

Domaining in Mineral Resource Estimation

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Keywords: domaining, mineral resource estimation, modelling techniques, good domaining practices

ABSTRACT

Mixing data from different domains to inform resource blocks is bad practice and making errors at the domaining stage can have negative consequences on the quality of the final resource estimate. As warned by many practitioners and documented in countless books over the years: geology is important (Coombes, 2017; Parker, 2014; Vann et al., 2012).

Domaining is ideally based on good geological information such as accurate geological logging of drill core or chips, but fit-for-purpose clean and accurate geological data is a rarity.

Proxies for geology, such as multi-element chemistry from portable XRF instruments followed by multivariate data analysis or machine-learned algorithms, core scanners, or down-hole optical televiewers are powerful tools to identify different geological domains. However, they are underutilised as they require additional investment, and their value can be hard to demonstrate.

Therefore, in practice, the use of actual geological information to create domains is unfortunately the exception rather than the rule. A study of 200 maiden mineral resource estimates published in the public arena around the world (RSC, 2019) shows that 95% of all estimation-constraining wireframes are built using grade cut-offs, and not on geological information such as lithology or alteration. At face value, this method seems perfectly logical, and it is not necessarily bad news, but if not treated with caution, domain integrity will be compromised. Of the 95% of all reviewed estimates where grade cut-offs were used, 80% of the practitioners did not provide any justification for their selected grade cut-off.

Books and courses on resource estimation clearly express the importance of domaining but offer few practical solutions or rules of thumb.

This paper summarises some good domaining practices and provides an analysis of key differences in approaches such as implicit versus explicit modelling techniques.