

Observation of sea floor vertical motion at the Boso slow slip region

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1. Introduction

To mitigate earthquake hazards, it is important to understand earthquake generation processes and forecast earthquakes through numerical simulation using earthquake generation models. To assess the models, we make a forecast of the next step by the models, then check this through observations, and make correction in the models. We should continue this revising process in several times. Since earthquakes have long recurrence time, we need usually hundreds or thousands years to assess the models. The Boso slow slip events (SSE) have short recurrence time as a few years, and locate in a depth where earthquakes occur (about 10-20 km). Hence, we can obtain data for two or three SSE cycles and assess the models within 10-15 years, if we may be able to treat earthquakes and slow events as events of the same category. The present observation is the first step of this assessment process. From vertical movement on the sea floor using ocean bottom pressure gauges (OBPs), we investigate the slip area of the Boso SSE.

2. Observation and analyses

We conducted an ocean bottom pressure survey at the southeast area of the Boso SSE from September 2013 to July 2015 using R/V Hakuho-maru and R/V Natsushima of JAMSTEC. In this survey period, the Boso SSE occurred from December 2013 to January 2014. We used three OBPs made by ERI, University of Tokyo, with a pressure gauge, 8B2000-2 or 8B7000-2 by Paroscientific Inc., and recorders equipped an atomic clock, SA.45s CSAC by Microsemi Co.

In analyses, we conduct transformation from pressure data to depth data, at first. Then, resampling, removal of tide components, estimation of correlation component with temperature, estimation of oceanic fluctuation from correlation between observation stations, smoothing, and removal of long-term trend due to instrumental aging are performed on the data. From these analyses, we try to estimate vertical movement on the sea floor.

3. Results

The estimated movement before and after the 2013-2014 Boso SSE shows no significant movement larger than the standard deviation of the estimated vertical movement.

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