

[JJ] Evening Poster | S (Solid Earth Sciences) | S-VC Volcanology

[S-VC44]Magmatism and volcanic dynamics on subduction zone

convener:Yujiro Suzuki(Earthquake Research Institute, The University of Tokyo), Hitomi Nakamura(Department of Solid Earth Geochemistry, Japan Agency for Marine-Earth Science and Technology), Yu Iriyama(国立研究開発法人 防災科学技術研究所)

Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Subduction zones are characterized by magmatism and volcanism caused by magma generation, magma transportation and storage, and volcanic eruption. These magmatic process and volcanic dynamics have been investigated using laboratory experiments and sophisticated numerical modelings. Recent progress of observation techniques has revealed the structures under volcanoes. Besides, the studies based on seismological observations and geochemical analyses try to determine the spatial and temporal scale of magmatic activity and explain the process of magma generation. This session aims to discuss the latest studies about magmatism and volcanic dynamics from various perspectives and integrate these understandings.

[SVC44-P01]An electrical resistivity profile along Murakami & Soma city, across the NE Japan arc

*Aoi Motoyama¹, Hideaki Hase², Makoto Uyeshima³, Takao Koyama³, Shin'ya Sakanaka⁶, Yusuke Yamaya⁴, Koki Aizawa⁵, Masahiro Ichiki¹, Yasuo Ogawa⁷ (1.Graduate school of science, Tohoku university, 2.Geothermal Energy Research &Development Co., Ltd, 3.Earthquake research institute, the university of Tokyo, 4.National institute of advanced industrial science and technology, 5.Graduate school of science, Kyusyu university, 6.Graduate School of International Resource Sciences Department of Earth Resource Engineering and Environmental Science, Akita University, 7.Volcanic Fluid Research Center, School of Science, Tokyo Institute of Technology)

Keywords:resistivity, geofluids, magnetotellurics

Mount. St. Helens locates at obviously fore-arc side from the volcanic front. Moreover, it is well known that the crustal seismicity have turned active around the Iwaki city and the northern Ibaraki prefecture since the 2011 off the Pacific coast of Tohoku Earthquake (the 2011 Tohoku earthquake), which is considered to be caused by transport of crustal fluids. These results indicate geofluids rise up to the crust beneath some areas of fore-arc from uppermost mantle. The crust beneath the fore-arc around the border of Miyagi and Fukushima prefecture could store geofluids transported from uppermost mantle.

Ohzono et al. (2012) estimated the coseismic strain response of the 2011 Tohoku Earthquake, and found the extension deficit region (EDR) along Ou-Backbone Range (OBR). They interpreted the EDR was ascribed to low viscosity in the lower crust induced by fluid-flow upwelled from uppermost mantle. The EDR runs towards fore-arc side around the border of Miyagi and Fukushima prefecture, and, therefore, we could expect fluid presence in the lower crust beneath the fore-arc side around Miyagi-Fukushima border. On the other hand, Miura et al. (2004) estimated the strain rate during an interseismic period between 1997-2001, and found strain concentration (shortening) around OBR, but relatively extension around the fore-arc of Miyagi-Fukushima border.

In this study, we model two-dimensional electrical resistivity profile along Murakami & Soma city, where passes the Miyagi-Fukushima border, to investigate fluid presence in the lower crust beneath the fore-arc region of NE Japan arc.

Magnetotelluric (MT) method is used to model the electrical resistivity profile. The electrical time variation data were acquired at 26 observation site along Murakami & Souma in Sep. 12th to Nov. 30th, 2010. Typical observation duration was 10 to 23 days per site. We got 32 Hz (all time) and 1024 Hz (2:00-2:45 JST) sampling data..

The MT response function was estimated using Bounded Influence, Remote Reference Processing (BIRRP, e.g. Chave & Thomson., 2004). The 0.01~1.5 s, 2~100 s and over 100 s period range of the response function was calculated from 1024 Hz, 32 Hz and 1 Hz sampling data, respectively. Obtained the response function, we calculated phase tensor (Caldwell et al., 2004) and its determinant Φ_{12} . The pseudo section of Φ_{12} represents almost 45° beneath fore-arc in all period range. The result indicates no obvious conductor in the crust and uppermost mantle beneath the fore-arc region around the border of Miyagi-Fukushima prefecture. On the other hand, the Φ_{12} is much larger than 45° in the 10~1000 s period range beneath around OBR, where an obvious conductor presence is expected in the deeper crust to uppermost mantle.

We found that the MT response data were affected by galvanic distortion, and will apply Groom-Bailey (G-B; Groom & Bailey, 1989) decomposition to the response data. In this presentation, we will show a two-dimensional electrical resistivity profile calculated from the MT response to which the G-B decomposition applies.