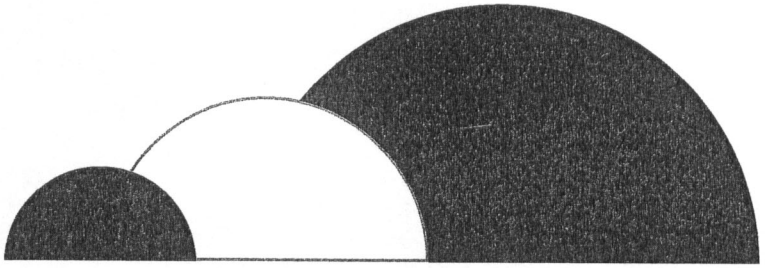
ISSN 1972-1552

Volume 2, 2007

Epitome



Geoitalia 2007

Sesto Forum Italiano di Scienze della Terra
Rimini, 12 - 14 settembre 2007

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highlight the paleo-depositional environment, the transgressive-regressive cycles during the highstands, and the eustatic-tectonic interplay in the terrace evolution.
The Late Pleistocene coastal deposits are characterized by wedge-shaped, landward-thickening sedimentary bodies, arranged in variable combinations of coarsening-upward (regressive) and fining-upward (transgressive) sequences, and intercalated table-shaped fluvial conglomerates. The transition downward to the Miocene and Pleistocene bedrock and landward to the paleo-sea cliff is characterized by an erosional-unconformity and by a coastal onlap, respectively. Significant thickness (~20 m or more) of the deposits (when the high relief and limited catchemnt basins adjoining to this coastline are taken into account) indicates sedimentation in accomodation space created by rapid sea-level rise prevailed upon land uplift during highstands. On the basis of the stratigraphical architecture, sub-orbital eustatic cycles (e. g. Thompson e Goldstein, 2005) during some highstands reflected in the terraces sequances can be argued.
In order to retrieve the nominal paleoshorelines, we mostly relied on the elevation of the terraces inner margin (the best-uniform sea level datum) and computed on a site-by-site basis its uncertanties in elevation. Error computation took into account accuracy in marker identification, measurement precision, thickness of cover shedding the inner edges, and paleo sea-level correction uncertainty.
The restored paleoshorelines show that Late Pleistocene to Holocene terraces are differentially uplifted along the coast. Although a regional signal accounts for the NE-ward tilt of the terraces (Cucci and Cinti, 1998; Ferranti et al., 2006), a second order signal with short-wavelength undulations is apparent. These undulations are interpreted in terms of paired anticlines and synclines. Preliminary radiocarbon dating, together with geomorphologic and indirect datings, suggest that Late Pleistocene and Holocene uplift occurred at variable rates of up to 2 mm/yr. Unlike previous interpretations (Bordoni and Valensise, 1998; Cucci e Cinti, 1998), the time-pattern of deformation argues for non-constancy of deformation.
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SESSIONE T40

Neotettonica e sismotettonica: metodi di indagine ed applicazioni all'area italiana e mediterranea

T40-1 Invitato Poli, Maria Eliana

10.1474/Epitome.02.0817.Geoitalia2007

ACTIVE FAULTS AND SEISMOGENIC SOURCES AT THE FRONT OF THE EASTERN SOUTHERN ALPS (NE ITALY): STATE OF ART.

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Key terms: Eastern Southern Alps; active fault; seismogenic sources

During historical time numerous destructive earthquakes (with M$\leq$ 6) hit the Veneto -Friuli area: seismicity is linked to the Quaternary evolution of the Eastern Southalpine Chain (ESC), a S-verging fold and thrust belt in evolution from Middle Miocene to Present. WSW-ENE to E-W trending thrusts extend from Lessini Mountains to the Italian - Slovenian border region. Up today the external front of the Chain propagates toward the South by means low-medium angle overthrusts that progressively involve Neogene and Pleistocene successions. Deformation of post LGM deposits, historical and instrumental seismicity largely documents the present tectonic activity of the area. The evolution and present-day structural framework of the ESC has been strongly controlled by the inherited structural pattern affecting the Mesozoic Adriatic passive continental margin, characterized by shallow marine carbonatic platforms and deep basins, separated by N-S- and E-W trending crustal normal faults. The inherited tectonic structures and palaeogeography influenced the development of lateral ramps along the main fronts and changes of the geometry of the thrust sheets. Moreover, in the Carnian and Julian regions the younger ESC thrusts were also geometrically influenced by the inherited Palaeogene, NNW-SSE trending thrusts of the External Dinarides.
Seismotectonic picture available until the nineteen was characterised by strong cylindrism, with long thrust fronts, entirely active for the whole Quaternary and without any evidence of segmentation.
During recent years by means CARG (Udine, Maniago and Gemona sheets), GNDT - 2000 and PRIN Projects, definition of the active faulting framework of external front of the Eastern Southern Alps was possible and new geological, geomorphological and structural data were collected: morphotectonic and neotectonic analysis allowed to date the activity and to define Quaternary kinematic of the active faults.
Quaternary successions were surveyed by UBSU units and the stratigraphic reconstruction was completed by radiometric dating and biostratigraphical analyses that locally enabled to detect timing of Quaternary depositional and deformational processes.
Geomorphological investigations were performed in order to identify the superficial traces of recent fault activity: gentle scarps connecting uplifted paleolandscapes of Quaternary age with the Veneto-Friuli plain-surface and considerable drainage anomalies, generally represent the most important morphostructural elements.
Mesostructural analysis allowed to reconstruct the Neogene-Quaternary stress pattern evolution and the present distribution of the σ1 principal stress axis in the Eastern Southalpine indenter.
Moreover the interpretation of reflection seismic lines of the Veneto-Friuli plain allowed to describe 2D and 3D geometries of the blind thrusts.
The updated structural sketch of the Plio-Quaternary front of the Eastern Southern Alps, shows a segmented system of mostly blind arcuate thrusts running along the foothills of the mountain range in the Venetian sector, or buried in the alluvial plain in the Friuli area. Some examples (Susans-Tricesimo, Pozzuolo, Arba-Ragogna and Montello thrusts) will presented and discussed.
The definition of the fault 3D geometry has permitted to draw seismogenic sources which (based on the empirical relations linking fault dimensions with Mw) may be responsible for earthquakes with M$\leq$6. This procedure has represented a fundamental step in the definition of the seismic hazard for a region with high frequency of destructive earthquakes but also high population density and highest density of industrial settlements.

