ABSTRACTS

Cenozoic structural evolution of the PANCARDI region: inferences from paleostress data and finite element stress modelling

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During the past decade large amount of paleostress data have been collected in the PANCARDI region to arrive at a better understanding of its Cenozoic kinematic and dynamic evolution. The principal aim of our study is to provide a comprehensive summary on the results achieved by separate working groups working on the deformation and stress history in different sectors of this intensely deformed part of the Alpine orogenic belt. Within this frame, we collected and compiled all available stress data published so far in a uniform data base which contains about 2000 entries from distinct tectonic units of the study area. This allowed us to construct a paleostress map series displaying the temporal and spatial evolution of the state of stress during Paleogene through Quaternary times. However, due to various reasons, the areal coverage and quality of these data exhibit strong heterogeneity. Areas in the Eastern Alps, the Transdanubian Range, the Western and Eastern Carpathians have been thoroughly examined, while great sectors inside the Pannonian Basin and most parts of the Dinarides remained "white spot" on our maps. Beyond these limits, this approach helped us to identify and interpret seven main structural events in and around the Pannonian Basin that are delicately reflected in the evolution of lithospheric stress. The combined analysis of stress indicators and the preliminary results of finite element stress modelling have shown that the state of stress in the PANCARDI region was governed by distinct tectonic factors. Hereby we argue for the strong correlation between the observed stress pattern and the boundary conditions affecting the area. A major contribution of our work is the recognition of the key importance of the relatively continuous northward drift of the Adriatic microplate with respect to Europe. As a result, active shortening at the South Alpine — Dinaric front played a relevant role in the stress evolution throughout Cenozoic times. Moreover, the formation and evolution of the Pannonian Basin system was mainly controlled by two additional processes during Neogene through Quaternary times. On one hand, subduction of the European plate beneath the internal (i.e. ALCAPA and Tisza-Dacia) units resulted in a slab pull force at the outer Carpathian front which may account for both tension (stress) and extension (strain) observed in the Pannonian Basin. On the other hand, body forces arising from density contrasts induced by the overthickened orogenic crust in the Eastern Alps and the presence of an asthenospheric dome beneath the internal sectors of the basin system could have also significantly influenced the reconstructed stress pattern.