

Cruise Summary

1. Cruise Information

- Cruise ID: YK14-05
- Name of vessel: R/V Yokosuka & submersible Shinkai6500
- Title of the cruise: Lithospheric structures and petit-spot volcanoes
- Chief scientist [Affiliation]: Naoto Hirano [Tohoku University]
- Representative of the Science Party [Affiliation]: Naoto Hirano [Tohoku University]
- Title of proposal: Petit-spot distributions along deformation of subducting plate
- Cruise period: April 10 to 24, 2014
- Ports of call: from Yokosuka to Funabashi
- Research area: Northwestern Pacific

2. Overview of the Observation

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Submarine tiny volcanoes, petit-spots, occur on regions of plate flexure prior to subduction (Hirano et al., 2006, 2013). The magmas produced by the melt-accumulation originating from asthenosphere just below the site of plate-flexure, are able to rapidly ascend to the surface from the base of the lithosphere (Valentine & Hirano, 2011). Such tiny volcanoes are ubiquitous in regions of plate flexure worldwide, and have been recently reported from the Tonga Trench (Hirano et al., 2008), south of Greenland (Uenzelmann-Neben et al., 2012), the Chile Trench (Hirano et al., 2013), an accretionary complex in Costa Rica (Buchs et al., 2013), and the Java Trench (Taneja et al., 2014).

The surface morphology and distribution of petit-spot monogenetic volcanoes are influenced by the stress field in the lithosphere. Although previously surveyed areas are limited to the regions off the Japan Trench, and the eruptions are related to the outer rise bathymetry. However, areas devoid of volcanoes and lava have been found surrounding areas of petit-spot volcanoes (i.e., sites A–C in Hirano et al., 2006), indicating that the local characteristics of the lithosphere, in addition to plate flexure, control the occurrence of petit-spot volcanoes. We conducted the nine submersible dives on ten petit-spot volcanoes along the linearly distributed more than eighty petit-spot knolls (Hirano et al., 2008) by JAMSTEC Shinkai6500 in April 2014. Volcanoes are old and young each based on preliminary palagonitic thickness of altered glasses on lava's surface. We are going to recognize the eruption ages and subsurface structures of subducting lithosphere.