ESTABLISHMENT OF GEOCHEMICAL EXPLORATION CRITERIA IN MINERAL PHASES WITHIN BASEMENT AND COVER SEQUENCES

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1. The Future of Exploration

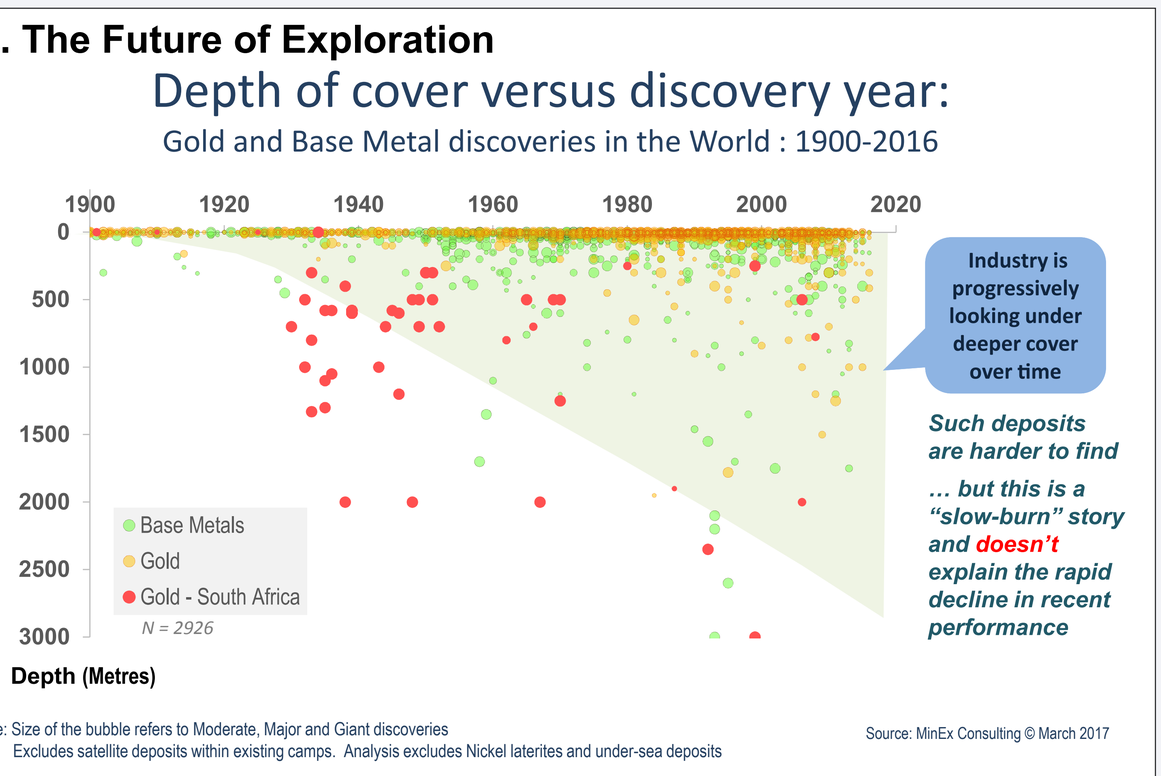

Figure 1: Gold and base metal discovery trends showing that the rate of deposit discovery is gradually decreasing as the exploration frontier is moving to deeper environments. As a result, the development of new technologies and exploration techniques that target areas with thick cover sequences is becoming a necessity.

