Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

SCG64-18 Room:501 Time:April 30 17:00-17:15

Activity characteristics of deep very low frequency earthquake and asperity structure

NIZATO, Taro[1] ; SUDA, Naoki[1*] ; MATSUZAWA, Takanori[2]

[1]Hiroshima Univ., [2]NIED

Deep very low frequency earthquake (VLF) and deep nonvolcanic tremor (NVT) concurrently occur with short-time slow slip event (SSE) in the Nankai subduction zone. Among them VLF is least known since seismic records are usually noisy at dominant periods of VLF signals (20-50 sec). We have developed a new grid-based method for monitoring VLF activity in the Nankai subduction zone. In this method we assume that VLF occurs at equally-spaced grids on model plate boundary, and that VLF at each grid has a fixed source mechanism predetermined from plate boundary model and observed plate convergence direction. Previous studies have used the grid moment-tensor method in which depth and source mechanism are freely determined. These parameters are predetermined in the present method, so that it is expected that small VLFs can be detected even from low S/N records.

As a preliminary study we analyzed Hi-net accelerometer records for two activities in western Shikoku in September 2006 and March 2007. We detected a large number of VLFs compared with previous studies, and observed the following characteristics: (1) Some VLF occurrences were rapidly activated than NVT occurrences, and VLF activity highs were sometimes delayed relative to NVT activity high, (2) There was an NVT cluster with or without VLF depending on activity, (3) Rapid tremor reversals are associated with VLFs, (4) Clusters with maximum moment release were different between VLF and NVT, (5) The cluster of maximum VLF moment release was located in the updip portion next to the region of maximum SSE moment release. Some of these characteristics can be explained by a nested or fractal asperity model, in which small NVT asperities are contained in a VLF asperity.

Keywords: Nankai subduction zone, slow earthquake, very low frequency earthquake, nonvolcanic tremor, automatic detection, asperity