

The magma system beneath Changbaishan-Tianchi Volcano, China/North Korea: constraints from three-dimensional magnetotelluric imaging

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SUMMARY

Changbaishan-Tianchi volcano is a potentially hazardous intraplate volcano, and has gained increasing concern because of its volcanic unrest between 2002 and 2006. However, the magma system beneath this volcano is not well understood yet. Electrical resistivity is highly sensitive to the presence of interconnected partial melt and/or saline fluid. A total of 41 magnetotelluric (MT) sites were occupied along a ~120 km profile crossing the Tianchi volcano. Both broadband and long period MT data were collected for each site. A crustal and uppermost mantle resistivity model was constructed by three-dimensional (3D) inversion of the quality off-diagonal impedance of MT data. Beneath the volcano, the model shows three spatial consistent high conductive zones at a depth of 3–5, 10–16 and 40–60 km, separately. Melt fraction of 6–8% is required to interpret the uppermost mantle high conductive anomaly, which might be caused by the decompression melting of upwelling asthenosphere. The middle crust high conductive zone is interpreted as a magma chamber with 7–30% melt, which could be supplied by the partial melting in the uppermost mantle. The porous saline zone with porosity of about 2% is preferred for the upper crust high conductive anomaly. More details can be found in Yang et al (2021).

We recently collected more MT data to obtain more details about this magma system. We are currently processing this dataset and would like to provide a preliminary electrical resistivity model during this workshop.

Keywords: Changbaishan-Tianchi Volcano; Magnetotelluric; Magma system

REFERENCES

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