

Very Low-frequency Source of Long-term Operation for Monitoring Global Ocean Variability

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Abstract

This paper describes long-term operating tests of the unit of the source and conceptual design of very low frequency sources below 30 Hz for monitoring global ocean variability of 10 Mm scale in long-term observation over a decade. An accelerated operating test of the driving units was conducted in a short period equivalent to ten years of 70 Hz source. Variation of strain, impedance and displacement-current sensitivity of five driving units were measured every 10,000 cycle drives. As a result, it was found that there was no significant variation for these parameters during the experiments. Then, the conceptual design of two types of very low frequency sources is shown. One is an ordinary barrel type using several giant magnetostrictive rods with larger diameter and larger pre-stress than the present 200 Hz source. Another is a bender bar type source constructed with giant magnetostrictive plates. The latter is expected to have a smaller size than the former because the displacement of bending plates can be larger than rods. Some theoretical results are shown.