

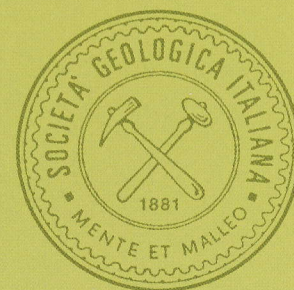
# Rendiconti

della

# Società Geologica Italiana

Sotto gli auspici del Consiglio Nazionale delle Ricerche

Volume V (2007) – Nuova Serie



**S.G.I.**

Fasc. 1

Società Geologica Italiana - Roma  
 2007



## Combination of morphometric indices as a method for the quantification of neotectonic evolution in active areas

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The linkage between tectonism and erosion may lead to the extraction of quantitative information regarding to the uplift rate of a fault block, based on the current relief. For this purpose different methodologies have been developed relating the differential block uplift with the eroding pattern of the stream channels. It is generally accepted that steep landscapes are associated with regions of rapid rock uplift, even if some exceptions exist. The fluvial network consistently maintains its connection to tectonic forcing and therefore contains potentially useful information about variations in rock uplift rates across the landscape. A number of studies have laid the groundwork for extracting this information, by exploring the theoretical response of channels to variations in rock uplift rate, and by analyzing fluvial profiles in field settings where the tectonics have been independently determined.

The methodologies discussed in this paper are used for the extraction of as much as possible tectonic information from the landscape, by interpreting high resolution digital elevation models (DEMs). The discussion focuses on the use of DEMs, which are inexpensive, easily obtained, and can be used to extract much of this kind of information quickly and easily, prior to field work. Such DEMs can be used for calculation of several morphometric parameters, providing a powerful tool for the exact

delimitation of neotectonic structures and potentially the estimation of the uplift rate. We summarize the basic theory published in previous researches, giving an idea of research needs which must be met before we can have a reliable quantitative tool for neotectonic procedures, in conjunction with quantified tectonic information derived from stream profile interpretation. The transition from the published theory to the accurate estimation of these geomorphometric indices is a complicated series of procedures based on calculations between arrays of pixels and visualize the results in a GIS platform. However, some uncertainty remains as to what can and cannot be learned from an analysis of river profiles, as a standard method for extracting tectonic information from these data does not exist.

The southern coastal zone of the Gulf of Corinth seems to be an ideal case for the application of kinds of methodologies, thanks to the conventionally calculated uplift rates. The combination of the calculated morphometric parameters with the tectonic uplift rates derived by previous studies led to the calculation of the average erosional coefficient. The interpretation of these results is in very good agreement between the variance of the values of every morphometric index and the irregularities of the drainage network, caused mainly by tectonism (active faults, block tilting). Strong variations of the index values combined with field data reveal probable unmapped tectonic structures which may have been significant in the evolution of the Gulf of Corinth rift.

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**KEY WORDS:** *fluvial erosion, neotectonics, Gulf of Corinth, tectonic geomorphology.*