transtensional or extensional regime can be interpreted as due to the gradual growing of the Alpine relief and subsequent gravitational collapse.

Field evidences indicates that the third stage of deformation reactivate N/S faults. Seismotectonic data suggest that the activity of N/S faults is still ongoing. In fact in the Pinerolese seismic district the distribution of present seismicity seems to be concentrated mainly along the N-S/N20E fault system. From the analysis of the cross-section it is evident that in this area the seismicity is concentrated at a depth of about 10 km. Focal mechanisms selected along the N/S fault system show trastensive to extensional solutions.

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CORRELATING GEOMORPHOMETRIC UNITS DERIVED BY ISODATA CLASSIFICATION OF A MULTI-GRADIENT RELIEF DATA SET WITH GEOLOGY: CEPHALONIA ISLAND APPLICATION (POSTER)

POSCOLIERI M.*[1], SOUKIS K.[2], PARCHARIDIS I.[2], VASSILAKIS E.[2]
[1]CNR Istituto di Acustica "O. Corbino", Rome, Italy,
[2]Department of geology, University of Athens, Athens Greece
maurposc@interfree.it

Traditional manual methods have been employed for decades to measure geomorphometric properties from topographic maps. Such techniques tend to be toilful and time-consuming and the designated landform elements cannot be easily overlaid on any digital map and imagery for further applied research. This study deals with a geomorphometric procedure, based on the multivariate statistical analysis of local topographic gradients (Negroni et al., 2000; Parcharidis et al., 2001; Cavalli et al., 2002). This method employs sets of computer algorithms that automatically extract and classify geomorphometric properties, from Digital Elevation Models (DEMs), delineating uniform geomorphic units. The result of the above procedure is the creation of a morphometric image which is correlated later on with the local geology.

Cephalonia, one of the Ionian Islands in western Greece located at the northwestern part of the narrow convergence zone between Africa and Eurasia, was chosen as a test site for the application of this method. To the south, the Ionian basin is still being subducted under the Aegean domain of the Eurasian plate, whereas to the north, continental collision occurred between the Apulian microplate and the Hellenic foreland. Those two domains are linked by a major right – lateral, NE - SW trending, transform fault (Cephalonia Transform Fault), which is located offshore, northwest of Cephalonia. Inland, Late Cenozoic deformation created major and minor thrust faults that define four major and several subordinate tectonic blocks and affect the geomorphologic characteristics of the island (Underhill 1989).

In order to define quantitatively the geomorphologic characteristics of the Cephalonia Island, as aforementioned, a procedure, based on the analysis of local morphological setting, has been applied to geomorphometric data gathered by processing a raster DEM (20m/pixel ground resolution) produced by digitizing the contours lines from topographic maps on a 1:50000 scale. This geomorphometric method is based on the application of a multivariate statistical procedure to an 8-layers stack describing topographic gradients measured along the 8 azimuth orientations of each DEM pixel neighbourhood. Such an approach allows to quickly estimate the spatial distribution of different types of slope steepness, permitting discrimination of areas characterized by similar local geomorphologic setting, that reveal changes in shape, orientation and steepness thus emphasizing the impact of erosional and tectonic processes on the overall relief. Therefore, the input data to the classification procedure are the eight elevation differences between each DEM's pixel and its neighbours, calculated along the 8 main azimuth directions starting from the NW corner and moving clockwise. The classification technique, chosen to process the resulting gradient values, has been an unsupervised cluster analysis technique, such as ISODATA (Tou and Gonzales, 1974; Hall and Khanna, 1977).

To apply this multivariate procedure to the Cephalonia Island, the following input parameters have been chosen: a number of 15 classes, a change threshold percent of 1.0 and a maximum iterations number of 25. The resulting classification map has been presented assigning each class a given colour shade, in order to facilitate the interpretation. The classes have been, then, statistically analyzed by computing mean and variance of the eight layers, represented by the elevation differences with respect to each reference DEM's pixel. Thus, a thematic map of homogenous morpho-units has been obtained for an accurate evaluation of the spatial distribution of different local morphological settings. Moreover, to perform a correct geomorphic interpretation of the classification results and to verify the accuracy of the corresponding map, slope and aspect values, relative to Cephalonia Island, have been calculated from the same elevation matrix. Next, mean and variance of height, slope and aspect, relatively to all the 15 ISODATA classes, have been computed and compared with the 8-layers statistics earlier obtained directly from the classified thematic layers.

The analysis and interpretation of the morphometric image in comparison with the geologic and tectonic blocks maps showed locally high correlation. In many cases, a combination of morphometric classes forms characteristic patterns. Based on the existence of these patterns it wasn't possible to distinguish the major tectonic blocks. The major blocks are distinguished mainly by linear – shaped patterns corresponding to major thrust faults. However, it's possible to observe a relatively high correlation between the morphometric image and the subordinate blocks within a major block. This observation is based on the existence of minor characteristic patterns within the major blocks and also by the presence of linear – shaped patterns along their boundaries.

Concluding, it could be referred that unsupervised classification of a multilayer data set extracted from a DEM has allowed the automated definition of geomorphic units within the island of Cephallonia. The application of this processing method for the evaluation of similar morpho-units has assisted in highlighting the spatial distribution of geomorphologic features and their degree of intensity, providing a valuable new information source for geological applications.

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LATE QUATERNARY ACTIVITY OF THE SCORCIABUOI FAULT, SOUTHERN ITALY (POSTER)

SALVIULO L.[1,2], CAPUTO R.*[2]
[1]Dept. Earth Sciences, University of Catania, Italy.
[2]Di.S.G.G., University of Basilicata, Italy
rcaputo@unibas.it

Tectonic activity along the Scorciabuoi Fault (Basilicata, Southern Italy) is well documented for Pliocene-Middle Pleistocene period, but only generic information is available for Late Quaternary (Pieri et al., 1997). Following a multidisciplinary approach, the present research is devoted to fill this gap and to improve our knowledge on the seismic hazard of the area.

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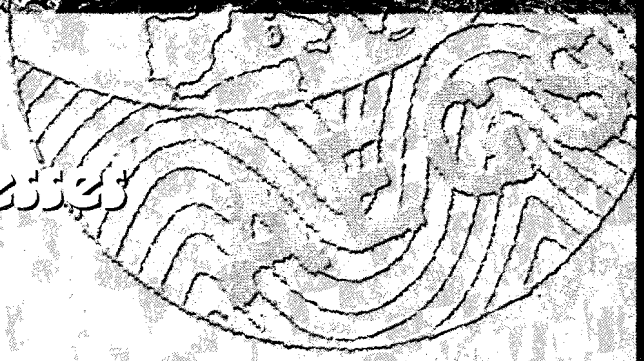

Natural hazards related to recent geological processes and regional evolution

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ABSTRACTS

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