

## Characteristics of the resistivity structure around the earthquake swarm activity leading up to the 2024 Noto (Mw7.5) earthquake

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### SUMMARY

On 1 January 2024, a large intraplate earthquake (Mw7.5) struck the northern part of the Noto Peninsula in north-central Japan, causing widespread damage due to strong ground motions and a tsunami. Prior to this catastrophic earthquake, an intense earthquake swarm and localized transient crustal deformation had been observed continuously since late 2020 in the region, which is a Quaternary non-volcanic/geothermal area. This swarm activity continued for a long period, with occasional M5-sized earthquakes, culminating in an M6.5 earthquake on 5 May 2023 and then an Mw7.5 earthquake on 1 January 2024. The western vicinity of the Mw7.5 rupture zone was also struck by an M6.9 earthquake on the Noto Peninsula in 2007.

We had conducted MT surveys to elucidate the structural characteristics of the swarm activity and to determine whether there were structural differences from the area of the 2007 Noto Peninsula earthquake. The resistivity structure inverted from the onshore broadband electromagnetic field data acquired in 2021 and 2022 shows the existence of a continuous low resistivity zone from the depth of the southern cluster, where a series of seismic swarms started, to the northern cluster, which is the most active area in the swarm regions. Furthermore, the clustered seismic activity is almost at the upper outer edge of this low resistivity zone, strongly suggesting the involvement of fluid in this activity. Although the 3D inversion analysis of the current phase only covers a central part of the rupture zone of the Mw 7.5 earthquake, it shows good agreement between the areas of high slip on the fault plane and areas of high resistivity.

**Keywords:** 3-D resistivity structure, the 2024 Noto (Mw7.5) Earthquake, earthquake swarm, fluid

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