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landforms evolution in collisional-dominated settings: the case of Northern Sicily (Central Mediterranean)

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In the young mountain chains underwent to emersion, the different crustal blocks which compose the belt may be subjected to differentiate tilting during uplift. The tilting process may be revealed both by the stratal pattern of the syn-uplifting deposits or deduced by the function altitude/area ratio. The prevailing of the uplift rate with respect to the tilting rate (and vice versa) result from the shape of this function.
So, in young mountains the hypsometric analysis may results a useful tool for decipher how the crustal blocks are underwent to uplift. An integrate analysis based on stratigraphy, structural and morphometric data represents the correctly approach for characterise the landform evolution in regions underwent to active tectonics.
In the aim to evaluate the recent tectonic history from topography in regions underwent to active deformations, by deducing the effect of tectonisms on landforms, the definition of the boundary conditions (regarding the crustal deformation) is fundamental for morphometric analysis.
In fact, the morphologic style and the morphometric pattern in tectonically active settings are closely related to the dominance of rock masses exceeding for uplift (or failure for subsidence) with respect to the exogenous erosional processes.
Collisional geodynamic processes induce crustal growth for faulting and folding. In this earth's sectors, the uplift of crustal blocks is a very common effect of compressional deformation.
It reflects for example fold amplification and thrusting, but it is a very common process also in settings dominated by crustal thinning, where the viscoelastic properties of the lithosphere induce tilting and localised uplift of normal-faulted crustal blocks.
The uplift rate is rarely uniform for wide areas within the orogens on the passive margins, but it changes from adjacent crustal blocks as the effect of space-variation of kinematics conditions or density. It also may change within a single block, as the effect of tilting, which induces synchronously mass elevation and subsidence.
Not considering sea-level fluctuations and the climatic-lithologic parameters, the 2D distribution of uplift rate influences the landmass evolution in time.
The tendency of rock masses to equilibrium resulting from concurrent tectonic building and denudation forces defines the geomorphic cycle. This evolution is checked by different stages, each characterised by a well-recognisable morphometric patterns.
The dominance of uplift or erosion and concurrent block tilting induce characteristic a landform evolution tendency, which may be evaluated with the morphometric analysis.
A lot of morphometric functions describe the equilibrium stage of landmasses, providing useful tools for deciphering how tectonics acts in typology (e.g. inducing uplift uniformly or with crustal block tilting) and resulting effects on landforms (magnitude of uplift rate vs tilting rate).
We aim to contribute in the description of landforms evolution in Sicily (Central Mediterranean) under different morphoevolutive settings, where may prevails uplift, tilting or erosion, each characterised by different morphometric trends.
The present-day elevation of Pliocene to upper Pleistocene deposits suggests that Northen Sicily underwent neotectonic uplift. The recent non-uniform uplift of Northern Sicily coastal sector is suggested by the different elevation of the Pliocene-Upper Pleistocene marine deposits. The maximum uplift rate characterise the NE Sicily and the minimum the NW Sicily.
The overall westwards decreasing trend of uplift is in places broken in the sectors where are located a lot of morphostructures. Localised uplift rates higher than the adjacent coastal plains are suggested by the present-day

elevation of the beachshore deposits of Tyrrhenian age.
Northern Sicily may be divided into a lot of crustal blocks, underwent to different tilting and uplift rates. Accentuate tilting and uplift results from transtensional active faulting of the already emplaced chain units, as also suggested by seismicity and the focal plane solutions of recent strong earthquakes.