

THE MAIN TASKS OF MORPHOTECTONIC  
MAPPING (on the pattern of the CAUCASUS)

Prof. B.A. BUDAGOV, Dr. A.S. ALIYEV

Institute of Geography, Azerbaijan Academy  
of Sciences, H. Javid Str., 31, Baku, 370143

ABSTRACT

The article presents the morphotectonic mapping on the pattern of the Caucasus. Morphostructure is the main object of this map. Proposed method allows to solve the main tasks of morphotectonic mapping.

The morphotectonics studies the relation of relief of Earth's surface with tectonic and deep structure of the Earth's crust. The object of morphotectonics is to study the morphostructures, which are the volume geological-geomorphological formation, i.e. the synthesis of geomorphological forms and tectonic structures. Morphotectonic mapping is based on those that the relief of Earth's surface reflects the bedding-block structure of Earth's crust. Morphostructure is elementary cell of morphotectonic map. Each morphostructure consists of three elements determined it: outside (ground) form - present relief of Earth's surface; inside (structure) form - tectonic structure; content - material composition. Just the elements of morphostructures are the object of morphotectonic mapping. Cartographical reflect of object (morphostructure) is one of the main problems in geomorphological researches. The main purpose of morphotectonic map is to reflect the relation of geological structure and geomorphological surface as an integral system. It is known that legend for map is the classification of different properties of object (morphostructure) in accordance with scale and aim. The main properties of morphostructures which is to be necessary to reflect on middle scale morphotectonic maps are follo-

wings: morphological homogeneity (dimension, altitude, order, area, geometrical form), sign (direction moves), definite type conformite of surface with tectonic structure, age, degree of connection form of relief and deep structure of the Earth's crust, material composition, limits, etc. A method offered by us for compiling of morphotectonic map was approbation on the Major Caucasus. The method consists of two stages of work.

Stage 1 - expose of morphostructures.

The first stage is divided in two substages: prefield and field. Prefield substage includes: A) qualitative recognition and marking out of contours of morphostructures on topographic maps and space photographs. For this it is necessary to collect the standart indications of interpretation of lineaments and morphostructures on space photographs (geometric - drawing of representation and optical-change of phototone) of research region. Usually the lineaments (photoline formation of the Earth's crust marked out on space photographs) correspond to fractures and it is the natural limits of morphostructures. The lineaments of different direction and genesis will be interpreted with the aim of expose of morphostructures of Azerbaijan. The analysis of planned disposition of lineaments allowed to reveal a definite net of regularly oriented lineaments (sublatitudes, submeridionals, diagonals direction). A general scheme of lineaments and morphostructures was worked out in result of interpretation of different scale space photographs. B) morphological (morphometrical and morphographical) analysis of morphostructures. Morphometric (quantitative) analysis of morphostructures is necessary beca-

use the change of quantitative characteristics is the indicator of morphostructures. In other words, spatial distribution choosed sections of Earth's crust is studied through their quantitative (morphometrical) and qualitative (morphographical) characteristics: altitude, area, horizontal and vertical dissection, steepness of slopes, design of hydrographical system, complication, etc. The analysis is based on interpretation of topographical maps, space photographs and spatial-statistical processing of relief, allowed to determine the most reliable limits of morphostructures and their quantitative difference. In prefield substage it is also necessary to attract the geologico-geophysical materials with the aim to confirm exposed on geomorphological indications of lineaments (order, kinematics). As a result prefield analysis is prepared the scheme on which finds reflection preliminary data about disposition exposed geomorphological forms and tectonic structures, supposed limits and age of morphostructures.

Field substage. Morphometric schemes made on the basis of topographical maps and space photographs give enough information about the morphological peculiarities of morphostructures. Therefore the field geomorphological investigation in morphotectonic mapping comes to minimum. On the whole two tasks are solved in the field: confirmation of conformity of geomorphological forms to tectonic structures; verification trustworthiness limits of morphostructures.

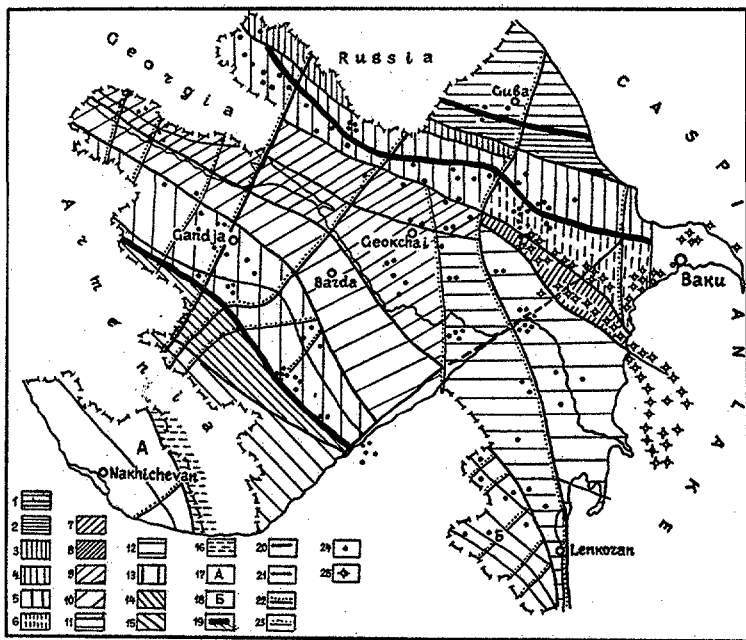
Stage 2 - geologico-geomorphological and geophysical interpretation of morphostructures.

On this stage the study of morphostructures and their

relations with deep structure of Earth's crust attracts the geologico-geophysical materials. The conclusions on the formation, genesis and age of morphostructures, marked out on the morphotectonic map, have been making. Such map can serve the basis for distinguishing the perspective areas to search the minerals. As a result final version of morphotectonic map is compiled (Fig.).

Morphotectonic structure and geodynamical regime of Caucasus is stipulated by horizontal pressing of lithospheric plates. Morphological reflection of this process is the wide development of overthrusts and thrust faults in Azerbaijan. The main geomorphological peculiarity of mountain systems of Caucasus is the stepped structure and asymmetry of slopes. The mountain systems consist of longitudinal tectonic steps conform hypsometric (morphological) layers. Steps are divided by gentle thrust faults. So, the morphotectonic steps, characterizing the main outlines of mountain system, are the main object of mapping in this work. This large morphostructures consist of: morphological layer (outside form); tectonic step (structure); and overthrust-formation complex (content).

So, the method allows to solve the task of morphotectonic mapping - to marking out the morphostructures of Caucasus by main genetic factor - active block-fault and overthrust tectonics.



LEGEND OF MORPHOTECTONIC SCHEME OF AZERBAIJAN\*  
 Morphotectonic steps: Major Caucasus (1-6); Kur depression (7-12); Minor Caucasus (13-18).

Faults. Caucasian stretch: 19- underthrust zones, root of zone overthrust; 20- overlap faults limited steps; 21- overlap faults complicated steps. Anticaucasian stretch: displacements of transforming type; 23- main faults. 24- epicentre of earthquakes with 3, 4 > 6, 25- mud volcanism

\* Characteristics of morphotectonic steps is not given in legend, in order not overload in scheme