

Geometric and Geostatistical Modelling of the Morro do Ouro Gold Deposit, Paracatu (MG), Brazil

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The Paracatu deposit (Morro do Ouro) is a classic metatubidite-hosted gold mineralization. It comprises low grade, high tonnage gold ores. The geology of the Paracatu deposit includes the Neoproterozoic Vazante and Paracatu Formations. The latter, the main host rock, is sub-divided into two members, from bottom to top: (i) Morro do Ouro Member, composed of carbonaceous phyllites alternated with quartzites - these host gold-rich quartz veins and boudins; (ii) Serra da Anta Member, constituted of intercalated meta-siltstones, quartzites and carbonaceous phyllites, which are not mineralized. Most of the gold explored in the Paracatu deposit have stemmed from the supergenically altered, upper part of the Morro do Ouro Member rocks. Ore grade and geologic controls are well known and have not been much of a problem. The primary mineralization, the focus of this paper, has only been investigated in detail recently. Here we attempt to use advanced 3D-geometric and geostatistical tools to model the geometry and gold grade distribution of a selected part of the Paracatu deposit. The geometric modelling allowed us to comprehend the geometry of the ore bodies and their spatial relation with lithologies, structures, hydrothermal alteration and other key geologic features documented in the field. Geostatistical modelling of gold grades and their spatial distribution along the deposit were derived from enhanced experimental variograms and estimation procedures at unsampled points such as kriging. The geologic-geometric model combined with the geostatistical model provided new constrains about the Paracatu mineralization, which may be of interest to both academic and mining audience.