Activity of low-frequency tremors during long-term SSE in the Bungo channel, southwest Japan

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Low-frequency tremor occurs in a non-volcanic region in southwest Japan. Bungo channel is one of the most active region of tremors. In this region, tremor activities with a few days occur about every two month, and activities with a few weeks occur coupled with those in western Shikoku every six month. Additionally, long-term slow slip events (SSE) over a year were detected in 1997 and in 2003. In this study, we examine tremor activities from (1) July 1997 to April 1998 and (2) August 2003 to June 2004, to investigate the relationship between tremors and long-term SSE in this region. Furthermore, we divided each period into accelerate term and decelerate term of SSE based on Ozawa et al. (2007), and compared with tremor activities in each term.

In this study, we detected tremor activities by using analysis method of our automatic tremor monitoring system (ATMOS). We used vertical components of continuous seismic records from 9 station installed by Japanese Meteorological Agency (JMA) and some universities in (1), and 14 station of Hi-net in (2). Difference of detection ability cause by such difference of station distribution made equal by adjusting detection parameters.

There are some common and difference between tremor activities during 1997 and 2003 SSE. In decelerate term, tremors occur about every two month and similar to those in term no SSE occurred. On the other, in accelerate term, tremors occur continuously. These are commonly observed in two SSEs. However, comparing number of tremors in the accelerate term, in 1997 number of tremor increase gradually, while in 2003 that increase rapidly and decrease gradually. Although time-space evolution of slip area was different between 1997 and 2003 SSE (Ozawa et al., 2007), corresponding variation of tremor source distribution was not observed.

Consequently, continuous occurrence of tremors in SSE accelerate term might be a characteristic of tremor activities during long-term SSE in the Bungo channel.