



Stress field measurements from joints: evidence for Middle-Late Quaternary deformation of the southern Adriatic foreland (Southern Apulia, Italy)

R. Caputo (1), D. Di Bucci (2), U. Fracassi (3), G. Mastronuzzi (4), P. Sansò (5), G. Selleri (5)

(1) Università degli Studi di Ferrara, Dipartimento di Scienze della Terra. Ferrara, Italy, (2) Dipartimento della Protezione Civile. Roma, Italy, (3) Istituto Nazionale di Geofisica e Vulcanologia. Roma, Italy, (4) Università degli Studi di Bari, Dipartimento di Geologia e Geofisica. Bari, Italy, (5) Università degli Studi di Lecce, Dipartimento di Scienza dei Materiali. Lecce, Italy

The foreland of the Apennine fold-and-thrust belt (Italy) essentially corresponds with the Adriatic Sea and has long been considered a tectonically and seismically “stable” area. The only exception is found in its central sector, one of the most seismic areas in the Mediterranean basin, corresponding on shore to the Gargano Promontory. It is characterised by significant historical and instrumental seismicity, and some active and seismogenic faults have already been identified (Gruppo di Lavoro CPTI, 2004; Castello et al., 2005; DISS Working Group, 2006, with references). To the South, the on shore Adriatic foreland of the Apennines is exposed only in the easternmost part of the Italian peninsula, i.e. in the Apulia region. Differing from Northern Apulia, Southern Apulia historically experienced only a few moderate earthquakes (e.g., 1826 Manduria earthquake, $I_{max}=VI-VII$, $M=5.3$; Gruppo di Lavoro CPTI, 2004). However, in 1743 the southern sector of the Adriatic foreland was also hit by a severe earthquake, probably located offshore ($I_{max}=IX-X$, $M=6.9$), and by a large tsunami (Mastronuzzi et al., 2007). Moreover, seismites have been recognised in deposits near the towns of Bari and Brindisi dated 125 ka (Moretti and Tropeano, 1996). All these clues suggest that Southern Apulia, a region whose Middle-Late Quaternary deformation was never investigated from a mesostructural point of view, is in need of a detailed analysis that may help outlining its present tectonics and the possible seismic hazard implications. Preliminary results of an original structural analysis carried out with this purpose indi-

cate that Southern Apulia has been affected by mild but discernible brittle deformation throughout the Middle and Late Pleistocene. Faults are rare and all characterised by little displacement, whereas extension joints prevail in most of the investigated sites, are frequently well exposed and organised in sets. Therefore, we carried out an in-depth quantitative analysis of these joint sets and of their relationships, in order to obtain indications about the tectonic component of the causative stress field. We analysed statistically the displacement vectors characterising the joints. In some sites we identified two orthogonal sets of extension joints, either crossing or abutting each other. According to Caputo (1995), we interpret this grid-lock system of geologically coeval joint sets as related to a common genesis and a unique remote causative stress field. For many of the considered sites, the results of our joint analysis allow us to infer the tectonic component of the stress field associated with Middle-Late Quaternary brittle deformation. The southern Adriatic foreland of Italy has a focal location with respect to the Central Mediterranean tectonic domains. The definition of the recent-to-active stress field which characterises this region, mild but not negligible as considered up to now, can provide a key to interpret the relationships among these tectonic domains.

Caputo, R., 1995. *Terra nova*, 7, 479-490. Castello, B., Selvaggi, G., Chiarabba, C. and Amato, A., 2005. CSI, version 1.0. INGV-CNT, Roma. <http://www.ingv.it/CSI/> DISS Working Group, 2006. Version 3.0.2. <http://www.ingv.it/DISS/>, © INGV 2006. Gruppo di Lavoro CPTI, 2004. CPTI04. INGV, Bologna, <http://emidius.mi.ingv.it/CPTI/>. Mastronuzzi, G., Pignatelli, C., Sansò, P. and Selleri, G., 2007. Marine Geology, in press. Moretti, M. and Tropeano, M., 1996. *Mem. Soc. Geol. It.*, 51, 485-500.