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Geokinematics of Central Europe: new insights from the CERGOP-2/Environment Project

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The CERGOP2 project funded by the European Union from 2003 to 2006 under the 5^{th} Framework Programme benefits from repeated measurements of the coordinates of epoch and permanent GPS stations forming the CEGRN network in Central Europe, starting 1994. We report on the results of the systematic processing of the available data up to 2005. The analysis work has yielded the velocities of some 60 sites, covering a variety of Central European tectonic provinces, from the Adria indenter to the Tauern window, the Pannonian basin, the Vrancea Seismic Zone and the Carpathian Mountains. The estimated velocities define kinematical patterns which outline, with varying spatial resolution depending on the station density and history, the present day tectonic flow in Central Europe. The CEGRN data show that the majority of active contraction originating from the Eurasia Nubia plate boundary and the microplate between them is taken up primarily in the Eastern Alps, the Dinarides, and the Pannonian Basin. After removal from the ITRF2000 velocities of a rigid rotation accounting for the mean motion of stable Europe, the residual velocities have random orientations with 0.3 mm/yr scatter. This low figure provides an upper estimate for the level of rigidity of the European Platform. A 2.3 mm/yr north-south oriented convergence rate is implied by our data between Adria and the Southern Alps, and a narrow -$\sim$60 km wide- contraction zone in the Southern Alps is identified, consistently with earlier results. An eastward extrusion north of the contraction zone corresponds with the extension of the Tauern Window. In the southeastern boundary of the microplate, 4-4.5 mm/yr motion of Adria decreases to $\sim$1 mm/yr through the microplate, its boundary, and the Dinarides mountain range towards the southwestern part of the Pannonian Basin. Our data suggest that if the Pannonian Basin is subject to deformation, then it is most likely to be compressional than extensional. We conclude that compression

and associated contraction due to the Adria collision with the Alps and the Dinarides is likely to fade away in the Western and Northern Carpathians, where our velocities and strain rates show no significant deformation