

STRUCTURAL, COGNITIVE, AND DISCURSIVE CHARACTERISTICS OF THE GEOLOGICAL TERMINOSYSTEM

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Annotatsiya. Mazkur maqolada geologik terminotizimning lingvistik, kognitiv va diskursiv xususiyatlari hamda uning ilmiy diskursdagi funksional o'рни tadqiq etiladi. Zamonaviy lingvistik paradigmlar nuqtayi nazaridan terminologik tizim shunchaki ixtiyoriy nomlar yig'indisi emas, balki muayyan fan sohasining konseptual tuzilishini aks ettiruvchi yuksak darajada tartiblashgan semiotik-kognitiv tarmoq sifatida baholanadi. Ushbu tadqiqotda terminologiya fanining klassik struktural modellardan hozirgi kognitiv-diskursiv yondashuvlarga bo'lgan taraqqiyotini kuzatish orqali geologik terminlarning semantik aniqlikka va tizimli tartibga qanday erishishi tahlil qilinadi. Shuningdek, maqolada geologik leksikaning milliy tillarda shakllanishi va me'yorlashuvi, xususan, o'zbek va qoraqalpoq tilshunosligida kuzatiladigan strukturaviy-semantik salohiyat hamda leksikografik barqarorlashuv masalalari o'rganiladi. Tahlil natijalari ko'p jildli akademik lug'atlarning soha terminlarini tilning ichki qonuniyatlari va xalqaro standartlarga muvofiq standartlashtirishdagi asosiy vosita ekanini ko'rsatadi.

Kalit so'zlar: geologik terminotizim, ilmiy diskurs, kognitiv lingvistika, so'z yasash salohiyati, leksikografiya, qoraqalpoq tilshunosligi, o'zbek tilshunosligi, standartlashtirish.

СТРУКТУРНЫЕ, КОГНИТИВНЫЕ И ДИСКУРСИВНЫЕ ХАРАКТЕРИСТИКИ ГЕОЛОГИЧЕСКОЙ ТЕРМИНОСИСТЕМЫ

Аннотация. В настоящей статье исследуются лингвистические, когнитивные и дискурсивные характеристики геологической терминосистемы и ее функциональная роль в научном дискурсе. В контексте современных лингвистических парадигм терминосистема рассматривается не как произвольная номенклатура, а как высокоорганизованная семиотико-когнитивная сеть, отражающая концептуальную архитектуру научной дисциплины. Прослеживая развитие терминоведения от классических структурных моделей до современных когнитивно-дискурсивных подходов, автор анализирует, каким образом геологические термины достигают семантической точности и системной организации. В статье также исследуются процессы формирования и нормализации геологической лексики в национальных языках, при этом особое внимание уделяется структурно-семантическому потенциалу и лексикографической фиксации на материале узбекского и каракалпакского языкознания. В ходе анализа подчеркивается роль многотомных академических словарей как ключевых инструментов стандартизации отраслевых терминов в соответствии с внутренними законами языка и международными нормами.

Ключевые слова: геологическая терминосистема, научный дискурс, когнитивная лингвистика, словообразовательный потенциал, лексикография, каракалпакское языкознание, узбекское языкознание, стандартизация.

GEOLOGIK TERMINOSISTEMANING TARKIBIY, KOGNITIV VA DISKURSIV XUSUSIYATLARI

Abstract. This paper investigates the linguistic, cognitive, and discursive characteristics of the geological terminosystem and its functional role within scientific discourse. In the context of modern linguistic paradigms, a terminological system is evaluated not merely as an arbitrary nomenclature, but as a highly structured, semiotic-cognitive network that reflects the conceptual architecture of a scientific discipline. By tracing the development of terminology science from classical structural models to contemporary cognitive-discursive frameworks, this study analyzes how geological terms achieve semantic precision and systematic organization. Furthermore, the article explores the formation and normalization of geological vocabulary within national languages, focusing specifically on the structural-semantic potential and lexicographical stabilization observed in Uzbek and Karakalpak linguistics. The analysis underlines the role of the multi-volume academic dictionaries as key tools for standardizing domain-specific terms in accordance with internal language laws and international standards.

Keywords: geological terminosystem, scientific discourse, cognitive linguistics,

word-formation potential, lexicography, karakalpak linguistics, uzbek linguistics, standardisation.

