

Seafloor electromagnetic observation and recent application for imaging sub-seafloor structure

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Abrupt changes of geomagnetic field can yield damages to pipelines, cables and other architectures. For understanding the phenomena and future risks, geomagnetic observations and exploration of sub-surface resistivity structure are necessary. Here, I introduce the seafloor electromagnetic observations: the observation techniques and recent examples of the application for evaluating sub-seafloor resistivity structure.

Mainly, the seafloor observation was conducted by using OBEMs: ocean-bottom electromagnetometers. OBEM can records the fluctuations of geomagnetic and induced electric field on the seafloor. Although the high frequency components could not be recorded due to high attenuation in the conductive sea layer, the low frequency components (e.g., less than 0.1 Hz typically) can be observed on the seafloor with water depth of several thousand meters. The obtained electromagnetic field can be analyzed for imaging sub-seafloor resistivity structure. In addition to the natural electromagnetic field, a controlled artificial electromagnetic signal can be used for imaging shallow sub-seafloor structures. The survey is now expanded to various fields: for finding energy and mineral resources, imaging active faults and submarine magmatic activities, etc.

In my talk, I review the techniques to observe electromagnetic field on seafloor, and recent topics related to sub-seafloor resistivity explorations briefly.

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