The future of mineral exploration – and what it means for geophysics

Minerals keynote paper

Jon Hronsky
Western Mining Services
jon.hronsky@wesminllc.com

SUMMARY

The global mineral exploration industry is currently perhaps a decade or two into the most important transition in its several thousand year history – the move from a world where discovery was primarily about surface prospecting (in various form) to a world where important future discoveries will be blind, with little or no surface expression. This transition is, and will continue, profoundly influencing all aspects of our industry, from financing and government policy through to targeting methods and detection technologies. Geophysics will play an increasingly central role in the exploration industry as this transition progresses, as it did in the analogous transition in the history of the petroleum exploration industry about a century ago. However, this future for geophysics will not simply be doing more of the same – the relationship of geophysics to the exploration industry will need to evolve significantly to enable cost-effective exploration performance in this future world. Some of the required key areas of development include; a) better characterisation of mineral systems at multiple scales from the continental to the deposit, b) improved integration between geological and multi-parametric geophysical observations at multiple scales, c) improved capabilities to image critical deep-seated ore-controlling structures and perhaps metal-enriched deep source regions which are cryptic in near-surface data and d) more specific rather than just more sensitive detection technologies, which reduce the usually high false-positive rate of geophysical targets. An important strategic enabler for these required advances will be ever increasing access to supercomputing capability. However, the potential of entirely new physical techniques cannot be overlooked either, with Muon tomography having recently been applied to mineral exploration for the first time.