2. Exploration within South Australia

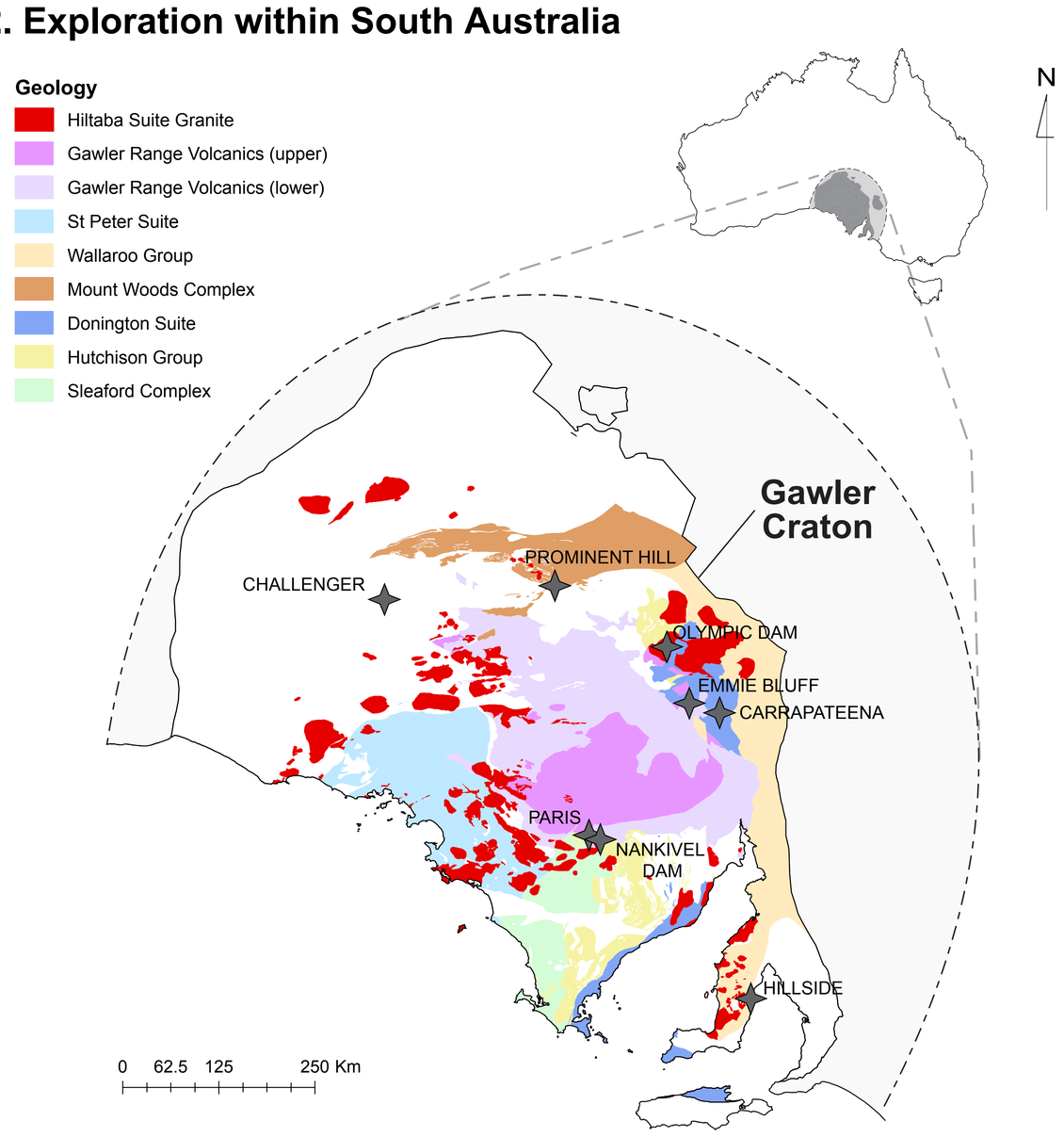

Figure 2: Simplfied geological map of the Gawler Craton showing the distrubution of targeted rock packages and interesting mineral deposits. These sequences may host key accessory minerals that have been suceptible to mineralsing events which may have altered the geochemical signature of the mineral. Samples will be taken from exposures and drill holes.

