Regional to Deposit scale exploration in Fennoscandia based on mineral systems approach

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The D-REX (Deposit to Regional scale Exploration) project is based upon the application of the mineral systems concept a potential paradigm shifting approach to mineral deposit identification. Transport, precipitation and concentration of metals into economic mineral deposits involves a combination of processes occurring over different scales and depths. Regions with similar surficial geologies often have widely disparate metal endowment levels especially in cratonic environments. By applying the mineral systems approach we can elucidate lower crustal structures that may play a key role in the processes responsible for metal endowment in the upper-most crust.

Mineral deposit formation is often driven by deeply originating large scale fluid transfer (magmatic and/or metamorphic), which requires; a source region for metal bearing fluids, an energy source for driving fluid circulation, pathways for the migration of these enriched fluids, a depositional mechanism responsible for the formation of the deposit, and a fluid outflow. The overarching goal of the D-REX project is to identify previously unrealised metal endowed regions, via application of a new workflow inclusive of large-scale regional data sets with the ability to identify the deep fluid source regions and transport pathways/mechanisms to the upper crust, for targeted exploration and characterisation of the near surface zones of metal deposition and concentration. 3D magnetotellurics can provide information at all scales of the mineral system, as such it is the primary tool of investigation used in D-REX. MT data sets have been collected at three 100x100 km^2 regions of economic potential in the Fennoscandian shield (central Norway, northern Sweden, and central Finland).

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