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# QUANTITATIVE STUDY of FOLDED STRUCTURES of SEDIMENTARY COVER of ALPINE GREATER CAUCASUS: SOME PROBLEMS of its GEODYNAMIC MODELS and of SCHEMES of DEVELOPMENT

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Grater Caucasus (GC) is important part of Alpine mobile belt [1, 2], its structure and main features of development may be used for understanding of common regularities of earth (continental) crust forming. New results of folds related strain study [3, 4, 5] shown such properties of GC structure, which force to change some conventional models and ideas of geodynamics. Classic model of GC development [1] indicates two main events – folding formation during short period on border Eocene/Oligocene and the beginning of mountains grows since Sarmatian Age (14 m.y.). GC as mountain building upraised as dome-block structure with estimated magnitude about 3-5 km. Now several particular model exist which has this and other opinions. But all these models ignored an idea of construction of balanced structure which based on fold related strain study.

## Isostasy and rocks transformations

Most general balanced scheme of Greater Caucasus development [6] (including the part for East Caucasus [5]) indicates that some volume of crust attained the mantle density during 15 km thickness deposits accumulation and in continuation, next part of crust rocks undergone the same changes during the folding formation. In order to consider what volume of rocks undergo such transformations, the modeling of these situations (in aspects of volumes and density of rocks, also as of shortening values) in condition of preservation of isostasy may be offered. First results of such simplest calculations were made by V.G. Trifonov [7].

## Sources of energy

Three types of movement can be considered as the main in modern geodynamics. There are the spreading in mid-ocean ridge, convective transport from spreading to zones of a collision and the subsidence caused by rock weighting (growth of its density) in zones of collision/subduction. Processes of transformation of crust rocks to mantle one (in density) together with data on increase in amplitude of normal fault on level of a top of basement on the southern border of GC [3, 6] constrain to assume that processes of rock transformations in crust and mantle can play the leading role for GC among these three movements. Data about existence of structures of tension (elongation) in fold systems of GC and in its periphery is confirming this hypothesis.

## Relationship of folding and of neotectonic rising

Data on total erosion of the top part of a sedimentary cover to 19-22 km were obtained [5] and it contradicts to estimations of a neotectonic raising of peneplains (marine genesis) on 3-5 km for all space of GC. Dating of these surfaces by time of 12-7 m.y. [1] can be erroneous as peak plains in center part of GC can have modern glacial genesis. The combination of these data raises a problem of revision of duration and amplitude of neotectonic movements. Partially this task can be solved by comparison of volume, age and rock-compound of pebble in deposits in N-Q foreland depressions around GC with counted volumes of an eroded part of Lias-Eocene sedimentary cover of GC. Improvement of ratio in time of folded shortening (caused by subsidence of basement) and growth of mountains (as a result of basement rising) also is an important task. It is considering now that the formation of folded complexes took place considerably earlier than growth of mountains which sharply amplified [7] in the last 2 m.y.

## Geothermal gradient

Lias-Eocene rocks in GC were undergone metamorphic changes not deeper than zeolitic facies (with cleavage appearance), instead of greenschist facies expected for 20 km rock column and for usual 20°C/km gradient. Some structures are showing gradual transitions of size of erosion over such rocks from 4 to 20 km. It may prove 10°C/km low gradient.


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