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## SIT4ME project: Up-scaling seismic methods for mineral exploration in the Zinkgruvan mining area, Sweden

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Mineral resources are used in large quantities than ever before because they are fundamental to our modern society. To this front and facing an up-scaling challenge, the EIT Raw-Materials funded project SIT4ME (Seismic Imaging Techniques for Mineral Exploration) was launched involving several European institutions. As part of the project, a dense multi-method seismic dataset was acquired in the Zinkgruvan mining area at the Bergslagen mineral district of Sweden, which hosts one of the largest volcanic-hosted massive sulphide (VMS) deposits in the country.

In November 2018, a dense multi-method seismic dataset was acquired in the Zinkgruvan mining area, in a joint collaborative approach among Swedish, Spanish and German partners. A combination of sparse 3D grid and dense 2D profiles in an area of approximately 6 km<sup>2</sup> was acquired using a 32t seismic vibrator (10-150 Hz) of TU Bergakademie Freiberg, enabling reasonable pseudo-3D sub-surface illumination. For the data acquisition, a total of approximately 1300 receiver positions (10-20 m apart), using different recorders, and 950 source positions were surveyed. All receivers were active during the data acquisition allowing a combination of 2D and semi-3D data to be obtained for various imaging and comparative studies. The main objective of the study, apart from its commercial-realization approach, was also to provide information useful for deep-targeting and structural imaging in this complex geological setting. The main massive-sulphide bearing horizon, Zinkgruvan formation, is strongly reflective as correlated with the existing boreholes in the mine. Careful analysis of the seismic sections suggests a dominant northeast-dipping structure, consistent with the general plunge of the main Zinkgruvan fold that has been suggested in the area.

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