

The use of airplane-lidar for registration of fish schools and plankton

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Abstract

The main advantage of the remote sensing lidar method is the potential to acquire data from oceanic subsurface layers, including the recording of phytoplankton and zooplankton layers, pelagic fish schools and transparency of water. The maximum depth for registering fish schools and plankton by airplane-lidar is equal to 30–40 m for the Barents Sea and Sea of Okhotsk.

The development of identification methods for recording schools of organisms (pelagic fishes, medusae, phytoplankton, zooplankton) is the main task in the practical use of airborne lidar surveys. The analysis of lidar data shows that each organism object has a specific combination of parameters and types of correlation with each other. So, a system of signatures for object identification is being designed.

A set of criteria is developing in several directions:

- The analysis of full-scale research results applying aerial and vessel lidars supplied with the data from accompanying observations;
- the conducting of full-scale nature and laboratory experiments with certain objects, first with fish and plankton to determine their characteristics of reflection, scattering and depolarization of light;
- The development of specific software for the visualization of laser sounding data and calculation of light scattering layer parameters and single signals.

The algorithms for efficient object identification in real-time surveying of the marine area are under development.