T40-2 Invitato Barchi, Massimiliano Rinaldo

10.1474/Epitome.02.0818.Geoitalia2007

AN INTEGRATED MODEL FOR THE ACTIVE FAULTS OF THE NORTHERN APENNINES OF ITALY

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Key terms: Active Faults; Normal Faults; Seismic Reflection Profiles; Northern Apennines

The axial region of the Apennines of Italy is one of the most important active extensional belts in the world, extending from Northern Tuscany to Northern Calabria. Historical and instrumental seismicity (Mmax $\leq$ 7), related to NW-SE trending normal faults extension, affect the upper crust (D $\leq$ 15 km).
This talk is aimed to describe the state of the art for the section of the Northern Apennines, comprised between the Mugello basin and the Norcia basin. This is a region of low extensional strain rate, where coseismic surface ruptures are rare and their tectonic origin is debated. Consequently, the connection between "geological faults" (Quaternary faults mapped at the surface) and "seismological faults" (seismic ruptures revealed by mainshocks' focal mechanisms and aftershocks alignments) is matter of discussion.
The seismic reflection profiles give a significant contribution to address this topic, since they effectively image the "geological faults" down to the seismogenic depth (6-10 km). In the last ten years, after the CROP03 project, the interpretation of numerous commercial seismic profiles greatly contributed to the knowledge of the extensional belt of the Northern Apennines, mainly addressing:
- the recognition of the presence of east-dipping major detachments (Alto Tiberina fault, Etrurian fault system), whose role was previously unrecognized or largely underestimated;
- the reconstruction of the geometry of west-dipping normal faults, generating the moderate seismicity of the region, also contributing to reconstruct their length (i.e. along-strike continuity), slip variations and long-term slip rate;
- the definition of the subsurface stratigraphic and structural setting of the region, calibrated through deep wells, controlling the thickness of the seismogenic layer.
These observations have been integrated with other data sources (e.g. instrumental and historical seismicity, surface geology, geomorphology, palaeoseismology) in order to identify the seismogenic sources of the studied region. This work produced a complete and realistic model for the region comprised between Città di Castello and Norcia, demonstrating the strict connection between the Quaternary faults and the seismic ruptures.
In the last two years this approach was extended towards the north, to the region comprised between Sansepolcro and Mugello basins, where the connection between the distribution of the earthquakes and the alignment of the continental basins is less evident. The latter research was developed by the Research Unit of Perugia University in the framework of the DPC S2 Project (Valutazione del potenziale sismogenetico e probabilità dei forti terremoti in Italia, http://www.ingv.it/progettiSV/Progetti/Sismologici/sismologici_con_frame.htm), mainly through the analysis of a new set of seismic profiles, made available by ENI.

T40-3 Invitato Tortorici, Luigi

10.1474/Epitome.02.0819.Geoitalia2007

ACTIVE FAULTING AND SEISMICITY ALONG THE SICULO-CALABRIAN RIFT ZONE (SOUTHERN ITALY)

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Key terms: Seismotectonics; Quaternary; normal faulting; Calabrian arc; eastern Sicily

Southern Italy is dominated by extensional tectonics that in the Calabrian arc and Eastern Sicily produced the development of the Siculo-Calabrian Rift Zone (SCRZ). This zone is represented by a » 370 km-long fault belt consisting of 10 to 50 km long distinct fault segments which extend both offshore and on land that, being also responsible of the crustal seismicity of this region. The geological and morphological observations indicate that the active normal faults of the SCRZ are characterized by throw-rates ranging from 0.7 to 3.1 mm/a. They accommodate an almost uniform horizontal extension rate of about 3.0 mm/a along a WNW-ESE regional extension direction. Based on our field observations and following empirical relationships between magnitude and surface rupture length connections between large crustal earthquakes and distinct fault segments of the SCRZ have been also tentatively tested. Our data indicate moreover that the magnitudes (M) of the historical and instrumental earthquakes are consistent with the estimated values and that the geometry and kinematics of the fault segments and the related different crustal features of the SCRZ control the different seismic behaviours of adjacent portions of the active rift zone.