3. Mineralising Systems

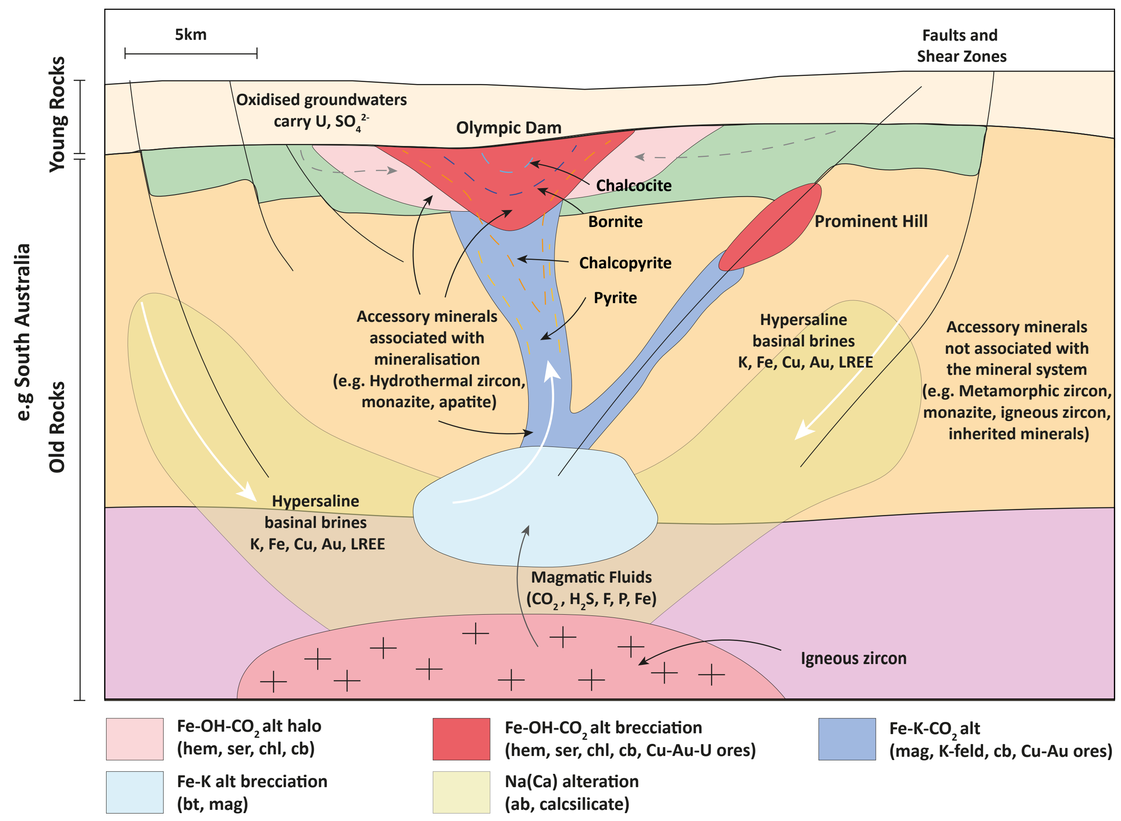

Figure 3: A typical mineralising system that can host multiple accessory minerals. These minerals can incorporate a variety of pathfinder elements into their chemical lattice, therefore may be used as an indicator mineral. A good indicator mineral is commonly abundant, sensitive to its environment and is a resistate phase (e.g. Zircon).

4. Zircon as an Indicator Mineral

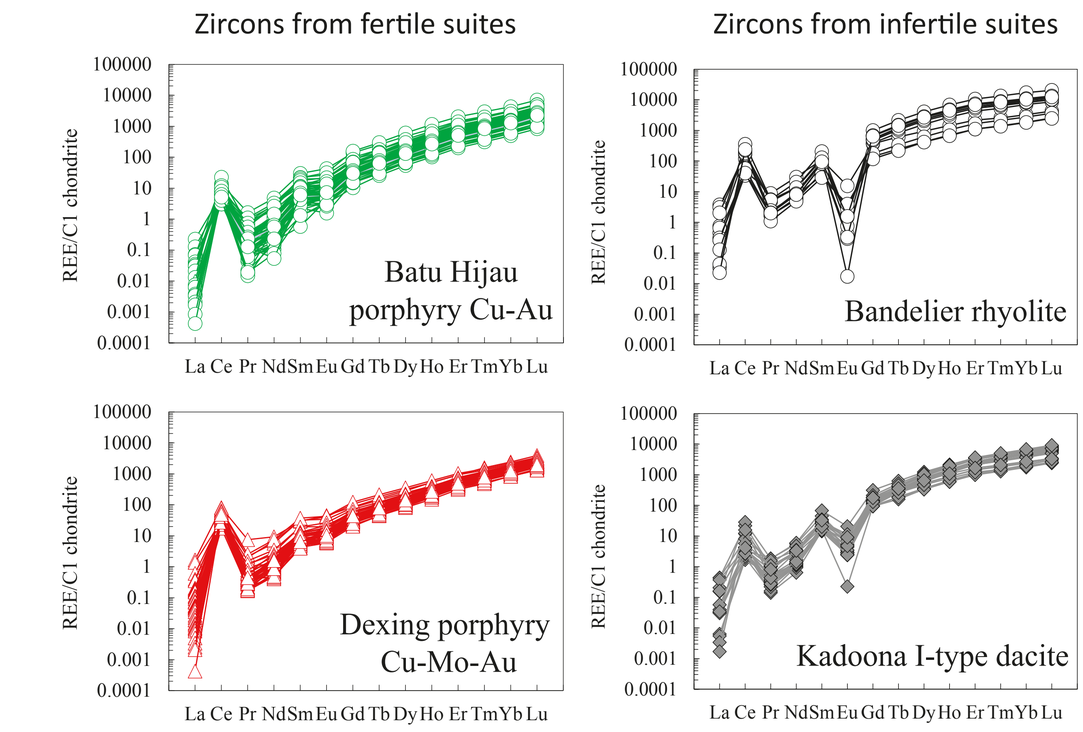

Figure 4: REE chondrite normalised spidergrams displaying geochemical characteristics of zircons from fertile and infertile suites associated with porphyry deposits. Modified after Lu et al., 2016.

5. Aims

1. Map out geochemical signatures that characterise zircon of different origin using trace and rare earth element geochemistry
2. Assess whether zircon preserves pathfinder element signatures related to base metal mineralisation by using samples that are directly sourced from mineralisation or rock units associated with the mineral system development (e.g. granites)
3. Evaluate the effects of chemical and mechanical weathering processes on zircon chemistry, which are associated with reworking of basement into cover sequence materials
4. Assess the influence of zircon geochemical signatures on whole rock assay data to develop an exploration criteria for vectoring towards mineralisation using basement and cover sequence materials

6. References

Lu, Y-J, Loucks, RR, Fiorentini, M, McCuaig, TC, Evans, NJ, Yang, Z-M, Hou, Z-Q, Kirkland, CL, Parra-Avila, LA & Kobussen, A, 2016, Zircon Compositions as a Pathfnder for Porphyry Cu ± Mo ± Au Deposits, Society of Economic Geologist

Schodde RC, 2017, Challenges of Exploring Under Deep Cover, Presentation to the AMIRA International's Exploration Managers Conference, Healesville, Victoria, March 2017.

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