Title: Source characterization of magnetic data using simulated annealing approach

Presented by: Sunaina Shinu

Abstract:

Understanding the magnetic anomaly in terms of the subsurface causative source plays a pivotal role in mineral exploration as well as in other geological applications. Automatic modeling of such isolated profile data is still rising, and fundamental improvements are needed in analyzing the association of subsurface rocks with the magnetic anomaly in terms of various independent model parameters. Here, we propose a MATLAB-based simulated annealing algorithm to simplify the interpretation process of magnetic anomalies. The performance of the adopted approach over various synthetic models of simple geometries like spheres, dikes, sills, and prisms is analyzed with and without contaminated noise. These geometries are widely used for some specific types of ore bodies such as iron, base metals, and mineralization such as skarns, massive sulfides, etc. Finally, two different real deposits of Chromite Ore and Uranium Ore are taken along with their magnetic anomalies to interpret their subsurface geometries in terms of model parameters. The estimated structures are verified to have a great affinity with the structures obtained in previously published works of literature. Furthermore, the present computational algorithm provides a user-friendly approach without any computational difficulties with minimum cost.