in Figure 2. Measurements were performed at Djankhot, near the Black Sea coast. Radon was determined using scintillator counters ZnS with photomultiplier. The diameter of the counter is 10 cm, its length 50 cm. Scintillator is protected by mylar and placed at a distance of 25 cm from the open end of the tube.
The equipment worked in automatic regime. The results of the radon activity in soil are shown in Figure 2. Besides radon, temperature, and hydrogen data are displayed.

![Figure 1](image_url)  
*Figure 1.* “Bursts” of temperature in soil in Novorossiysk gallery (depth 50 m). Earthquake occurred on 20.01.00 at 13:37 h (GMT) in Turkey (M=4.8) 600 km away.

Similar measurements were undertaken to study this phenomena in mud volcano. The preliminary hydrogen and radon survey of the volcano area with the net of 25 m was done. In the active zones around the volcano both radon and hydrogen concentration were determined to be low in the volcano mud. In order to study the variations of radon and hydrogen in the volcano mud in a nearby forest, a number of counters were placed in the nearby hill. Changes of radon content are shown in Figure 3. It is clearly seen that the change of radon in the forest was low, whereas in the hill it was high. The daily changes of radon correlate with the temperature changes. However changes of hydrogen in the forest and hill were not observed.

The high activities of volcano are not observed in the places where high concentrations of radon and hydrogen exist. The increase of volcano activity is associated with large differences between radon and hydrogen concentrations.

Also, natural radioactivity variations were observed at sites where element concentrations changed significantly. In order to study the Sun-Lunar phenomena and/or cosmic gravity waves, it is necessary to carry out measurements within 1 to 5 minute intervals.