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Cenozoic subduction to post-collision magmatic evolution of the Lesser Caucasus: new constraints from the Tejsar and Amulsar areas, Armenia

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The Lesser Caucasus, located in the Central Tethyan orogenic belt, extends from the Black Sea to the Caspian Sea across Georgia, Armenia and Azerbaidjan. It resulted from Neotethys ocean closure during the Late Cretaceous and the Cenozoic as a consequence of NNE-verging convergence of Arabia, Gondwana-derived microplates and Eurasia. The timing of the collision onset remains uncertain and recent studies, including this one, focused on constraining the geodynamic and metallogenic evolution from the subduction to post-collision stage in this part of the Tethyan orogenic belt.

The Lesser Caucasus is divided in three main tectonic domains, including from NE to SW: 1) the magmatic and sedimentary Somkheto-Karabagh belt and the Kapan Zone belonging to the Eurasian plate, 2) the ophiolitic Amasia-Sevan-Akera suture zone, and 3) the Gondwana-derived South Armenian block (SAB). Long-lived Cenozoic magmatic activity took place along the Pambak-Sevan-Sunik and Garni faults zones, as well as intermittent emplacement of Eocene to Miocene porphyry and epithermal deposits. Our knowledge concerning the geodynamic, magmatic and metallogenic evolution of the Lesser Caucasus remains fragmentary.

The Cenozoic geodynamic, magmatic and metallogenic evolution of the Lesser Caucasus has been relatively well constrained by recent studies in its southernmost part, known as Meghri-Ordubad pluton (MOP). Three distinct magmatic events of different ages and compositions have been recorded in this area, evolving from calc-alcaline mid-Eocene to shoshonitic/adakitic early Miocene magmatism. Each magmatic episode being associated with the formation of porphyry copper and/or epithermal deposits and prospects.

This study focuses on two new areas located in the northern and central Armenia, respectively known as the Tejsar and Amulsar areas. New geochronological and geochemical data have been obtained from these Cenozoic intrusions in both areas. Our new results present a similar geodynamic and magmatic evolution as the one revealed by earlier studies in the MOP. In Tejsar, three different magmatic series can be distinguished: 1) a 43 Ma old calc-alkaline magmatic pulse, 2) a 41 Ma old shoshonitic magmatic pulse associated with an epithermal gold deposit and 3) a 28.4 $\pm$ 0.2 Ma old adakitic-like magmatic pulse associated with a porphyry Mo occurrence dated at 29.34 $\pm$ 0.12 Ma. In Amulsar, a single 34.5 Ma old high-K calc-alkaline to shoshonitic magmatic pulse has been identified and is likely associated to the Amulsar epithermal gold deposit. This new data set proves that these different intrusions are part of a common regional Cenozoic magmatic arc and were associated with several distinct mineralizing events.