Japan

JAMSTEC: Present and Future

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Summary. The Japan Marine Science and Technology Center (JAMSTEC) was incorporated in 1971 as a general oceanographic institution, its management coming under the general supervision of the Science and Technology Agency (STA). Besides the Administration Department, it has, for research and development work, the Deep-Sea Research Department, the Deep-Sea Technology Department, the Ocean Research Department, and the Marine Development Research Department. For fleet operations, there is the Ship Operations Department. Since its establishment, JAMSTEC has been actively engaged in basic and pioneer-type R&D projects, shared use of large-scale facilities, educational and training programs, and technical library and information services, thereby contributing to the development of Japan’s oceanic science and technology.

Some of the primary achievements of JAMSTEC to date are as follows: On the sea floor of the continental shelf with depths of up to 300 m, the temperature is relatively constant throughout the year, so that it is possible to create a high-pressure environment utilizing the ambient water pressure. This sea floor space on the continental shelf can be effectively utilized if humans can be made to work there directly. JAMSTEC has been engaged in developing this diving technology under the “New Seatopia” Project, and has carried out psychological and physiological studies during dives. For the next step, we aim at developing a comprehensive system for underwater work employing unmanned technology to the maximum degree possible.
JAMSTEC took note of the energy of waves existing naturally on the sea surface and carried out a series of sea trials for effective use of this energy via the experimental power generation system “KAIMEI.” The experiment demonstrated the practicability of developing large wave power generation systems and established a design method for an economical KAIMEI-type wave power generation system. Based on this research experience, JAMSTEC now aims to develop technologies to calm the sea area behind a system designed for efficient wave energy utilization, to help improve the environment of the sea area.

The oceans of the world have an average depth of about 3,800 m. In other words, our earth is covered mostly by those deep oceans and seas. We are thus called to uncover the realities of the deep sea. JAMSTEC has engaged in the development of tools necessary for deep-sea research in forms of manned and unmanned submersible systems. For manned submersibles, we have the “SHINKAI 2000,” with a depth capability of up to 2,000 m, and the “SHINKAI 6500,” with a depth capability of up to 6,500 m, currently the world’s deepest. For unmanned probing, we have the “Dolphin 3K,” with a depth capability of up to 3,300 m. All of these submersibles are in active service now, and the discoveries of hydrothermal phenomena in the Okinawa Trough and of active black-smoker spurts in the same area are a few examples that demonstrate their utility. Also, JAMSTEC is engaged in basic studies of deep-sea organisms growing in those environments where such phenomena are observed.

JAMSTEC is also attempting to understand the dynamic processes of the ocean. Our efforts include studies on large-scale oceanic change phenomena and the development of technologies required for carrying out such studies, e.g., ocean acoustic tomography and ocean laser profiling. We are also participating in the joint international programs of TOGA, WOCE, and JGOFS.

With the twenty-first century now in perspective, JAMSTEC’s emphasis in the years to come will be on the development of comprehensive research and development programs. We will aim at deep-sea research which will, by utilizing our state-of-the-art equipment such as the SHINKAI 6500, hopefully result in achievements worthy of world recognition. We expect to pursue observation programs which are global and comprehensive. Regarding areas of research and development, we will need to establish priorities taking into consideration the situation anticipated 10 years from now. We will also need to take special measures to give effective support to these programs. For the immediate future, we consider the following appropriate as our priority areas of research: (1) deep-sea surveys and research, (2) ocean observation, and (3) coastal sea area development and utilization. We also consider the following important as our basic approaches to promote our work: (1) establishing long-term and specific research objectives, (2) ocean observations, (3) balance between science and engineering; (4) JAMSTEC functioning more like a “center of excellence” in ocean research and development, (5) strengthening the environment to support research work, and (6) cooperation with other organizations including participation in joint international programs.