



some morphological effects related to a non-uniform uplifting of crustal blocks in Northern Sicily (Central Mediterranean)

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We can distinguish two morphological evolutions of the drainage basins which develop in the earth's sectors subjected to uplift and tilting, in relationship to their antecedence or subsequence in comparison to the tectonic process. If this process begins in concomitance with a geomorphic cycle the main valleys of the drainage basins will longitudinally be developed according to the tilting direction which the crustal block is subjected. But if the non-uniform vertical movement develops in a sector already characterized by the presence of a hidrographic network, this can be influenced in its pattern in various ways.

A crustal block contemporarily subject to uplift and tilting will be characterized to its inside, at the end of this process, by more elevated and less elevated sectors. The erosive ground processes suffer this non-uniform vertical movement and since it gradually develops in time, landforms, as valleys of drainage basins, will suffer analogous variations.

If pre-existing, the slopes of the valleys will be subjected to tilting also and one of the characteristics in the evolution of the reliefs connected with the uplift and the tilting of crustal blocks are represented by the progressive asymmetry of the slopes of a valley.

The uplift and the tilting of the block progressively determines a difference of inclination of the slopes of the incising valley. This effect is given by the progressive incision and migration of the axis of the valley that it determines slopes with crests to different middle elevation between the right side and that left. The erosional process that determines him with the uplift and the tilting of the crustal blocks are characterized by a greater erosion rate in the sectors of head of the slope that is mostly raised. Likewise, the migration of the river consistent with the tilting direction determines a greater rate of erosion along one of the banks. The general morphometric result can be that of the individualization of slopes that -in section- constitute polylines assimilable to arcs of circumference with different rays of bending.

In map view, the evolution of the drainage network is characterised also from a different development of the river channels of different orders. Particularly, in the slope that is more subject to uplift the drainage network is more branched, with larger formation of river orders with respect to the opposite slope.

If we suppose that the crustal block underwent to uplift and tilting is eroded from several hidrographic networks that are identified in more drainage basins, at the end of the process, in absence of large-scale deformations as folding and faulting, the slope asymmetry of every main valley is maintained but, for tilting direction about orthogonal with respect to the directions of the rivers, a different altimetric development will be observed of the main rivers.

If to the tilting and uplift of the crustal block are associated internal deformations as folds and faults, then the asymmetry of the slopes not always may result clearly evident, as well as the altimetric development of the main valleys.

Regarding the above concepts, we recognised a non-uniform uplift and large-scale recent faulting in Northern Sicily (Central Mediterranean), both from drainage network pattern analysis, slopes geometries and structural data.

The data sets have been compared with the uplift rate and seismicity distributions, allowing us to recognise different crustal blocks in which the northern Sicily chain may be divided.

Each chain block reflects characteristic morphometric pattern of the drainage basins.

The morphostructural setting, the distribution of seismicity and the orientation of the recent faults indicate that the main neotectonic narrow deformation zones bounding the crustal blocks range from NW-SE, NE-SW and W-E.