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Towards understanding the interplay between tectonics, magmatism, and sedimentation in the Timok Magmatic Complex (TMC) basin of the Serbian Carpathians

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Among the many examples observed worldwide, the Timok Magmatic Complex (TMC) basin of the Serbian Carpathians represents an excellent area for a process-oriented study on the interplay between tectonics, sedimentation, and magmatism in continental back-arc basins above evolving subducted slabs. The TMC is a segment of the larger Late Cretaceous Apuseni-Banat-Timok-Srednogorie (ABTS) magmatic belt, formed in response to the subduction of the Mesozoic Neotethys oceanic lithosphere beneath the Carpatho-Balkanides of south-eastern Europe. However, despite many qualitative studies, the quantitative link between the subducted slab's mechanics and the overlying basins' evolution is less understood. Within the scope of the newly funded TMCmod project, supported by the Science Fund of the Republic of Serbia (GRANT No TF C1389-YF/PROJECT No 7461), coupled field and laboratory kinematic and petrological investigations will be focused on creating a conceptual definition of the TMC geodynamic evolution, by combining near-surface observations with the known evolution of the subduction system. This definition will be subsequently validated through analogue modelling and integrated into a coherent geodynamic model of tectonic switching in basins driven by the evolution of subducted slabs. The new geodynamic model coupling the TMC basin with its Neotethys subduction driver will quantitatively advance the strategy of prospecting and exploration of world-class porphyry copper-gold deposits, which have been actively exploited in this region for more than a century. Furthermore, reconstructed regional kinematic evolution will improve seismic hazard assessment during industrial and societal infrastructure planning and construction.