Biogeochemical mapping of mine contamination with portable XRF

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The application of biogeochemistry in mapping the distribution of trace elements across areas affected by contamination or the persence of mineralisation is well-established, though few studies have been conducted in Australia. The use of fpXRF to provide real-time geochemical data is now common in lithogeochemical and regolith studies but have received little attention in biogeohemistry [1]. A series of studies have been conducted across the historical Sunny Corner Ag-Pb-Zn (radiata pine) and Woodlawn Cu-Pb-Zn minesites (green and black acacia) and the Thackaringa Co-pyrite deposit (saltbush). Regional studies are being conducted in the Cobar Basin of NSW and Cyprus.

Initial results indicate fpXRF to deliver similar analytical data for selected elements as laboratory-based methods such as ICPMS, with spatial patterns reflecting the effects of mineralisation, contamination and lithological variation (Fig 1). There are issues with differential adsorption of element-specific X-ray energies and depth of penetration into vegetation organs.

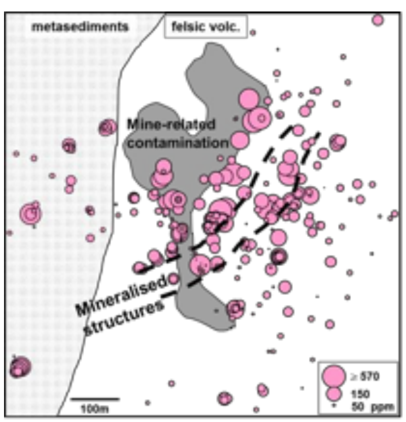

Figure 1: fpXRF-determined Zn in *P. radiata* needles at Sunny Corner, NSW.

[1] Rincheval et al. (2019) *Sci. Tot. Env* **XX**, 123-321.