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## Unraveling the structure of the magmatic hydrothermal system beneath Uturuncu Volcano by joint seismological and petrophysical analysis

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The eruption risk of a volcano depends on how much melt and gas have built up in its magmatic hydrothermal system in the upper crust. However, it is still challenging to characterize their spatial distributions and quantitatively estimate their concentrations. By integrating geophysical imaging results, petrological analysis and rock physics models, we mapped the migration pathways of fluids and gases and estimated their concentrations beneath Uturuncu volcano in Bolivia. This volcano last erupted 250,000 years ago, and our results explain why it still shows activity and are helpful for assessing its future eruption risks. This study shows how combining seismology, petrology and rock physics can help resolve the internal structure and composition of hydrothermal system beneath a volcano.