

# **Low-Frequency Submarine Volcanic Swarms at the Southwestern End of the Okinawa Trough**

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## **Abstract**

A low-frequency (LF) submarine volcanic swarm has been first observed at the southwestern end of the Okinawa Trough where some submarine volcanoes have recently been identified. A swarm of more than 24 earthquakes was recorded at land seismic stations in Taiwan between September 1st and September 4th, 2006. These earthquakes without clear S-arrivals were substantially different from other abundant tectonic earthquakes in the area. The dominant frequency of around 1 or 2 Hz recorded at all stations shows that the LF seismograms were generated by neither path nor site effects, but directly from the source. Based on seismic characteristics including low frequency contents, the absence of the S-waves and long durations, these LF earthquakes can be characterized as B-type volcanic earthquakes, which were in fact observed before the eruptions of the 1991 Pinatubo, Philippines and the 1989 submarine Teishi Knoll, Japan. The observations of these LF volcanic earthquakes beneath submarine volcanic cones and seamounts are strong indicator that some submarine volcanoes are still active at the southwestern end of the Okinawa Trough. Therefore, further seismic monitoring, such as with the submarine cable-OBS, would be extremely valuable to monitor potential eruptions in submarine volcanoes in the southwestern end of the OT that might generate tsunamis and probably affect all cities near the coastline in Taiwan, Japan, China and even Korea.