

FEATURES OF THE ENERGY BALANCE OF THE HARMONICS OF THE GRAVITATIONAL AND INFRAGRAVITY RANGES

G.I. Dolgikh, S.G. Dolgikh

The article analyzes data on changes in the hydrosphere pressure of the gravitational and infra-gravitational ranges obtained using an ultra-sensitive sensor of variations in hydrosphere pressure installed at a depth of 25 m at the bottom on the shelf of the Sea of Japan. It is established that the change in the total energy of the harmonics of the sea waves of the infragravity range almost always correlates with the change in the total energy of the harmonics of the sea waves of the gravitational range. In rare cases, this is not the case, i.e. anticorrelation behavior is observed. The anticorrelation behavior of the total energy of the harmonics of the gravitational range and the total energy of the harmonics of the infragravity range is associated with the defocusing of the harmonics of the gravitational or infragravity ranges. The total energy of the harmonics of the gravitational range is always greater than the total energy of the harmonics of the infragravity range.

Key words: sea excitement, gravitational range, infragravitational range, focusing, defocusing, abnormal behavior

References

1. Dolgikh G.I., Dolgikh S.G., Shvets V.A., Yakovenko S.V. Features of the interaction of infragravity and wind sea waves. *Underwater investigations and robotics*. 2023. No. 2(44). PP. 57-66. DOI: 10.37102/1992-4429_2023_44_02_05. EDN: PAIRBR.
2. Alekseev A.V., Valentin D.I., Dolgikh G.I., Dolgikh S.G., Kovalev S.N., Koren I.A., Ovcharenko V.V., Kholodkevich E.D., Shvets V.A., Yakovenko S.V. Registration of infragravity waves at the hydrosphere-lithosphere boundary using coastal laser strainmeter. *Doklady Earth Sciences*. 2003. Vol. 389. No. 2. P. 291-293.
3. Christou M., Ewans K. Field Measurements of Rogue Water Waves. *J. Phys. Oceanogr.* 2014. Vol. 44. PP. 2317-2335.
4. Dolgikh G., Dolgikh S., Chupin V., Ovcharenko V., Shvets V., Yakovenko S. Registration of Nonlinear Hydrophysical Disturbances - Rogue Waves in Full-Scale Conditions. *J. Mar. Sci. Eng.* 2022, 10, 1997. <https://doi.org/10.3390/jmse10121997>.
5. Shurgalina E.G., Pelinovsky E.N. Development of freak swell wave in a weak wave field // *Fundam. Appl. Hydrophys.* 2012. 5. PP. 77-88.
6. Borisov S.V., Kabanov N.F., and Rutenko A.N. Experimental study of sound field fluctuations on fixed paths. *Acoustical Physics*. 1996. Vol. 42. PP. 347-358.
7. Dushaw, B.D.; Sagen, H.; Beszczynska-Möller, A. Sound speed as a proxy variable to temperature in Fram Strait. *J. Acoust. Soc. Am.* 2016, 140, 622-630.
8. Dolgikh G., Budrin S., Dolgikh S., Plotnikov A. Supersensitive Detector of Hydrosphere Pressure Variations. *Sensors*. 2020. Vol. 20(23). 6998. doi:10.3390/s20236998

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About the authors

DOLGIKH Grigory Ivanovich, Academician of the Russian Academy of Sciences, Professor, Doctor of Physical and Mathematical Sciences, Director.

Pacific Oceanological Institute Far Eastern Branch of the Russian Academy of Sciences.

Address: 43, Baltiyskaya st., Vladivostok, 690041, Russia

Research interests: waves, infrasound, sound, hydro- and seismoacoustics, physics of earthquakes and tsunamis, interaction of geospheres, natural oscillations of geospheres, linear and nonlinear processes, laser-interference systems.

Phone: +7(423)2311400, **fax:** +7(423)2312573

E-mail: dolgikh@poi.dvo.ru

ORCID: 0000-0002-2806-3834.

DOLGIKH Stanislav Grigorievich, Doctor of Technical Sciences, Head of Laboratory.

Pacific Oceanological Institute Far Eastern Branch of the Russian Academy of Sciences.

Address: 43, Baltiyskaya st., Vladivostok, 690041, Russia

Research interests: laser-interference measuring systems, Michelson interferometer, infrasonic oscillations, seismoacoustics, wave processes in the ocean, natural disasters

Phone: +7(423)2312598, **fax:** +7(423)2312573

E-mail: sdolgikh@poi.dvo.ru

ORCID: 0000-0001-9828-5929.