



## **MT and seismic reflection data in northwestern Skellefte Ore District, northern Sweden.**

María de los Ángeles García Juanatey, Peter Hedin, Juliane Hübert, Ari Tryggvason, and Christopher Juhlin  
Uppsala University, Solid Earth Physics, Uppsala, Sweden

Sweden is a country with a long mining history and well positioned among the leading mining nations in Europe. Our area of study is in the western part of the Skellefte District, a very rich mining area in northern Sweden. The main deposits consist of volcanic-hosted massive sulphides (VHMS) rich in zinc, copper, lead, gold and silver. Due to the long exploration history in the area, new efforts are now being dedicated to finding deeper deposits within the district. In order to succeed in this quest a joint research project between industry and academia (VINNOVA 4D Modelling Project, co-funded by the Swedish Geological Survey) was launched in 2008, aiming at the construction of a 3D geological model of the Skellefte District and its evolution over time. The outcomes of this project will greatly improve the understanding of the area and increase the chances for successful exploration.

The main geological units in the Skellefte District are the ore bearing volcanic rocks (Skellefte Group), early granitoid intrusions coeval with the Skellefte Group (e.g. Viterliden intrusion), sedimentary rocks (Vargfors Group) and late granitoid intrusions (Revsund granites). All these units are metamorphosed to greenschist and lower amphibolite facies. Even though the district has been the target of many studies, several deformation events, the great areal extension of the Revsund granites that cover the other units, and a minimal number of outcrops, results in that the existing knowledge about structural relationships and contacts between main geological units is rather poor.

To tackle this problem, new MT and seismic reflection data have been recorded in the district. The profile considered in this study extends previous investigations around the Kristineberg mine (the most important mine in the western part of the district, in operation since 1940) northwards in the direction to the Adak area (with 5 closed mines). It attempts to elucidate the connection between the different ore bearing rocks and the thickness of the Revsund granite covering this area.

The seismic reflection profile is a 27 km long crooked line in NE-SW direction. The receiver spacing was 25 m with 240 active channels and about 750 shots were recorded along the profile with a mechanical source system. Along the same profile 17 broadband MT stations were installed. Some of them are not directly on the profile, but more than 1 km away to avoid cultural noise. This profile overlaps about 2 km of a previous 25 km long profile in the Kristineberg area to the south, that also has MT and seismic reflection data.

The conductivity models together with the seismic section help to delineate the depth extension of the Revsund granites in the area and provide further constraints on the deep conductive feature also found in previous studies in the Kristineberg area. Altogether, these results provide important pieces of information that will help to unravel the enigmatic Skellefte Ore District in the framework of the VINNOVA 4D Modelling Project.