

Equipment for fisheries research

The test results of the Russian echo-sounder with split beam intended for resource researches on inland water

S. M. Goncharov, S. B. Popov, A. N. Dolgov, A. N. Kutsenkø, M. A. Raskin

¹ Russian Federal Research Institute of Fisheries and Oceanography (FSBSI «VNIRO»), Moscow² Vector Marine Electronics, Ltd («Vector»), Taganrog

Design of Russian scientific echo-sounder for resource researches is actual, especially after imposition of sanctions against the Russian Federation by the western countries, when sale of different foreign high-tech products was prohibited in Russia. Besides buying foreign equipment which is allowed for sale in the Russian Federation, our users don't have opportunity to contact with the western partners as well as don't have possibilities to modernize and improve purchased equipment. This article presents short technical characteristics of new russian small-sized echo-sounder model, named MIEL. For testing of new echo-sounder there was carried out hydroacoustic survey, also using scientific Simrad EY-500 echo-sounder on Vazuza basin in autumn 2018. The EY-500 echo-sounder was chosen as reference standard device as many years it was used by many Russian and foreign scientific organizations for resource researches on inland water. Fish school and single fish which were registered by EY-500 and MIEL echo-sounder were completely identical. Completeness and convenience of information provided on the MIEL screen was significantly higher than the information, presented by EY-500 echo-sounder. Also it should be noted the high extent of results coincidence of echo-counting and fish TS. Estimated lower cost of new Russian echo-sounder as well as its high technical characteristics which are well-compared with foreign analogues, and in some parameters surpassing them, compactness, makes this model more available and attractive for solution of fisheries and environmental problems.

Keywords: scientific echo-sounder, hydroacoustic survey, quantitative estimation, echo-integration, echo-counting, resource researches.

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TABLE CAPTIONS

Table 1. Calculations results of mean volume backscattering strength on each transect of hydro-acoustic survey according to echo-sounders MIEL and EY-500 data

Table 2. Calculations results of target strength average value T_{mean} and fish length L_{mean} on each transect of hydro-acoustic survey

FIGURE CAPTIONS

Fig. 1. Photo of russian echo-sounder MIEL containing computer, transducer and split beam antenna

Fig. 2. Scientific Norwegian echo-sounder Simrad EY-500

Fig. 3. Fragment of caring out MIEL calibration

Fig. 4. Transects scheme of echo-survey

Fig. 5. Echogram fragment on MIEL display and location of single fish in the echo-sounder beam in three-dimensional projection during echo-signal reception

Fig. 6. Echogram fragment on MIEL display, value of surface density on current integration interval — 24222 pieces / hectare, number of fish — 146 pieces in the layer, selected by green lines, as well as histograms of dimensional distribution of roach with 5cm modal value

Fig. 7. EY500 echogram example (upper part) MIEL echogram example (lower part) of small fish school and single fish in EchoView software

Fig. 8. Histogram of distribution TS fish according to echo-sounders MIEL and EY500 data, calculating on all route of hydro-acoustic survey