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Geological Settings and Future Ore Potential of the Ordubad Region, Nakhchivan (Naxçivan), Azerbaijan, Lesser Caucasus

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The Ordubad district is located in southeast Nakhchivan and constitutes the Azerbaijan sector of the Zangezur-Ordubad metallogenic belt of the southernmost part of the Lesser Caucasus. The Ordubad contract area (OCA) is currently being explored for porphyry-style mineralisation by the Azerbaijan International Mining Company. The region contains several examples of porphyry- and epithermal-style mineralisation including the world-class Kadjaran deposit and the Agrak, Sungun, and Masjed Daghi porphyry-style deposits. The igneous rocks of the OCA were formed during the transition from Early Paleogene subduction to an Oligo-Miocene stage of collision to post-collision tectonics during the convergence of the African-Arabian and Eurasian plates. Previous work has demonstrated that these magmatic suites display strong “porphyry-fertile” signatures. The OCA is cut by the SE-NW Ordubad, Keleki, and Pazmara fault zones. East of the Ordubad fault constitutes the southwest part of the Mehri-Ordubad pluton (MOP) and hosts the porphyry Cu-Mo-Au centres of Misdag, Agyurt, Shalala, and Diakchay. The mineralisation at these centres presents as stockworks in NE-trending structural zones. The Pazmara fault juxtaposes a sequence of downthrown Eocene andesitic volcanic rocks against the Oligocene MOP. These Eocene units host the sub-epithermal Cu-Au vein systems of Shakardara and Piyazbashi, which are associated with extensive chlorite-epidote-carbonate alteration. Within the Eocene volcanic units west of the Keleki fault, an extensive area (12 km²) of intermediate argillic to advanced argillic alteration is observed, which may be interpreted as a potential lithocap. This alteration exploits the more permeable pyroclastic/epiclastic volcanic units. At the margins of this alteration are located the Dyrnis malacite-dominated Cu-Ag occurrences, which are interpreted as supergene “washouts.” The interplay of regional and local structures with favourable magmatic chemistry make the OCA a favourable district for both further discoveries and a natural laboratory for the study of the wider porphyry system model.