CGPS DEFORMATION FIELD IN CENTRAL EUROPE: ANALYSIS AND MODEL

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In order to study the ongoing tectonic deformation in the Rhine Graben area the crustal velocity and strain rate fields from GPS array solutions are reconstructed. Permanent GPS stations, belonging to various networks (EUREF, AGNES, REGAL and RGP), have been used to estimate the general velocity field in central Europe. Moreover, the strain rate field has been calculated and displayed in terms of principal axes and values as well as projections of the tensor components perpendicular and parallel to the strike of major faults. A broad - scale kinematic deformation model across the Rhine Graben is provided dividing the area of study into four blocks between which there might be relative motion. The borders of the blocks were depicted on the basis of the differences between the velocity directions at the permanent GPS stations, of earthquakes, focal mechanisms and fault distribution. The SE and NE blocks are located S and N of the Alpine zone, respectively, while the band of seismicity connecting the Central with the Armorican Massif represents the border between the NW and the SW blocks. The division between the northeastern and the two western blocks passes trough the European Cenozoic Rift System (ECRIS). The velocity and strain rate fields were reconstructed along these borders, by estimating a uniform rotation for each block in terms of location of pole of rotation and angular velocity. The tectonic behaviour is well represented by the 4-block model in the Rhine Graben area: the velocity and strain rate fields found along the border corresponding to the ECRIS are consistent with geological observations and seismic results. Along the border between the NW and the SW blocks, a change in the direction of the velocity vectors (from WSW to S) is seen, and small values of strain rates are estimated. Nevertheless, although these results are realistic, more GPS stations and longer time series to support them are required. On the other hand, no significant strain rates are observed along the Alpine zone. Therefore, a more detailed model should be needed in this area. For this

purpose, mechanical 3D models are tested, considering geological, geophysical and geodetic constraints. The most reliable results obtained are compared with the ones provided by the 4-block model.