

## Toward unveiling the volcanic system of Izu-Oshima island by jointing the grounded and ocean bottom electromagnetic data

Tatsuto Oishi<sup>1</sup>, Takao Koyama<sup>2</sup>, Makoto Uyeshima<sup>3</sup>, Kiyoshi Baba<sup>4</sup>, Yoshiya Usui<sup>5</sup>, Noriko Tada<sup>6</sup> and Satoru Tanaka<sup>7</sup>

<sup>1</sup>Earthquake Research Institute, the University of Tokyo, [t-oishi@eri.u-tokyo.ac.jp](mailto:t-oishi@eri.u-tokyo.ac.jp)

<sup>2</sup>Earthquake Research Institute, the University of Tokyo, [tkoyama@eri.u-tokyo.ac.jp](mailto:tkoyama@eri.u-tokyo.ac.jp)

<sup>3</sup>Earthquake Research Institute, the University of Tokyo, [uyeshima@eri.u-tokyo.ac.jp](mailto:uyeshima@eri.u-tokyo.ac.jp)

<sup>4</sup>Earthquake Research Institute, the University of Tokyo, [kbaba@eri.u-tokyo.ac.jp](mailto:kbaba@eri.u-tokyo.ac.jp)

<sup>5</sup>Earthquake Research Institute, the University of Tokyo, [yusui@g.ecc.u-tokyo.ac.jp](mailto:yusui@g.ecc.u-tokyo.ac.jp)

<sup>6</sup>Japan Agency for Marine-Earth Science and Technology, [norikot@jamstec.go.jp](mailto:norikot@jamstec.go.jp)

<sup>7</sup>Japan Agency for Marine-Earth Science and Technology, [stan@jamstec.go.jp](mailto:stan@jamstec.go.jp)

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### SUMMARY

Izu-Oshima is an active island volcano in Japan that erupts about every 35 years. The latest eruption occurred in 1986, and it is probable that it will erupt in the near future. Thus, it is important to understand the subsurface structure of Izu-Oshima.

Magnetotelluric (MT) surveys are effective tools for investigating the existence of magma within a volcano. In 2021-2022, Earthquake Research Institute, the University of Tokyo (ERI) and Japan Agency for Marine-Earth Science and Technology (JAMSTEC) conducted joint land and marine MT observations around Izu-Oshima. The land data were obtained at 11 sites on Izu-Oshima for about 40 days, with sampling frequencies of 32 Hz and 1024 Hz. The marine data were obtained at 7 sites (although we initially deployed OBEM at 10 sites) on the seafloor around Izu-Oshima for about one year, with sampling frequencies of 8 Hz and 0.1 Hz. In this study, we use these data to apply 3D inversion and aim to estimate the resistivity structure of Izu-Oshima.

First, we performed a time-series analysis to calculate impedance tensor of land data by using BIRRP (Bounded Influence Remote Reference Processing) (Chave and Thomson, 2004).

Second, we calculated the phase tensor. The electrical conductivity gradient (the average of the maximum and minimum values of the singular values of the phase tensor) is large at the summit observation site. The results suggests that the low resistivity zone exists just below the summit caldera. In addition, the impedance skew angle is larger than  $3^\circ$  at many frequencies for all land observation sites, which indicate that the subsurface resistivity structure is 3-D.

Therefore, using these observed data, we will perform the 3-D inversion to estimate the subsurface resistivity structure of Izu-Oshima. Based on them, in this presentation, we will discuss the volcanic system of Izu-Oshima.

### Keywords:

- Izu-Oshima
  - Land and marine MT observation
  - 3-D inversion
  - Resistivity structure
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