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Late Cretaceous Metallogeny of the Turkish Eastern Pontides and the Georgian Bolnisi District: Evidence for a ~700 km-Long Epithermal-Porphyry and VMS Belt Along Eurasia

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Late Cretaceous magmatic rocks of the Eastern Pontides in Turkey and the Bolnisi district of the northernmost Lesser Caucasus in Georgia have recorded comparable evolutions and host abundant base and precious metal ore deposits and prospects with a similar age range. Together, these two segments of the Tethyan orogenic belt document the presence of a highly fertile ~700 km-long eastwest-oriented metallogenic belt, which has been formed along the Eurasian margin during north-verging subduction of the northern Neotethys. The Late Cretaceous magmatic arc hosts abundant volcanogenic massive sulfide (VMS), porphyry and epithermal systems. The total metal potential (Cu, Au, Zn, Pb, Mo, Re, etc.) of this belt remains unknown, since the Late Cretaceous magmatic arc is partly concealed by Oligocene and Quaternary volcanic and sedimentary rocks, and its eastern extension into Azerbaijan still needs to be understood. The Late Cretaceous fertile metallogenic event is related to reactivation of magmatism along the southern Eurasian convergent margin after a magmatic lull of about 40 m.y. at the Early to Late Cretaceous transition. In the Eastern Pontides, bimodal Turonian to Santonian tholeiitic to calc-alkaline magmatic rocks host major VMS deposits (e.g., Murgul, Tunca, Hod Maden). A major magmatic and tectonic switch at about 83 Ma marks the onset of Campanian calc-alkaline to shoshonitic magmatism coinciding with the uplift of the arc, and resulting in the formation of epithermal (e.g., Yanıklı, Sisorta) and porphyry systems (e.g., Elbeyli, Emeksen). In the Georgian Bolnisi district, epithermal systems (e.g., Madneuli, Sakdrisi, Beqtakari) are coeval with late Santonian to early Campanian magmatism, dominated by felsic rocks ranging between low-K and high-K calc-alkaline compositions. Cenozoic post-ore tectonic, hydrothermal and magmatic events have overprinted the Eastern Pontides and its ore deposits. By contrast, such overprints are minor in the Bolnisi district, except local Eocene magmatism, therefore preserving its Late Cretaceous settings.