

海洋地球物理研究与海底探测声学技术的发展

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摘要 海洋地球物理以物理学的思维与方法研究占地球三分之二面积的海洋系统.20世纪地球科学迅猛发展, 它的重大进展是海底扩张说与板块构造说的出现和海底大洋的发现, 以及前者所引发的地球科学思想革命, 从固定论向活动论的思维转变.海底研究对于20世纪地球科学发展的贡献极为巨大, 而海洋地球物理是推动海底科学研究的重要原动力.海洋地球物理在20世纪地球科学的发展中有过辉煌的成就, 占有十分重要的地位; 在新的21世纪里, 海洋地球物理研究仍然保持着前沿科学的地位, 继续推动着地球科学的进展.目前的海底探测主要还是依赖于声学探测技术.水下声学定位技术是实现水下探测系统精确定位和海底高精度探测的基础.传统性的海洋地震探测技术是研究海底构造与海洋岩石圈深部结构和寻找海底矿产的主力技术, 它近年来无论在海上采集技术还是数据处理技术方面都发展得很快.多波束测深、侧扫声呐测图和海底地层剖面测量等则是近数十年快速发展起来探测海底浅部结构信息的技术.这些技术已经在当代海底科学研究、海底资源勘查、海洋工程和海洋开发, 以及海洋军事活动等方面发挥出极其重要的作用.

关键词 [海洋地球物理海底科学海底探测声学技术](#)

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The development of research in marine geophysics and acoustic technology for submarine exploration

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Abstract The marine geophysics studies marine system over 2/3 of Earth's surface with philosophy and methodology of physics. The geosciences have been developed violently at 20th century. The epoch\making advances in geosciences are the appearance of seafloor spreading—plate tectonics hypothesis and the discovery of subseafloor ocean. The hypothesis of seafloor spreading—plate tectonics initiated the evolution in philosophy of geosciences, the transform in ideology from fixism to mobilism. The study of submarine geosciences has great contribution to progress in geosciences, and the marine geophysics is the motive power to promote the research in submarine geosciences. Marine geophysics has brilliant achievements and takes important place in the development of geosciences at 20th century. In new century, marine geophysics still keeps the position of front science.The submarine exploration is depended mainly on the acoustic technique so far. The underwater acoustic positioning technique such as ultra\short base line, short base line, and long baseline is the basis of the precise position fixing for underwater exploration system and submarine vehicles. In traditional technique of marine seismic exploration as capital technique to study the tectonics of seafloor and the deep structures of oceanic lithosphere, not only the data\acquisition but the data\processing techniques also have been progressed rapidly. The developed in last few ten years new acoustic techniques for submarine detecting structures of seafloor upper part are multi\beam sounding technique, side\scan sonar technique, and sub\bottom profiling technique. All these techniques play important role in submarine scientific research, submarine resources exploration, marine engineering, marine exploitation and activities of marine military.

Key words

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