SCG63-P01   Room:Convention Hall   Time:May 20 15:30-17:00

Non-volcanic low frequency tremors at Kii channel detected by vertical seismic array network (VA-net)

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In 2007, Geological Survey of Japan has started an integrated borehole observation (water levels, strains, seismic waves etc.) in southwest Japan for forecasting the Tonankai and Nankai megathrust earthquakes. At present, 14 stations are in operation. Each site has three level vertical seismic array. We developed a high sensitive detection method (Vertical Seismic Array Detection: VSAD) of non-volcanic low frequency tremors (NVTs) using the three level vertical seismic array network, VA-net, and demonstrated that the method enables us to detect minor NVTs which cannot be identified by a conventional envelope cross-correlation method (Imanishi et al., 2011).

The spatial distribution of the NVTs in southwest Japan is not uniform and has some clear gap areas of activities (e.g., Obara, 2010). On the basis of the VSAD method, Takeda et al. (2011) succeeded in detecting NVTs in Ise Bay, which is one of major gap regions of NVT activities. In this study, we report the NVT activities in another major gap region, Kii Channel, that was detected by the VSAD method.

We analyzed vertical seismic array waveforms of our observatory in Anan city of Tokushima prefecture, which faces Kii Channel. The VSAD method was applied over the last three and a half years. It is noted that large activities of long duration were not recognized, while small activities lasting a few minute were frequently detected. We determined epicenters of these NVTs by using manually picked S-wave arrival times and found that these events are located to the northeast of Anan city.

References:
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Keywords: vertical seismic array, VA-net, Non-volcanic low frequency tremor, Kii channel