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Trace elements geochemical signature of gold-bearing pyrite from Niou gold deposit,within the Boromo-Goren green belts(Burkina Faso-West African Craton)

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The Niou gold deposit, in the Boromo-Goren belt is characteristic of an epigenetic gold bearing sulfide mineralization hosted in andesite-basaltic. Sulfides investigation under backscattered imaging coupled with LA ICP MS, enable to document their textures and the chemistry of the associated trace elements in relationship with both nature of mineralizing fluids and conditions of gold formation. Sulfides are pyrite and chalcopyrite, with minor arsenopyrite that develops small euhedral crystals inclusion in subhedral pyrites. The deposition of gold occurs in two major phases in relation with a proximal sericite-chlorite hydrothermal circulation which canalizes the sulfurous silica-carbonate fluids. The first phase takes place in the primary pyrites in as disseminated micro inclusions. The second phase occurs during the introduction of the As-Cu-Au-Bi-Te complex magmatic fluid contemporaneous to the diorite intrusion where gold precipitates on contact with Py-Cpy-Po as inclusions or facture filling on contact within Py-Po. The examination of the pyrites using SEM and the occasional analysis of these sulfides show the importance of trace elements included in the pyrites. The spiculated appearance of the time-resolved spectrum of the LA ICP MS shows that the edge of these sulfides is enriched in major elements (Fe-Cu-As-Zn-Co) while the core trace rich-elements (Bi-Te-Ag-Au-Pb-Sb-Se...). Gold crystallizes in the form of Au-Ag, Au-Bi, Au-Te, and Au-Bi-Te or free form in the silicate micropores of quartz-carbonate veins and correlates well with these elements. On the other hand, Bi, Ni, Zn, and Pb are negatively correlated with gold. This suggests that a magmatic fluid circulated during the gold event with a possible contribution of metamorphic fluids during regional metamorphism. Overall, the study of trace elements and pyrite-Au in at Niou helps to better understand the nature of the mineralizing fluids and the conditions of gold crystallization in the Goren Belt.