

# Measuring spatial domain models' uncertainty for mining industries

*S A McManus<sup>1</sup>, A Rahman<sup>2</sup>, J Coombes<sup>3</sup> and A Horta<sup>4</sup>*

1. Lecturer, Charles Sturt University, Port Macquarie NSW 2444. Email: smcmanus@csu.edu.au
2. Associate Professor, Charles Sturt University, Wagga Wagga NSW 2650. Email: azrahman@csu.edu.au
3. CEO and Managing Director, Amira Global, Perth WA 6000. jacqui.coombes@amira.global
4. Senior Lecturer, Charles Sturt University, Albury NSW 2640. ahorta@csu.edu.au

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## ABSTRACT

The sustainability of mining projects is linked to informed investment decisions based on public reporting of exploration and mineral resource estimation results. In Australia, public reporting guidelines are established by the Joint Ore Reserves Committee reporting code through the JORC Code (2012). Although the assessment of uncertainty in the results reported is a requirement, this is often communicated qualitatively and evaluated subjectively. This can become a liability if not communicated effectively, particularly in the early stages of mining projects when spatial domains of geological interpretation and mineralisation envelopes influence resource estimations' reliability.

A recent review of JORC reports found no reports used quantitative assessments of the geological interpretation or mineral resource estimation envelopes, and 27% of reports did not address the question of quality of geological interpretation. Reports that did address the quality used 19 different terms to communicate quality.

The review described methodologies for quantitative uncertainty assessment and communication and explores how they could be applied in public reporting practice. The complexity, cost and additional work of doing a quantitative assessment could hinder a straightforward implementation. This could be overcome if mining companies budget for quantitative uncertainty assessment and associated professional development. A compulsory requirement for the inclusion of uncertainty assessments in public reporting or adopting standardised subjective language would improve industry practice.

Uncertainty assessments of spatial domains also benefit mine planning and financial modelling as these end-users assume the geology is 100% right as no error was communicated or only a single deterministic model provided.

Keywords: Uncertainty, Spatial Domains, Mineral Estimation Envelopes