sequence. Evolutionary phases of the sedimentary basins were defined from an early extensional stage of the subduction, through island-arc formation, to the compressional stages when onset of nappe stacking gave rise to formation of polymict olistostromes and then redeposition of large blocks derived from out-of-sequence nappes of the previous platform foreland. Remarkable differences between the composition of the redeposited clasts in the olistostromes of the Bükk and Darnó area indicate deposition in different subduction-related subbasins.

Hydrothermal Pb-Zn-Au-Ag and Cu-Au mineralisation in the Kassandra mine district, N Greece: a metallogenetic model with regional economic implications?

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Mining has a long tradition in SE Europe, is important for today's regional economies, and will play a key role in helping secure future supplies of raw materials in Europe. Of particular importance is the Serbomacedonian–Rhodope metallogenic province developed throughout Serbia, Kosovo[*], FYROM, Greece and Bulgaria. The Kassandra mine district (KMD) in N Greece is part of this economically important region and since ancient times one of Europe's largest Au and Ag resources. The close proximity of different types of magmatic-hydrothermal deposit of known economic importance makes the KDM an ideal location for studying the genesis of base and precious metal deposits in the context of the regional geodynamic evolution. However, despite available data, the knowledge about the timing of magmatism and mineralisation is limited and an overarching, genetic district model is distinctly lacking.

Mineralisation in the KMD is related to Tertiary (Oligocene - Miocene) I-type, calc-alkaline magmatism in the metamorphic hinterland of the Hellenic orogen. The crystalline basement of the KMD is characterised by a tectonic nappe stack of Palaeozoic to Precambrian gneisses and marbles of the Kerdillion Formation and an ophiolitic mélange unit consisting of peridotites, dunites and amphibolites. Olympias and Mavres Petres are Pb–Zn (Au–Ag) carbonate-hosted massive sulphide replacement deposits. Both are interpreted to represent the distal and proximal part of a structurally controlled, skarn-type ore system on the footwall of the main detachment for the Southern Rhodope metamorphic core complex (SRMCC) — the Tertiary transtensional Stratoni–Varvara Fault. Recent work has made a step change in understanding the geological evolution of the N Aegean and suggests the SRMCC as a controlling factor in the regional mineralisation, requiring a reinterpretation of existing mineralisation models in this geodynamic setting. Skouries is a nearby Cu–Au porphyry resource and is part of a suite of mainly unmineralised porphyry stocks that intruded the hanging-wall of the same fault. The syenitic and dioritic to andesitic stocks were emplaced in a local intrusive belt, presumably along deep seated faults. The geodynamic–tectonic setting of this emplacement, subduction, continental arc or orogenic collapse, is hypothetical and not proven. PGE concentrations in the ore concentrates from the Cu–Au porphyry at Skouries and Fe–Ni–Co–V sulphides in a porphyry-style alteration system in vicinity to Skouries suggest an ultramafic/ophiolitic component to the mineralisation. The role of ophiolites in the hydrothermal mineralisation processes is a new angle that has not been previously considered and could have important applications in future exploration strategies.

[*] under UNSCR 1244.

This multidisciplinary study seeks to develop a new metallogenic model that correctly places the mineralisation in the regional context of extensional magmatism and core complex exhumation. This includes a new interpretation of old and the generation of new isotope and fluid-inclusion data in order to determine the origin and evolution of mineralisation-related magmas, fluids and ore components. Set against a refined understanding of the spatial and temporal distribution of magmatic–hydrothermal ore deposits in the south Balkan region, this will enhance our knowledge of ore generation processes in post-collision, orogenic belts and significantly aid future exploration. Our work will inform current exploration models through improved understanding of magma processes and hydrothermal systems associated with mineralisation in a province which has a particular complexity reflected by the uneven distribution of deposits in time and space. The KMD is ideal for developing such models due to the juxtaposition in space and time of a range of mineral deposit types; all with known economic importance.

New results and assessment of the geochronology of the youngest volcano of the Carpathian region: Ciomadul (Csomád), East Carpathians

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In the Carpathian-Pannonian region volcanic eruptions of various magmas have occurred for about 20 Ma. The last eruption took place at the Ciomadul (Csomád) volcano, Southeastern Carpathians, a lava dome complex with two explosion craters. The lava domes are built up by potassic dacites with fairly homogeneous composition. Plagioclase, hornblende and biotites are the main phenocryst phases in addition to less amounts of apatite, sphene, clinopyroxene, quartz, K-feldspar, FeTi-oxide, zircon and occasional olivine. The lava dome rocks are crystal rich with up to 40-50vol% crystal abundance sitting in a glassy matrix. The pumices formed during the explosive phases show similar bulk chemical composition and mineral assemblage, but significantly less crystal volume.

The precise chronology of the volcanic activity is still unclear. Previous K/Ar radiometric data suggested that an earlier effusive phase at about 900-500 ka was followed by explosive volcanic eruptions at least in two stages (about 220 ka and 10-40 ka, respectively). Combined petrographic and mineral chemical investigations have revealed, however, that most of the volcanic products consist of a mixture of mineral phases formed at different time and different stage of magma evolution. The reconstructed magma chamber evolution before formation of one of the lava domes (Kis Csomád) involves remobilization of an older crystal mush by fresh magma. This fact limits the traditional radiometric age determination of the volcanic eruptions. On the other hand, occurrence of charcoal fragments in two localities of pumiceous pyroclastic products helps to determine the age of the youngest eruptions. Former radiocarbon measurements from the Tusnad locality (western margin of Ciomadul) provided ambiguous results between 10-40 ka. Our new high-precision AMS radiocarbon data of a charcoal sample from the pyroclastic flow deposit in this locality give 41,300 cal (BC) In addition, we found further charcoal samples at another locality (Bixad) at the southern margin of the volcano. Here, three samples provided consistent ages of 29,500 cal BC. These data suggest that the product of the youngest eruption is exposed at the southern margin of the volcano (Bixad locality) and not at the western one (Tusnad locality) as was previously thought. Furthermore, it indicates volcanic activities with fairly large, distinct periods. The