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Development of deep-sea observation equipments for precise magnetic and electrical explorations

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It is basically not easy to obtain the fine-scale structure of the oceanic crust with accuracy better than several tens of meters, because the deep sea prevents us from approaching the bottom in most parts of the oceans. The necessity of such detailed information, however, has been increased in researches and developments of the sea floor. For instance, it is essential in development of seabed resources like sea-floor hydrothermal deposits and methane hydrate in order to estimate accurate abundance of those resources. Therefore, it is very important to develop some equipment for precise measurement of the oceanic crust. In accordance with this idea, we have developed new deep-sea observation equipments of high-precision by magnetic and electrical methods especially for the exploration of the sea-floor hydrothermal deposits. In our project, we are working on research and development regarding measurement of the magnetic field with high resolution and high sampling rate, electrical exploration with accurately controlled source signals, electrical exploration tools for shallow and deep targets, versatile instruments of electrical and magnetic explorations with multi-platforms (deep-tow system, ROV (Remotely Operated Vehicle), and AUV (Automated Underwater Vehicle)), comprehensive analyses of electrical, magnetic, acoustic and thermal data, and so on. We finished basic designs of the magnetic and electrical observation systems last year, and we are now manufacturing each instrument. Several performance tests of those systems will be conducted in sea areas. We will present the outline and the current state of the project in this presentation. Note that this project has been supported by MEXT.