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B. Z. Belashev (Petrozavodsk, IG KRC RAS)**. Cyclity of geophysical processes.**

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Abstract: The aim of the study is to identify and compare the periodicity of the time sequences of seismic noise, geomagnetic variations and volumetric radon activity,which were obtained from specialized complexes that automatically conduct geophysical monitoring in Karelia. The time sequences studied were processed using Burgэ's maximum entropy method.It was established that most of the allocated process periods are close to the periods of own fluctuations of the Earth.

Key words: seismic noise, geomagnetic variations, volumetric radon activity, periodicity, own fluctuations of the Earth.

The present study is based on the results of geophysical monitoring in Karelia sent from specialized complexes that automatically conduct instrumental observations of the region's lithosphere and magnetosphere.

The aim of the study is to identify and compare the periodicity of the time sequences of seismic noise, geomagnetic variations and volumetric radon activity and to obtain the information on the intrinsic rhythms of a geophysical medium at low seismic and geomagnetic activity.

Geomagnetic data were obtained in Petrozavodsk Geophysical Laboratory. The horizontal and vertical constituents of the Earth's magnetic field are measured by a GI MTS-1 geophysical complex. Seismic noise sequences are presented as the readings of three spatially oriented Guralp GMC-6TD meters in a PITK seismic station recorded at a frequency of 50 Hz. Volumetric radon activity in the air of basements was measured in the village of Tsarevichi, Pitkaranta and Solomennoye Town, a suburb of Petrozavodsk. Radon monitoring was carried out by a SRS-05 mobile seismic station. ata from all complexes are sent through the Internet or by mobile communication in an automatic mode to the ftp server at the Institute of Geology, KarRC, RAS, in Petrozavodsk.

The length of the sequences obtained with weak geomagnetic and seismic perturbations was a week or slightly more than that. Data averaging in the one hour discretization range suppressed the fluctuation of smaller periods. Some of the data could not be tied to one time interval because of technical malfunctions during monitoring. The time sequences studied were processed in the MATLAB computer mathematical system using Burg's maximum entropy method at a window width of 40 [1].

There is a set of characteristic fluctuations in the spectra of the processes studied. Diurnal, semi-diurnal and 8-hour periodicities are characteristic of seismic noise and geomagnetic activity. The presence of other periods cannot be explained by simple speculation.

Most of the periods was found to be similar were close to the Earth's own oscillations [2, 3]. The revealed periods of radon exhalation in the village of Tsarevichi amounted to: 42.67, 18.29, 12.80, 9.48, 6.92, 5.69, 4.83, 4.27, 3.56, 3.28, 2.94, 2.56, 2.44, 2.33, 2.17 hrs, in

the city of Pitkaranta were 28.44, 12.80, 6.74, 5.69, 4.41, 4.00, 3.48, 3.01, 2.75, 2.51, 2.29, 2.19 hrs, in the Town of Solomennoye were 18.3, 10.7, 8.26, 7.11, 5.95, 5.12, 4.41, 3.66, 3.37, 3.05, 2.78, 2.39, 2.19, 2.10 hrs. Periods of intrinsic seismogravity oscillations detected in experiments were 6.03, 5.67, 4.75, 4.35, 4.01, 3.76, 3.60, 3.41, 3.21, 3.06 hrs [2]. Periods calculated by formula $\Omega \pm n\omega$, where frequency Ω corresponds to oscillations of the center of gravity of the Earth's core relative to the center of gravity of the mantle, ω — frequency of daily rotation of the Earth, were 23.37, 12.03, 8.07, 5.97, 4.80, 4.01, 3.43, 3.00, 2.66, 2.40, 2.18 hrs [3].

The modulating contribution of the Earth's own oscillations to seismic noise and geomagnetic variations is known, but it has been revealed for radon exhalation for the first time.

To explain it, the following mechanism is proposed. It is known that radon is supplied to subsurface ground layers and the atmosphere in hydrogen and methane bubbles. In contrast to methane, which carries radon at sites with the stubs of hydrocarbon clusters, hydrogen is a multiple-purpose carrier. Simultaneous variations in the ozone layer destroyed by hydrogen on dynamic maps indicate a common deep-seated source of hydrogen. The source is assumed to be provided by the Earth core. Fluctuations of the mass centre of the Earth core relative to that of the mantle modulate hydrogen degassing and though it radon exhalation, acoustic emission and geomagnetic variations.

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