

Workshop on Green Transition and Geophysics for Smart City Stakeholders
November 15, 2024 | University House, Bucharest

**Evaluating the use of active seismic survey in low enthalpy geothermal projects:
a VOI based methodology**

Juri Muzi¹, Alessandro Brovelli²

¹ PSS-GEO, Norway

² ISAMGEO, Italy

ABSTRACT

Historically, collecting active source 3D seismic data has been seen as costly and of little benefit in a low-enthalpy geothermal prospect. Seismic data, however, can successfully be used to measure the anisotropy generated by the typical fracturing state of the reservoir, which is responsible for the permeabilities allowing the circulation of the substantial amount of fluids involved in geothermal systems.

The possible economic benefit of collecting seismic data in a low-enthalpy field can be ascertained using the Value of Information (VOI) approach: investing in a survey can be justified only when the prospective Value of the Seismic Information is superior to the expense required for gathering the required seismic data.

A methodology is here created by modifying the magneto telluric survey's VOI assessment for geothermal prospects (Trainor-Guitton et al, 2014). This methodology is first developed in a theoretical mono-dimensional manner, considering a single drilling location and the corresponding single Common Depth Point (CDP) seismic gather. It is subsequently extended to cover a full 3D prospect. The Grado low-enthalpy geothermal system in Northeast Italy, which produces hot water for direct use (home heating and agriculture), is then tested to ascertain the VOI assessment method's validity.

Acknowledgments

This work has developed in the frame of the project: "Driving Sustainable Urban Futures: A Romanian-Norwegian Innovation Geophysical Alliance for Green Transition and SMART City Development" granted by Innovation Norway

Corresponding Author: Juri Muzi, juri@pss-geo.com