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Submarine Cable Voltage Measurement between Okinawa and Taiwan for Monitoring the Kuroshio Volume Transport

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ABSTRACT

The submarine telephone cable voltage has been observed between Okinawa and Taiwan for monitoring the Kuroshio volume transport. The submarine cable crosses the Kuroshio near the entrance into the East China Sea. We started the preliminary voltage measurement from the Okinawa cable landing site in March 1993. The submarine cable (Oki-Tai cable) is still in operation and is powered by a nearly constant electric current with high voltage power supplies at both of the cable landing sites. To get the full set of the cable voltage information we also started the voltage and current measurements from the Taiwan landing site in April 1995. Observations show the overlapped voltage variations are induced by geomagnetic field changes, tidal currents, longer-period ocean currents like the Kuroshio, unsteadiness of the cable power supply system, etc. This paper shows our preliminary results of the measurements and discusses the possibility of monitoring the Kuroshio volume transport using the Oki-Tai cable at the entrance into the East China Sea.

(Keywords: Kuroshio, submarine cable, voltage measurement, volume transport)

INTRODUCTION

The ocean transection between Okinawa (Ishigaki Island) and Taiwan is one of the most effective sections to monitor the Kuroshio transport variability. The Kuroshio flows into the East China Sea through the transection between Okinawa and Taiwan as shown in Fig. 1. However, direct long-term current measurements in the strong Kuroshio region will be difficult to maintain. Fortunately, a co-axial submarine telephone cable (Oki-Tai cable) runs near the transection also seen in Fig. 1.

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