

Fractal dimension and its implication to mineral exploitation

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The fractal dimension value plays a vital role in describing the spatial distribution of gold mineralization [1]. In this study, gold assay results (in g/t) of few boreholes from Gadag Gold Field (GGF), Dharwar Craton have been analyzed for fractal analysis to identify possible fluid-flow pathways. Both the fractal correlation integral and rescaled range analysis have been used to measure the fractal dimension. The higher-grade gold ores are mainly found to be deposited along the structures represented by steep fractal gradient. As several researchers have already been reported that gold-bearing fluid is derived from mantle/ juvenile magmatic depth at GGF [2, 3]. So during the process of fluid movement requires a flow path, along which gold-bearing fluid moves from mantle towards upper crust. The fluid moves both vertically as well as laterally through pressure gradient. During the process of movement, the economic gold is being deposited along the structures represented by steep fractal gradient, which can be used as a mappable proxies for exploration targeting in unexplored areas, especially for structurally controlled ore-forming processes.

References: [1] Swain, et al (2019) Ore Geol. Rev. 110: 1-10; [2] Swain, et al (2018) Ore Geol. Rev. 95: 456-479; [3] Swain, et al (2015) Ore Geol. Rev. 70: 305-320.