

Formation of gold-quartz veins controlled by the strike-slip fault mega-system in Tapajós Mineral Province, Amazon, Brazil

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The Tapajós Mineral Province in southeastern Amazonian Craton is characterised by widespread granitic magmatism related to Trans-Amazonian orogenesis and Uatumbã event (2.1-1.8Ga), to which are genetically associated numerous gold deposits. The majority of these deposits occur as gold-quartz veins, controlled by a sinistral NW-SE strike-slip fault mega-system, and its subsidiary faults. The faults have anastomosed geometry, localized complexities and crossings with other planar surfaces, developing dilational sites favorable to the circulation and deposition of hydrothermal fluids. The lack of high rheologic contrast, allows for a consistent kinematic analysis of the angular relationships between the co-genetic shear and extensional fractures using the Riedel model. The study of 23 gold deposits determined the direction of the main stress vector as around E-W. Thus, the position of the gold-quartz veins within the strike-slip fault system may be determined and even foreseen. Some faults remained active after their filling by mineralized hydrothermal fluids, as indicated by the presence of quartz veins with hydrothermal breccias and multiple stages of quartz deposition in extensional fractures. The gold-quartz veins are thinner than one meter, and they are positioned preferably in dilational jogs along strike-slip faults, in shear and extensional fractures, and in the contact between mafic dikes and granitoids. Gold occurs associated to sulfides, almost always in free state, both in the quartz veins and in the alteration zones and hydrothermal breccias. The structural and textural characteristics of these gold-quartz veins are similar to deposits formed in upper crustal levels under low confining and high fluid pressure.