

ON THE ISSUE OF MODERN GEODYNAMICS OF PLATFORM AREAS OF THE CENTRAL ASIAN FOLD BELT (ON THE EXAMPLE OF THE DEKHKANABAD TROUGH)

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ABSTRACT

The article deals with the issue of studying the geodynamic situation of the Dehkanabad trough, confined to the transition zone between the platform oil and gas-bearing territory and the orogenic region of the Southern Tien Shan. It is shown that the influence of external tectonic forces determines the current geodynamics of the deflection, expressed by the activity of north-eastern faults, the formation of small folded dislocations and the concentration of tension in the zones of curvature, intersections and interfaces of faults.

Keywords: *Geodynamics, Deflection, Structure, Plate, Tectonic, Tension, Faults*

INTRODUCTION

At present, in world practice, the issues of studying the geodynamics of seismically active zones and forecasting earthquakes in order to reduce their damage are urgent problems of most countries in the world, including Uzbekistan. Stable development of states located in seismogenic zones, their economic and isostructural level of progress depends on the degree of solution to this problem. In particular, carrying out complex geological and geophysical studies makes it possible to reliably decipher the current geodynamic environment of a section of the earth's crust, which makes it possible to assess its seismic risk and establish the most tectonic active faults.

The planned studies are aimed at solving the problems of seismotectonics through the prism of modern geodynamics of the territory of the Southwestern Tien Shan, in particular the Dekhkanabad trough. The restoration of the modern geodynamics of this structure was carried out through the synthesis of data on geology, tectonics, oil and gas content, geophysics, cosmogeology and seismology. The results of such a comprehensive analysis of geological data were a special study of the current stress-strain state of deflection by the method of physical modeling. In our opinion, what complex approach in solving urgent problems of seismology, as well as oil and gas content, will most reliably restore the modern geodynamics of the Dekhkanabad trough.

The purpose of the study - is the study of the modern geodynamics of the Dekhkanabad trough.

To achieve this goal, the geological materials of the South-West and South Uzbekistan have been studied. Geological-geophysical, tectonic, seismogeological and modern geodynamic models of the studied area have been studied: Materials of remote sensing of the earth have been studied in order to identify ring and linear cosmostructures and create a cosmostructural model of the Dehkanadabad trough. Based on a comprehensive analysis of the results of the study, the modern geodynamics of the Dekhkanabad trough was determined.

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MATERIALS AND METHODS

Analysis of materials on geology and tectonic structure, geological and geophysical features, cosmostructural and seismogeological features of the trough was done. A method for studying remote sensing materials and stress-strain of the earth's crust was followed.

RESULTS

Analysis of the available geological materials on geology, tectonics, geophysics, geodynamics, oil and gas potential and seismotectonics of Central Asia, in particular the southern territory of the Southern Tien Shan and the southwestern spurs of the Gissar, made it possible to establish that the studied area of the Dekhkanabad trough is a tectonically active area of the earth's crust. This is despite the difference in views on tectonics (Yakubov *et al.*, 1976; Davlyatov, 1971; and geodynamics Zonenshain, 1972; Mukhin, 1991; Abdullaev and Dolgopolov 2016 and others) of the formation and geological development of the territory of the Southwestern Tien Shan.

As a result of the tectonic activity of the trough, new structural elements are formed, the earlier laid ones are renewed, and all this leads to a complication of the structural-tectonic structure of a section of the earth's crust.

At the same time, deformation increases, as the geological and geophysical studies of the tectonospheres of Central Asia show (Tal-Virsky, 1982; Khamrabaev, 1962; Davlyatov, 1971; Mirkamalov, 2019, etc.) deformation increases along active regional faults (drag fold), in the zones of their intersections and junctions. And the degree of deformation here depends on many factors, among which the dominant position is occupied by the composition, and the physical and mechanical parameters of geological formations.

Research Khain, (2001 and 2002); (Trifonova *et al.*, 2002) M.Yu. Pushcharovsky, (2001); Akhmedzhanova and Borisov, (1972); Yarmukhamedova, 1993); Abdullabekova *et al.*, 2002) and other tectonic active zones of regional and local scales allows, in general terms, to conclude that a complex of structures is formed in the active zones that determine the localization of intense seismicity (Khain, 2008).

CONCLUSION

In our case, the Dekhkanabad trough is tamed to the transition zone between the platform area and the orogenic area of the Southern Tien Shan. In scale, naturally, it is inferior to the tectonic activated zone between the continent and the ocean. But despite this, they have common features expressed in tectonic and seismic activity, as evidenced by the data of Akhmedzhanov and Borisov (1972); Tal-Virsky and Zunnunov, (1972); Davlyatov, (1971); Abdullaev and Dolgopolov (2016); Abdullabekov *et al.*, (2002) and others.

