

Agate-geode deposit 3D modelling in the Salto do Jacuí Mining District (RS, Brazil)

HEEMANN, R. and STRIEDER, A.J. Mining Engineering Department, Federal University of Rio Grande do Sul, Porto Alegre, Brazil.

The Salto do Jacuí mining district (SJMD) is the largest known world resource for agate-geode type deposit. The agate geodes occur within an individual vesicular - amygdaloidal basaltic lava flow (HF). The host lava flow makes part of the Serra Geral Formation, Paraná-Etendeka CFB province (Wilson, 1987). The mining in the SJMD is carried out both by open cast and underground, without a sharp geological and structural mining control. The 3D modelling softwares were use to exploration of new target areas. The geological and structural analysis by means of geographic information systems (GIS) is integrated to orebody 3D model in order to improve the mine exploration procedures. The aim of this paper is to display a new methodological development for 3D modelling in agate-geode type deposit. The SJMD project is made up by 3 important research stages: 1) geological characterization of the SJMD lava sequence (regional and mining district scale), 2) define exploration guides for the agate geodes, and 3) geometric mapping and evaluation of the SJMD volcanic sequence and associated structures (structural model). This last research stage implies in the development of a 3D model for orebody exploration and exploitation. The SJMD 3D modelling is supported by the structural and geological data integration analysis in a sequence of steps such as: 1) geological attributes definition (x,y,z database, geological limits, etc.), 2) digital elevation model (topographic charts and aero-photographs restoration), 3) dikes, sills and drifts design, 4) orebody 3D model development, 5) regional ore reserves evaluation.