Experimental reconstruction of shallow water parameters using data from vector receiver

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The report presents the results of solving the inverse problem of reconstructing the characteristics of an oceanic waveguide - velocity and density of the near-surface bottom layer, depth of the reservoir. A distinctive feature of the approach under consideration is the use of information about the spatial pressure attenuation, vertical components of the oscillatory velocity and acoustic power flow as initial scattering data. These data are measured using a vector receiver, which allows measuring orthogonal components of vibrational velocity. The results of numerical modeling and processing of the experiment carried out at the hydroacoustic test site of MSU are presented. The possibilities of sound velocity recovery in the considered scheme in the gas-saturated bottom, where its values can reach only a few hundred meters per second, are shown. Simultaneously with the parameters of the propagation medium it is possible to estimate the immersion depth of the source and the vector receiver, which in the general case may not be known exactly. A passing ship is used as a source, which simplifies the field experiment, as it does not require the use of specially positioned low-frequency emitters.

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