These and other geological facts give grounds to study the modern geodynamic environment of the Dekhkanabad trough for solving problems of seismic hazard, forecasting and prospecting for oil and gas, for planning infrastructural development of the study area. determination of external tectonic forces acting on the deflection, and modeling the tectonic tension of the deflection structures under the influence of these forces. In this case, the objects of research were: the activity of faults in both the vertical and horizontal planes; block offset; areas of high stress concentration; deformation behavior under the influence of external forces.

Questions about the structural and tectonic structure of the Dekhkanabad trough in the framework of the geological structure of tectonics, geophysics and oil and gas content of the Mesozoic-Cenozoic cover have been resolved unambiguously.

However, there are disagreements in determining the nature and direction of the external tectonic forces acting on the deflection.

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In this regard, the reconstruction of the modern geodynamics of the Dekhkanabad trough was carried out in two versions: the first option takes into account the data. Center for Geological Research. Potsdam by Trifonov (1983); the second option is the results of studies by Abdullaev and Dolgopopolov, (2016) geodynamics and oil and gas content of the lithosphere of Uzbekistan.

In this paper, we will consider the results of the first version of the reconstruction of the trough geodynamics (Fig. 1). When reconstructing this version of modern geodynamics, it is assumed that the deflection is acted upon by external forces from the side; Indian plate (Himalayas) in the northwest direction; from the north - Kazakhstan microliths; and from the west - the forces that caused the displacement of the western territory of Central Asia from west to east.

The last tectonic forces acting along the trough from the west are data from space studies of the modern tectonic movements of the Earth's lithosphere. Analyzing these data, Trifonov (1983) notes that the horizontal displacement of tectonic plates occurs at different speeds and directions. He suggests that these differences are due to the tectonic sheathing of the lithosphere; by the injection of the oceanic lithosphere under the granite-metasomatic layer of the continents Trifonov (1983); In the zones of collision and absorption of the lithosphere at the boundaries of oceans and continents, significant modern deformations spread over huge distances from plate boundaries, forming a complex pattern of direction and speed of horizontal displacement.

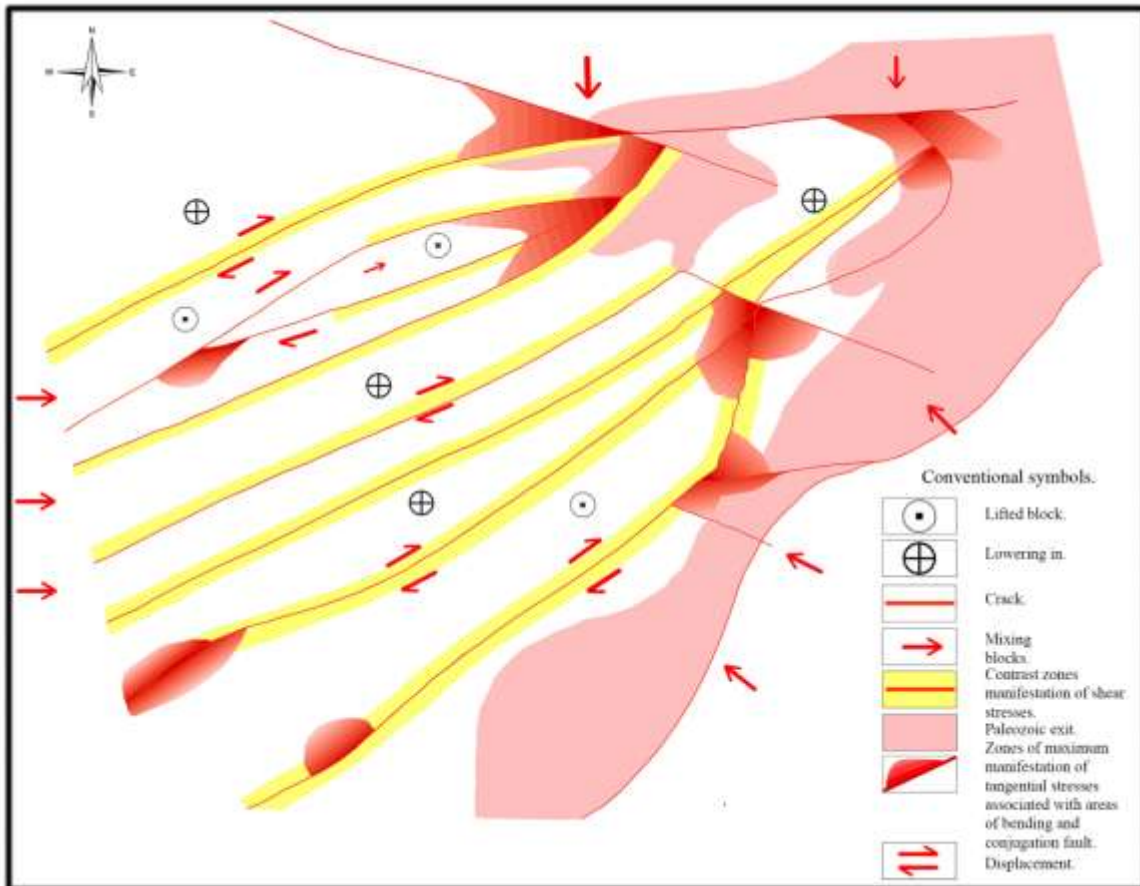


Figure 1: Model of modern geodynamics of the Dekhkanabad trough. Option 1. (The direction of external forces, based on the materials of G.V. Trifonov).

