

## **SOME KEYS TO FINDING USEFUL INFORMATION IN EXPLORATION GEOCHEMICAL DATA**

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Most regional geochemistry data reflects processes that can produce superfluous bits of noise and, perhaps, information about the process of interest. To find patterns of interest, it is necessary to transform the data and to remove unwanted masking patterns. With trace element geochemical data, small but important variation may be compressed into a relatively narrow range while other variation is spread out over a wider range than its importance justifies. Another reason to transform the data is that many statistical tests of significance are not valid for skewed distributions. For these reasons, we use a logarithmic transformation on most data. Histograms of the log-transformed trace element data can show a spike on the left representing values substituted by the analyst for lower limit of detection or censored data. If the number of cases affected by this substitution represents more than a few percent of samples, this practice can introduce biases in contoured values. In many cases, censored data can be estimated using multiple regression of other uncensored variables on the variable with censored values. For each element, transformed values are standardized, or normalized, to a Z-score by subtracting the subset's mean and dividing by its standard deviation. This removes all effects of different means and measurement scales and facilitates the comparison of the spatial patterns of the elements. Subsets include any source of differences that might be due to processes unrelated to the target sought such as different laboratories, sample media, analytical procedures, or rock types.