Special Issue

Advancements in Mineral Resource Characterization Using Machine Learning

Message from the Guest Editors

The traditional methods of mineral resource characterization have long relied on geological models, statistical techniques, and manual workflows to assess the quantity, quality, and distribution of mineral deposits. However, with the rapid advancement of machine learning (ML), new opportunities are emerging to improve the accuracy, efficiency, and predictive power of these assessments. By leveraging vast and complex datasets, ML algorithms offer innovative solutions to geological and geospatial challenges, optimizing exploration, resource management, and geometallurgical processes. This Special Issue seeks to explore the latest advancements in applying ML techniques to the characterization of mineral resources. The integration of ML—such as deep learning, neural networks, ensemble methods, and unsupervised learning—into resource modeling workflows holds significant potential for improving the precision of geological models, understanding mineral deposit distribution, and automating time-consuming tasks.

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Message from the Editor-in-Chief

Minerals welcomes submissions that report basic and applied research in mineralogy. Research areas of traditional interest are mineral deposits, mining, mineral processing and environmental mineralogy. The journal footprint also includes novel uses of elemental and isotopic analyses of minerals for petrology, geochronology and thermochronology, thermobarometry, ore genesis and sedimentary provenance. Contributions are encouraged in emerging research areas such as applications of quantitative mineralogy to the oil and gas, manufacturing, forensic science, climate change, geohazard and health sectors.

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