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Reflection seismic imaging to construct a 3D geological model of the central Skellefte district, northern Sweden

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The Palaeoproterozoic Skellefte mining district in northern Sweden is one of the most important mining districts in Europe due to its volcanic-hosted massive sulphide and orogenic gold deposits. Currently a joint effort and collaboration is ongoing between universities and mining industry to construct a 3D/4D geological model of the central part of the Skellefte district. To construct this model, three new sub-parallel reflection seismic profiles, with a total length of about 95 km, were acquired during 2009-2010. Processed seismic data reveal a series of gently- to steeply-dipping reflections and a series of diffraction packages. The majority of reflections that extend to the surface can be correlated with geological features either observed in the field or interpreted from the aeromagnetic map of the study area. Main reflections correlate well with major faults and shear-zones and/or represent lithological contacts. Based on the seismic results and correlations with other geophysical and geological data a preliminary 3D-model of the central Skellefte district has been created in order to visualize the fault patterns and to provide a base for future 4D geologic modeling of the area.