

Methods of hadal research with the use of different types of underwater vehicles and related equipment

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During last years, many great discoveries were done in world ocean. Most essential from them – discovery of hydrothermal fields on ocean floor. Besides that, great jump was done in practical development of oceanic depths in aspect of the searching of mineral and energy recourses and of the mining of them. It was came possible thanks to implementation of new technical means, mainly of underwater vehicles.

Most of discoveries in the World Ocean were done on the depths 6000 m and less, because these areas are available for existing equipment, which is in the hands of the researchers in different countries. During multi-years operations were developed several methods and different interactions between different types of the vehicles, which were confirmed as most effective and productive for scientific research and special technical underwater operations. These methods, used for most area of the ocean with the depth less than 6000 m can be used for hadal research with new equipment and vehicles, calculated for maximum depth of the ocean.

If to put glance back, the first investigations of the hadal research were done with the samplers and measuring devices, deployed from the board of research vessels. But most essential discoveries of XXth and XXIst centuries were done by the use of underwater vehicles. Contemporary vehicles subdivided on deep manned submersibles (DMS), remotely operated vehicles, deep towed vehicles (DTV), autonomous underwater vehicles (AUV). As practice showed, most effective combination is the use of DTW on first leg of the research for the searching of the objects and small areas, which are most interesting for science; and the use of DMS on the second leg – for detail research of the area.

Second important problem: what kind of the vehicles: DMSs or ROVs are most effective for detail scientific research. This question is considered also in this paper. The preference is given to DMSs, but in some situations, ROVs could be used as well, particular in combination with DMSs.

In the paper different concrete examples of the vehicles, their combinations and use are described.