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This explanation by V.G. Trifonova provides a basis for determining the causes of the emergence of tectonic forces of the latitudinal direction, acting from the west to the entire territory of Central Asia, including the studied territory.

As is known from the west, the Dekhkanabad trough with the Beshkent trough is granite through a deep fault, in the east - by the orogenic structures of Gissar, to the north is a powerful zone of the South Gissar regional fault. The axis of the Dekhkanabad trough and parallel discontinuous structures (uplifts, thrusts) stretch in a northeastern direction, where they extend beyond Uzbekistan in the south, and abut the orogenic structures of the Southern Tien Shan in the north. The impact of external tectonic forces on the Dekhkanabad trough from the southeast, from the Indian plate, is characterized by the fact that the direction of the external forces almost - that is perpendicular to the direction of the system of northeastern faults of the deflection. In this situation, when the structure is subjected to compression directed to the cross of its strike, the fault zone is compacted and its thickness is reduced, displacement along the fault along the horizontal plane does not occur.

The tectonic activity of faults also depends on their direction and angle of incidence. All large fracture structures of the deflection are steeply dipping. Depending on their morphology, one can observe both horizontal and vertical movements along them, with increased deformation of rocks in the zones of influence of activity. As a result, fine folds are formed along the faults, the axis of which is parallel to the direction of the activated fault. According to the modeling of stresses in the structures of the Dekhkanabad trough, in the curvature area, in the zones of conjugation and suppression of faults, there is a concentration of tangential stresses and an increase in deformation (P.M. Bondarenko 1985; V.M. Isai 1983; M.K. Turapov, 2011).

From the west, external forces act on the Dekhkanabad trough in the latitudinal direction and in relation to the faults at an angle of 40-45°.

Experimental data (Luchitsky 1985; Gzovsky 1975; Bondarenko 1985; Gintov 1985 and others) on modeling the structures of a section of the earth's crust show that when external forces act on the fracture structure at an angle of 40-45°, then the maximum manifestation of activity is observed in it, depending on the morphology and form (Turapov, 2011) of the shear.

In the study area, with a similar layout, the directional external forces and discontinuous structures acting from the west should note the tectonic activity of the latter in the form of a clockwise shift. According to tectonic studies (Davlyatov 1971; Tal-Virsky 1982; Abdullaev, Dolgopopolov, 2016) the overwhelming majority of discontinuous structures of the Dekhkanabad trough are reverse faults and under strike-slip faults.

The intensity of the manifestation of tectonic activity of the structures of the deflection depends not only on their relationship with the external forces acting on them, but also on the morphology and their internal structure.

The data on the morphology and structure of the fractured structures of the Dekhkanabad trough show on both geological and structural maps of the depression and its individual oil and gas bearing areas, the fractures of the trough have a rectilinear morphology.

Large discontinuous structures of the northeastern direction break the trough into blocks, giving the territory a key-like structural appearance. Since these structures are studied by the Paleozoic basement by Sh.D. Davlyatov (1971), B.B. Tal-Virsky, Zunnunov (1972), their activity is synchronous with the activity of the basement structures, i.e. external forces of a planetary scale act with equal force on the entire lithosphere of Central Asia, including the Mesozoic-Cenozoic cover of the Dekhkanabad trough.

The activity of the basement structures is the reason for the concentration of shear stresses in the zones of change in their morphology. The excess of the shear stress over the internal stress of geological formations in these zones of structures in most cases will provoke an earthquake Ulomov 1971; Abdullabekov, Artikov, Ibragimov, *et al.*, (2002). This indicates that the Dekhkanabad trough is a tectonic active zone and confirms that its fracture structures, extending deep into the Paleozoic basement,

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are earthquake-prone, and are important elements of seismic zoning of the territory of the platform part of Western Uzbekistan and forecasting earthquakes in order to develop the infrastructure of the region.

A feature of the stress state and deformation in the vicinity of the fault space is their uneven, contrasting manifestation. Tension and deformation increase in the areas of change in the morphology of faults, and the dynamics of the structure is expressed passively. In the linear sections of the faults, on the contrary, their dynamics are intense, and the tension and deformation are weakened due to the energy consumption of external forces for displacement along the fault.

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