The Neogene to Quaternary Volcanism of the Carpathian–Pannonian Region: from the initial plate tectonic models to the quantitative petrogenetic explanations

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A wide range of volcanic activity was associated with the formation and evolution of the Pannonian Basin (eastern-central Europe) during the Neogene to Quaternary: (1) Silicic volcanic rocks (high-SiO_2 rhyolites and rhyodacites); (2) Calc-alkaline-type volcanic suites (basalt-andesite-dacite-rhyolite and adakitic rocks); (3) Potassic and ultrapotassic volcanic rocks (shoshonites, latites, leucitites, lamproites); (4) Alkali sodic volcanic rocks (various basalts, trachyandesites and trachytes). The origin of the magmas was incorporated into the early models in the advent of the plate tectonic concept, and this played a significant role in the geodynamic interpretations. Plate tectonic theory provides a general view about the areal distribution of volcanoes and the chemical composition of the erupted magmas, but this cannot be applied routinely. In this talk, we demonstrate how the diverse volcanism can be linked to lithospheric extension, subduction and post-collisional events. After 50 years of the intense research, there are still many open questions to be solved. Mutual understanding of the results of different disciplines is crucial to better constrain the evolution of this tectonically complex area with a highly extended continental crust, to reveal its resources, and to assess the potential natural hazards. Furthermore, we emphasize the volcanic geoheritage value of this various and long history of volcanic activity.