Geological Modelling of the North Sucuri Region, Vazante Mine, Minas Gerais - Brazil

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The northwest of the Minas Gerais state, Brazil, holds a world-class hypogene willemite deposit hosted in carbonate rocks of the Vazante Group, containing a total resource of 21 Mt 6.8% zinc, 0.34% lead, and 16.6 g/t silver. This deposit is divided by a severe karstication area that separates the North Extension and the Vazante mines, located 8 km from the city of Vazante (Minas Gerais state). The mines follow the northeast orientation of the Vazante fault, which structurally controls the willemite orebody. The North Sucuri region is placed on the northeastern limit of the Vazante mine, where the ore found with infill drilling is composed not only of the classic mineral assemblage of the willemite orebody (willemite+dolomite+quartz+hematite±barite±apatite±franklinite±zincite±magnetite and imbricated sulphide lenses) but also of sphalerite bodies composed of sphalerite+galena±barite±pyrite±hematite±zincite±anhydrite, unrelated to the principal ore. The infill drilling was unoriented, but geological mapping of the gallery and subadjacent areas in development prove that host rocks are the Lower Pamplona and Upper Morro do Pinheiro members of the Vazante Group, as expected, with N50E/20NW bedding orientation and N45W/50SW fractures. Macro-description of more than 9,000 meters of drill holes, allied to geological mapping data, resulted in the geological modelling of the host rocks and orebody with Leapfrog GEO (Seequent), where the carbonated/siliciclastic rocks of the Lower Pamplona and Upper Morro do Pinheiro member compose a hydrothermally altered and brecciated zone that hosts the ore. The modelling of the willemite and sulphide bodies shows that, despite the structural and composition complexity of the region, the orebodies remain following the Vazante fault and main body orientation. Moreover, the geological mapping of galleries and geological modelling results of the region can be useful for better comprehension of the geological setting and to the ore beneficiation process while identifying contaminating rocks.