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**Scattering and absorption imaging of the Nesjavellir (Iceland) geothermal area**

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Detailed imaging of the elastic and anelastic properties of the crustal structures of geothermal regions is crucial from a scientific and industrial standpoint. The Hengill volcano region is the most productive high-temperature geothermal region in Iceland, located in the southwestern region of Iceland (30 km east of Reykjavík). To the north of the Hengill volcano is the Nesjavellir geothermal subfield, which lies within the Hengill fissure swarm trending N30°E.

Scattering and absorption measurements have proven reliable proxies for the spatial extension of faults, thrusts and fluid reservoirs across tectonic, volcanic and hydrothermal settings. Scattering marks tectonic interactions and lithological contrasts due to wave-trapping mechanisms that increase energy across the earthquake coda. Fluid content is, instead, the primary controller of seismic absorption. Rock physics studies and numerical simulations have proven the sensitivity of this parameter to strain rate and pore space topology.

The present work aims to provide the first 3D images of seismic scattering and absorption accross the Nesjavellir geothermal area at different frequency bands, measured through peak delay mapping and coda-attenuation tomography, respectively. Manually picked seismic events that occurred between November 2017 and December 2022, recorded by three permanent and temporary seismic networks, have been used to provide the first attenuation imaging of this geothermal area.

The preliminary results show, firstly, the stability of the peak delay and coda attenuation results as the analysis parameters change. The 3D scattering and absorption imaging show that the well-resolved areas of the Hengill region are characterized by high scattering, coinciding with highly-fragmented fissures at the surface. High absorption anomalies mark the Nesjavellir geothermal sub-field, mainly between 4 and 6 km depth, where seismic tomographies highlight high Vp/Vs.

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