

APPLICATION OF LONG-TERM ARRAYS OF OCEANOLOGICAL DATA AND REFERENCE HYDROACOUSTIC SIGNALS FOR REFINING THE METHOD OF CALCULATING THE EFFECTIVE SOUND SPEED ON ACOUSTIC PATHS IN THE SEA OF OKHOTSK

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The article presents a multilevel methodology for calculating effective sound velocities on acoustic paths in the Sea of Okhotsk based on all available historical deep-sea oceanological information from 1929 to 2020 and reference underwater acoustic signals. Processing of long-term arrays of oceanological data revealed seasonal and interannual features of the formation of sound velocity fields in the sea and the rules for grouping and processing initial data on acoustic paths. A prognostic equation (with a lead time of at least two months) has been developed to predict the type ("warm", "normal", "cold") of the thermal regime of the waters of the cold subsurface layer of the Sea of Okhotsk, where an underwater sound channel is formed. Interannual variations of climatic indices of the atmosphere and ocean and interannual variations of local parameters in the system "Atmosphere-Ice-Ocean" of the Sea of Okhotsk and adjacent regions of the land, the Pacific Ocean and the Sea of Japan, are used as predictors of the prognostic equation. The implementation of the technique significantly reduces the error in calculating the effective sound velocities on acoustic paths based on oceanological observations. Its implementation will be most in-demand in an onboard computer of an autonomous underwater object performing a mission on a relatively vast area test site with significantly changeable hydrological conditions and values of effective sound velocities along acoustic paths.

Keywords: water temperature, speed of sound, underwater sound channel, oceanological data, seasonal and interannual variability.

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