Introduction. One of the most important and current directions in modern linguistics is the systematic linguistic, cognitive, and discursive analysis of field-specific terminological systems that develop in accordance with the laws of rapid scientific and technological advancement. Socio-economic development, the intensive exploitation of mineral resources, and the global emergence of critical geo-ecological problems demand a continuous updating of geological science. Concurrently, this requires a rigorous revision of the theoretical foundations of the geological terminosystem, which serves as the linguistic reflection of this discipline.

A geological terminosystem is not merely a simple collection or translation dictionary of terms regarding the crust of the Earth, its composition, structure, petrographic dynamics, tectonic movements, minerals, and stratigraphical layers. Instead, it is a complex structural-linguistic system whose components exist in direct mutual cognitive, semantic, logical, and hierarchical relationships. In scientific discourse, geological terms serve not merely as informative tools to deliver data, but as instrumental-cognitive tools that actively shape new geological hypotheses and theories.

Theoretical Foundations of Terminology Science and Structural Systemicity

In clarifying the theoretical basis of the geological terminosystem and determining its methodological place in scientific discourse, focusing on the linguistic nature of the concept of a "term" is an essential prerequisite. D.S. Lotte [9], a well-known scientist who founded the initial theoretical school of terminology and proved the systematic character of terms, demonstrated the fundamental differences between terms and common leksika (vocabulary). He proved that terms possess a stable meaning within a specific conceptual field, precision, and the innate ability to form an integrated system. In the field of geology, this characteristic is exceptionally clear because the language of geological concepts is distinguished by its objectivity and its capacity to encode natural phenomena with mathematical-geographical precision.

Analyzing a specialized terminological field as an independent functional-lexical layer of language, V.M. Leychik defines a term as:

"...a language unit belonging to a special and professional field of knowledge, possessing definitive linguistic and derivational characteristics, expressing a special conceptual notion, and reflecting the mental system of that field" [8].

In geological discourse, this mental system encompasses highly complex macro-concepts such as the lithosphere, magmatism, stratigraphy, and geochemistry.

The development laws of terminological systems and their functional theory in modern linguistics were also extensively discussed in the works of A.A. Reformatzky [14]. The scientist highlights that the core characteristics of terms include revealing their real semantic meaning strictly within the scope of a specific scientific field, striving toward monosemy (having a single meaning), being incompatible with structural synonymy and homonymy, and being completely devoid of any emotional-expressive coloring.

In geological vocabulary, this law is precisely maintained. For instance, terms like anticline, syncline, metamorphism, hydrogeology, and oogeometry lose their semantic precision when taken out of professional discourse; whereas within the scope of the discourse, they serve as terminological units with a single, clear meaning.

The Geological Terminosystem in Uzbek and Karakalpak Linguistics

In Uzbek and Karakalpak linguistics, fundamental research on field-specific terminologies and the linguistic features of scientific discourse is being carried out systematically. Sh. Rahmatullayev systematically studied the formation and development laws, word-formation potentials, and semantic structures of terminology in the Uzbek language. He noted that developments in science and technology are immediately and directly reflected in the lexical composition of a language, especially in branch terminologies, and that this process is governed by the internal derivational laws of the language. The development of geological science precisely confirms this view, as new petrographic and geophysical terms enter the language and become systematized alongside the growth of the mining industry, hydrology, and ecogeology [13].

In Karakalpak linguistics, the theoretical and practical issues of terminology science, as well as the stages of formation and structural-framework modeling of industry terms based on the national language, were extensively researched by E. Berdimuratov [3]. In his fundamental work on lexicology, Berdimuratov demonstrated the paths through which national terminological systems are enriched. This occurs through the internal word-formation capacities of the national language—specifically morphological and syntactic methods—and via vocabulary borrowed from other languages, particularly Russian and Greek-Latin elements. The evolution of geological terminology within the context of the Karakalpak language continues to develop steadily as a result of the language's own term-forming affixes, syntactic unification, and integration with the international terminological fund.

This tradition of investigating the lexico-semantic features of specialized terminological systems within Uzbekistan is reinforced by H. Jamolxonov, who discussed the development stages of the scientific style and terminology of the Uzbek language, focusing on the problems of standardizing, unifying, and correctly applying terms in academic textbooks [7]. Furthermore, among the scientific investigations carried out on branch terminologies in the Karakalpak language in recent years, the works of M. Qosjanov must be highlighted. He demonstrated the specific ways the Karakalpak vocabulary is enriched, the unification of terms, and the impact of external socio-linguistic factors through rigorous empirical observations. These theoretical views provide a clear linguistic framework for understanding the ongoing processes of formation, unification, and integration of the geological terminosystem within the national language fund [12].

