The structural control of the major Mo-Cu-porphyries and Au - polymetallic deposits of the Tertiary Meghri composite pluton, Tethys metallogenic belt, Lesser Caucasus, Southern Armenia

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The Zangezour ore district of Southern Armenia belongs to the central segment of the Tethys metallogenic belt. It is located within the South - Armenian terrain, and it was generated during the convergence of the southern margin of the Eurasian plate and the northern margin of the Arabian plate. The district is characterized by abundant Upper Eocene to Lower Miocene magmatism, which generated the Tertiary Meghri composite pluton and the Bargushat group of intrusions, which host major Mo-Cu-porphyries deposits, including the world-class Kadjaran deposit, and subsidiary gold and polymetallic hydrothermal deposits. The Meghri pluton is the largest pluton of the Lesser Caucasus. The composite Meghri pluton was formed by successive pulses of intrusive rocks, with Eocene olivine gabbro, gabbro-monzonite, syenite and syenogranite, followed by Oligocene to Miocene monzonite, quartz-diorite, monzodiorite, granodiorite, and porphyritic granite-granodiorite. Recent U-Pb TIMS dating of magmatic zircons and Re-Os dating of molybdenites confirm the pulsed magmatic and ore-forming events.

The tectonic setting of the Zangezour ore district is characterized by three major magma- and ore-controlling deep-seated tectonic zones, and include the Khustup-Giratak, Salvard-Ordubad and Central zones. The N- to NW-oriented Khustup-Giratak and Salvard-Ordubad zones are mainly characterized by Au mineralization. Epithermal gold, and polymetallic mineralization are associated with the Khustup-Giratak zone in the south-western part of ore region. They include the Tundirget deposit and the Mazra prospects. The Ordubad-Salvard tectonic zone hosts the Marjan Au-Pb-Sb epithermal deposit and numerous Au prospects.

The Central magma-and ore-controlling zone is located in the axial part of the Meghri pluton, and it is the product of a long lasting and multi-stage evolution. Major Mo-Cu- porphyry (Dastakert, Kadjaran, Lichk, Aygedzor, and Agarak deposits) and epithermal gold and polymetallic deposits (Tey-Lichkvaz and Terterasar) are associated with this zone. Detailed structural mapping and analyses of stereonets compiling ore-bearing fractures and vein orientations allow us to define the
main ore-controlling structures of these deposits. This zone consists of a complex of parallel north-south-oriented faults, including the regional Tashtun fault, which hosts the world-class Kadjaran deposit, and the Agarak and Lichk deposits. These north-south-oriented faults and in particular their intersection with east-west- and north-east-oriented faults played an important role in the formation of ore deposits and prospects of the region. The main paleostress axes orientations, based on our results, indicate that compression ($\sigma_1$) was southwest-oriented and it was responsible for tectonic fracturing in the Zangezour ore district. The axes of compression had a shallow plunge with average angles of 30-35° to the southwest.

The tectonic conditions associated with the south-west-oriented paleostress were favorable for dextral displacements along the north-south-oriented ore-controlling fractures, and repeated movements along the south-west-oriented ore-controlling fractures. Their orientation parallel to the regional south-west-oriented compression and circum-horizontal location of axis of extension, transverse to ore-containing fractures contributed to optimal conditions of extension. During formation of structural framework of the Kadjaran and Agarak stockwork deposits besides NS-oriented faults an important ore-controlling role are played also WE-oriented fractures. The above-mentioned tectonic conditions were favorable for sinistral displacements of the roughly east-west-oriented fractures.