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Analysis of active extension in the Central Apennines (Abruzzo, Italy) using GPS measurements

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We present in this work the preliminary results of the GPS velocity field analysis in the Central Apennines (Abruzzo, Italy). Data from periodic campaigns operated in the period 1994-2006 have been processed and analyzed. The study area lies in a portion of the Central Apennines and extends from the Tyrrhenian to the Adriatic coasts.

Previous works outlined a predominant extensional active deformation in the Apennines, oriented NE-SW. Crustal strain rates obtained from the seismic moment tensor summation of historical and recent earthquakes shows values of about 0.3-3 mm/yr, while the analysis of the strain rates in the central Apennines performed with geodetic data led to values of about 3 mm/yr. Values of 4 and 6 $\pm$ 2 mm/yr came from VLBI data and GPS measurements respectively.

In the time span 1994-2006 seven GPS campaigns have been performed on 24 sites monumented by the Istituto Geografico Militare (IGM) in the IGM95 project and by the Servizio Sismico Nazionale in the Abruzzi region. The sites reoccupied are located across active mapped extensional structures, associated with destructive earthquakes ($M > 6$) showing paleoseismologically-defined slip rates up to 1 mm/yr.

Velocities of the 24 sites reoccupied for this work are aligned in an Eurasian reference frame and show two different patterns. On the Tyrrhenian side, west of the Fucino Plain, velocities have low values of about 1 mm/yr in the NW direction, in agreement with CGPS stations lying on the Tyrrhenian coast. In the Apenninic chain we outline a northeastward increase and a rotation in the N-NE direction of the site velocities east of the Fucino Plain, reaching values of about 3 mm/yr consistent with the CGPS ve-

locity on the Adriatic coast.We then considered the velocities of 10 sites aligned along a NE-SW transect in order to calculate the velocity profile in a direction roughly parallel to the orientation of the regional extension. The GPS velocities projected onto the N45 direction show a cumulative rate of extension of about 3 mm/yr, consistent with the extension rate predicted by the counter-clockwise rotation of the Adria block around an Eulerian rotation pole located in the Northwestern Italy. The extension rate is localized in $\sim$ 25 km wide area in the Fucino sector, while no significant deformation seems to be outlined west and east of the Fucino Plain. The strain rate predicted by the velocity profile in the area of maximum strain is of 119 $\pm$ 34 nanostrain/yr, representative of 12 years of interseismic strain accumulation, consistent at 1-sigma level with the values of 118 $\pm$ 32 and 58 $\pm$ 30 nanostrain/yr obtained by triangulation data analysis that spans a one order of magnitude longer period (120 years).