LandScape+® - A new Software Providing Machine-Learned Landscape Context and Target Definition from your Exploration Surveys

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It has been common practice in greenfields mineral exploration to use soil geochemistry with little regard for landform setting. Especially in varied cover, exploration success is often hindered by the lack of tools to understand and evaluate near-surface geochemical anomalies in context. Five years ago, the CSIRO, with the support of over 30 industry sponsors, set out to identify machine learning approaches to integrate soil geochemistry with spatial data layers (i.e., SRTM digital elevation radiometric and Sentinel-2 satellite data). The aim was to improve our ability to identify targets and understand the spatial variation and influence of regolith types on soil geochemistry. Since the conclusion of this research, the CSIRO has improved, tested and commercialised this research to provide a hands-on tool to the exploration industry; LandScape+®. This new software creates landscape models from publicly available spatial data layers almost anywhere in Australia and uses these to detect statistically relevant geochemical outliers from soil survey results. The user uploads their data to a user interface to tailor for the best fit for each survey area. The model is used to rapidly generate elemental outliers and multielemental trends from the dataset. The data can also be exported to a GIS software of choice. Overall, this process accelerates the review of geochemical data and allows the explorer to make decisions with more confidence. This talk will cover the background R&D that led to the development of the software and introduce relevant machine learning and regolith science concepts. We will show where this approach helps to better interpret geochemical results with examples from across Australia, highlight some practical limitations, and take a peek at the user interface to showcase some of the statistical and geospatial visualisation tools.