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Geological controls, environment of formation and style of copper and gold mineralization in the Mundiawas-Khera area of Alwar district, Rajasthan, Western India.

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The copper and associated gold mineralization of the Mundiawas-Khera area of Alwar basin in North Delhi Fold Belt of Paleoproterozoic age, western India has a typical disposition as compared to the other copper deposits of India. The volcano-sedimentary sequence comprising felsic rocks of rhyo-dacitic composition, dolomitic marble and volcanic tuffs are the host rock for the ore minerals dominated with chalcopyrite, arsenopyrite, pyrrhotite and minor amount of cubanite, native copper, associated native gold, silver and sulphide bound gold. The mineralization occurs in the form of veins, stringers, disseminations and at places in massive form within the felsic volcanic rocks as well as at the contact zone of the felsic volcanic rocks and the dolomitic marble. The deposit is represented by pervasive hydrothermal alteration patterns as deduced from the presence of wide scale development of scapolite, tourmaline and epidote minerals associated with the ore mineralization. Its unique style of mineralization in terms of the structural and lithological controls, relationship with the country rocks, hydrothermal alteration patterns, mineralogical association and geochemistry of the host rocks reflects the formation of the deposit in a contrasting geological setting. The deposit is also characterised by a high tonnage, low grade ore and medium to high aspect ratio, with stratiform and strata bound morphology. Sulphur isotopic composition of the ore minerals suggest the ore precipitation from the deeper magmatic source as well as the mixing of the hydrothermal fluids with the seawater with variably reduced sulphur content. The integrated understanding of the ore deposit from the mode of occurrence, overall control of mineralization, age constraint, host rock association, hydrothermal alteration patterns, style of mineralization, ore mineralogical assemblages seems to be an analogue to a volcanogenic massive sulphide type depositional setup at Mundiawas-Khera area.

