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Geodynamical aspects of the Eurasia-Nubia collision zone in Sicily (Italy): new data from a dense CGPS network

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The collision zone between Eurasia and Nubia spans the entire Mediterranean and is characterized by a deformation pattern which is the result of a complex evolution of the related collisional plate boundary system. Reconstructing the kinematic pattern of such a plate/microplate mosaic is not an easy task. For this purpose, we analyzed new geodetic data from continuous GPS measurements carried out between 1996 and 2006 in Southern Italy, and in particular in Sicily, which is one of the keys areas for understanding these complex tectonic. The collisional processes acting along the boundary between the Eurasian and Nubian plates in Sicily is also a critical context for the definition of the hazard related to intense volcanic activity and to a diffuse seismic activity. The Catania section of the Istituto Nazionale di Geofisica e Vulcanologia (INGV-CT) currently manage a network of about 40 continuous GPS (CGPS) stations. Many of these stations are devoted to the monitoring of active volcanic areas (Etna, Stromboli, Vulcano and Pantelleria), but some of these stations can help to improve the current knowledge of the geodynamical aspects of Sicily and surrounding areas. In this work we show the first results of the analysis of the data from CGPS network finalised to the estimation of velocity field referenced to an Eurasia-fixed reference frame. The time span covered by our stations is different, ranging from 10 years to, at least, 3 years. We analysed the data using the GAMIT/GLOBK software (King and Bock, 1995; Herring, 1995) in a two step approach: in the first step we used double-differenced phase observations from each day to estimate station coordinates, atmospheric zenith delays at each station, and orbital and Earth orientation parameters, applying loose constrains

to all parameters. In the second step we used the estimated station coordinates and their covariances from each day as quasi-observations to estimate a consistent set of coordinates and velocities for the entire period (10 years). The analysis of these velocities and of the main strain parameters in some peculiar areas more densely covered by our network (Aeolian Islands, Eastern Sicily) gives new insights in the small scale processes linking the geodynamical aspects and the volcanic activity and a description of the features related to the large scale process of the collision.