Structure of the Tongariro Volcanic Complex Magmatic System, New Zealand: Insights from Magnetotelluric Imaging

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A key step in understanding a volcanic system is the determination of the location and size of the magma reservoir beneath the volcano. The electrical conductivity or resistivity of a magma reservoir containing an interconnected melt fraction will be much more conductive than the surrounding host rock. Here we use the results from 136 magnetotelluric (MT) measurements to determine the location and structure of the magmatic system beneath the Tongariro Volcanic Complex. 3-D inverse resistivity modelling of the MT data shows a narrow vertical conductive zone located beneath Mount Ngauruhoe linked to but offset from a larger more conductive region about 4 km beneath the surface centred under the north-eastern flanks of Mount Tongariro. The location of the recent eruption and seismicity prior to the eruption occurred at the margin of this larger conductive region.