



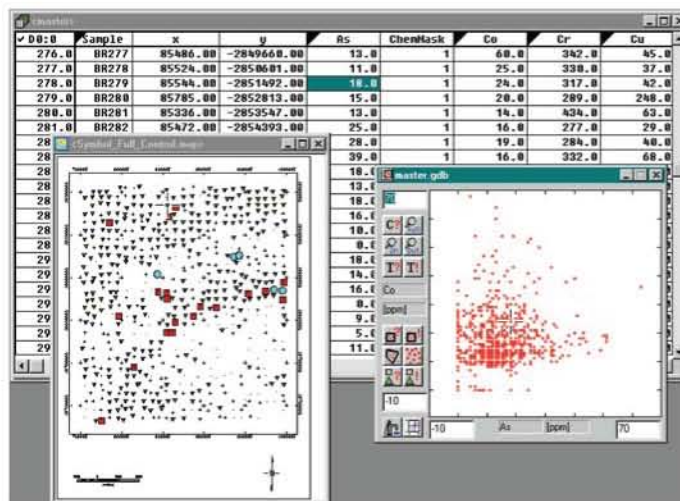
Geochemical Data Processing and Analysis: A Regional Case History

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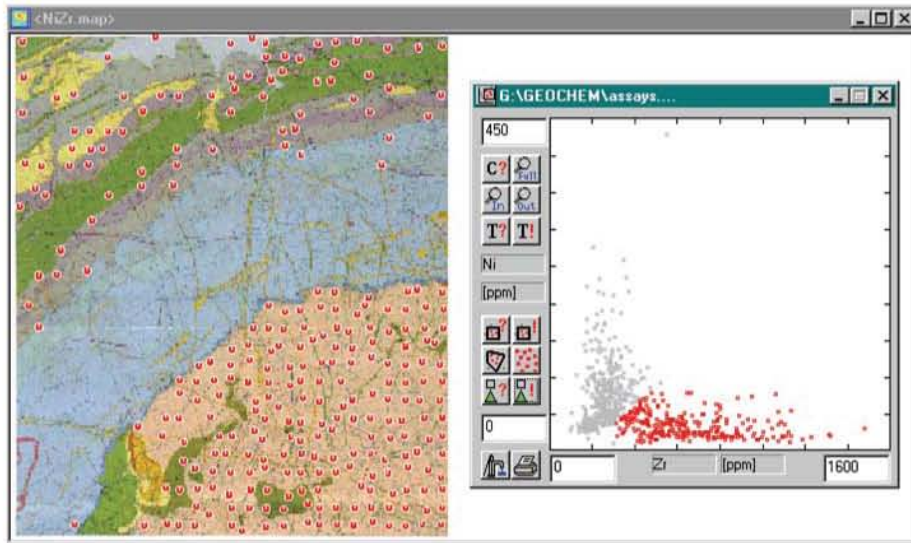
From large-scale reconnaissance programmes that cover countries or continents to local programmes on a single exploration property, today's explorationists have increasing access to multielement geochemical data. On a regional scale, the geologist is initiating exploration in an often unfamiliar country or region to recommend areas for detailed investigation. Data volumes are large with as many as 40,000 samples assayed for up to 48 elements – and often stored in different digital formats. Quality control is a problem since historical data often have different sources, survey types and analytical techniques.

In a case study drawn from raw data provided by the Council for Geoscience in South Africa, data were processed starting from a basic digital spreadsheet file supplied by an assay lab. Using Chimera, the geochemistry software for Oasis montaj, data were imported for initial quality control tasks, such as removing control samples, evaluating duplicates and checking sample locations.

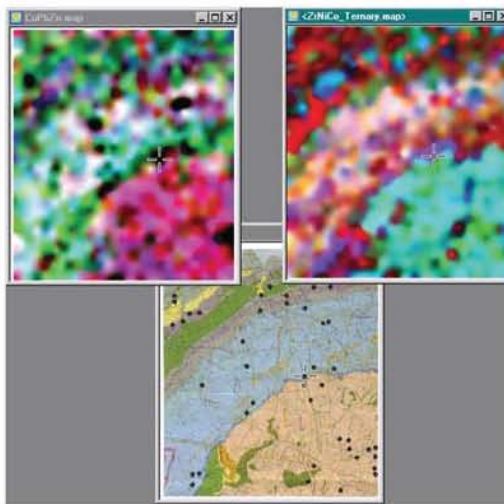
Following initial quality control, data were plotted for analysis. A standard method involved transforming data to a logarithmic scale and creating proportionally sized symbol plots. Histogram and scatter analysis presentations were also used to identify problems (such as background shifts reflecting data from different laboratories) at an early stage. The following example shows a symbol plot overlying a geological map and the corresponding histogram plot. The colour symbol plots on the map were also interactively manipulated to emphasize trends in assay data.



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After initial analysis, data were gridded using a geostatistical algorithm – a special processing routine that emphasises coherent patterns while maintaining the spatial integrity of individual samples. Gridding and visualisation techniques are becoming more widely accepted in exploration geochemistry as geologists gain familiar with methods and new software capabilities. As shown below, there are many options available – ranging from imaging single elements to imaging ternary combinations of elements to adding symbols to digitised geology maps.



Through this type of processing and analysis, the geologist now has new tools for working in today's "data- and informationrich" environment. The end result is a high quality dataset in which poor-quality assay data have been removed. The remaining statistically meaningful data is ready for integration with other information (including ternary maps and integrated geophysical, geological and satellite presentations) and detailed selection of prospective areas can begin.

In summary, this short case history provides a roadmap of integrated presentation and interpretation methods for regional projects using commercially available exploration Geochemistry software. For the geologist, the significance is an up-to-date cross-section of techniques to help navigate the large volumes of data and multidisciplinary information available in today's mine-finding environment.