

Activity of low-frequency tremors occurred in the east Shikoku region

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Low-frequency tremors occur in a non-volcanic region in southwest Japan. Their epicenters show a beltlike distribution along the subducting Philippine Sea plate over a length of 600 km. The distribution is by no means uniform but can be grouped into six regions, each of which spans with the length of 50 ~ 100 km along the subduction. Tremors occur synchronously in each region, and their activities have a quasi-periodicity with the interval of two to six months. In this study, I researched temporal and spatial characteristics of tremor activities in the east Shikoku region from an analysis of records from short-period seismographs. I analyzed two active periods from June 2003 to September 2003. And I studied five active periods during one year which includes three active periods analyzed before.

I studied temporal variations in each of five activities by measuring tremor durations with visual inspection of seismic waveforms. The result shows that tremor activity can be categorized into two groups in terms of temporal variation: gradual growth and rapid decay, and rapid growth and gradual decay.

To study spatial variations I made hypocenter determination by using a conventional traveltime method and a new method based on cross-correlation diagram of waveforms. Epicenter distributions determined by using the conventional method show that in most cases tremor source migrate slowly with a velocity of about 10 km/day. In particular, migration is most evident in the most active portion in each activity. Migration directions are either west to east or east to west. Also I observed that tremor source migrates with a high velocity of about 40 km/hour. This fast migration was consistently obtained both by the conventional hypocenter determination and by the method based on cross-correlation diagram. The fast migration, however, may be an exotic phenomenon since I observed it only in the special tremor activity that might be triggered by an nearby earthquake; whether fast migration occurs or not may depend on whether tremor activity is triggered by an ordinary earthquake or not.

I suggest that stress accumulation-release process of low-frequency tremors relate to periodicity and migration.