

SEG 100 Conference: Celebrating a Century of Discovery

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Future Mineral Exploration

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Increased exploration and discovery are needed because shortages of some commodities are likely. Copper shortages are predicted beginning in 2025 due to the electric car boom. Recent exploration focused on exploring known areas by searching laterally or deeper in known districts. In Australia depth of discovery increased to 2,000 feet in 2010. The trend in recent years have been fewer discoveries at higher cost. There is a great potential for new discoveries under thin cover. Approximately 50% of the world's land area is under cover of recent unconsolidated sediments, jungles, deserts, glacial moraines, and lakes. Future exploration in these areas will increase using available tools. Diamond deposits were discovered in Canada under glacial moraines using indicator minerals in the till. Geochemical surveys can be used to explore for a variety of mineral deposits under glacial cover in the northern hemisphere. Side-looking airborne radar (SLAR) can detect target areas under jungle cover as was done in Brazil. Airborne radar surveys could be used to detect exploration targets in jungle areas in Africa and Southeast Asia. Airborne magnetic and electromagnetic geophysical surveys have detected target areas and in some localities have found mineral deposits. In Australia the Olympic Dam deposit was found by an aeromagnetic survey, and in Canada massive sulfide deposits were located by airborne electromagnetic surveys. Airborne surveys can detect areas of interest under deserts and under hundreds of feet of rock cover and could be used in many countries around the world. The use of drones has made airborne geophysics more efficient and less costly. Landsat multispectral data can be used to identify geological features related to subsurface mineralization as has been done in the Philippines. Mineral deposits created by the energy of large meteorite impacts as in the Sudbury, Canada, district can be detected by negative gravity anomalies similar to the Sudbury anomaly. We have examined Canadian regional gravity data and identified areas of possible mineralization created by meteorite impacts. Proposed future exploration will begin selecting areas based on known geological, geochemical, and geophysical data. Prime targets for selection are in Precambrian shields around the world. In the northern hemisphere large shield areas are covered by glacial moraines. Deserts in Australia, China, and Arabia and jungle cover in Africa and South America cover future mineral deposits. Future exploration will need to be done in joint ventures between private companies, governments, and research organizations as is in progress in Australia. The exploration will be promoted by mineral shortages and higher prices.