Cognitive-Discursive and Semiotic Dimensions of Geological Text

Investigating the problems of scientific discourse and text linguistics within the modern linguistic paradigm, N.D. Arutyunova highlights the social, cognitive, and communicative nature of discourse, explaining that:

"...discourse is the living life of language in action, within its socio-cultural and scientific-intellectual context" [11].

Geological discourse encompasses the mutual professional communication of specialists, scientists, and practitioners in that field, as well as the textual features of scientific articles, dissertations, geological reports, maps, and textbooks. Within this discourse, the geological terminosystem serves as a supporting structural skeleton, performing the function of transforming and transmitting specialized knowledge.

In studying the structural-semantic foundations of geological terminology from the perspective of linguistic characterization, V.A. Tatarinov's works on the theory and methodology of terminology science are of great significance. Tatarinov reveals the derivational (word-formation) potential of terms and the laws governing their application and stabilization in specialized texts [16].

Most geological terms are formed through predictable derivational paths, either based on international Greek-Latin elements such as geo-, -logy, -graphy, -lite, -metry or through the syntactic and morphological methods of the national language. In the Karakalpak language, syntactic and morphological structures form descriptive terms such as:

jer qabıǵı - earth crust

taw jınısları - rocks

jer astı suwları - groundwater

These combinations show that native lexical stems directly undergo the laws of linguistic derivation to fulfill scientific functions.

New directions of terminological vocabulary in the aspects of cognitive linguistics, conceptual analysis, and frame modeling were proven in the works of L.A. Manerko [11]. She views terms as linguistic signs of concepts, showing that every field of science possesses its own mental map and frame system. In the geological field, there are basic hyper-concepts or superordinate notions such as "Earth's Crust," "Mineral," "Tectonics," and "Surface Dynamics," around which hundreds of hypo-concepts or subordinate terms form cognitive frames and systematize scientific knowledge.

Similarly, D.A. Bakhtiyarova investigated the cognitive field of specialized vocabulary, particularly terminological systems belonging to the exact and natural sciences in Uzbek linguistics. She notes that any specialized discourse builds its supporting structural framework through these highly specific terminological clusters[2]. The geological discourse operates under this identical law, serving as a cognitive-semiotic tool in transforming and preserving scientific knowledge about the earth.

Evolutionary Dynamics and Lexicographical Standardization

In the modern paradigm of linguoterminology, studying terms not just as isolated linguistic units but as cognitive-semiotic systems that encode knowledge is highly required. S.V. Grinev-Grinevich, in his methodology of terminological analysis, investigates the evolution of terms in connection with the development of society and science. Geological vocabulary has undergone a complex evolutionary path, originating from the natural, everyday terms of the initial empirical era of earth exploration up to the modern, high-tech, and computerized geophysical terminology of the theoretical-systemic era [6].

In Uzbek philology, the views of A.E. Mamatov occupy a special place in studying the cognitive-semantic field of terminological systems. He developed a comprehensive methodology for determining the mutual dominance and subordination relations of terms based on linguistic field theory, establishing how core (nucleus) and periphery relations operate within a field-specific vocabulary[10].

Studying the specific linguistic characteristics of the geological terminosystem requires evaluating its degree of unification and standardization in both national and international arenas, rather than just its development history. In this regard, addressing the unification of terminological systems, N.V. Podolskaya states that the professional language of any field of science must clearly define its semantic boundaries and correspond to international standards [15]. In geological science, this problem is highly relevant because the names of most minerals, petrographic objects, or stratigraphical layers consist of words from international languages-specifically Greek, Latin, English, and Russian. Unifying them in accordance with the phonetic-morphological laws of the national language requires fundamental linguistic research.

The scientific views of A.S. Gerd occupy a special place in the formation of industry terms and their lexicographical matching. He proves that the stability of scientific style and discourse is directly connected with the correct explanation of terms in translation and explanatory dictionaries, allowing them to acquire an official normative status[5].

From this perspective, a fundamental source that structurally compiles the exact corpus and terminological potential of the Karakalpak language at an academic level is the 7-volume Explanatory Dictionary of the Karakalpak Language [4]. The role of this dictionary is paramount in researching the place of geological terms in the national language fund, their relationships with common words, and the stages of their semantic specialization. Basic geological concepts such as tas (stone), qatlam (layer), jer (earth/ground), and jınıs (rock/genus) are lexicographically unified within this work:

Core karakalpak stem	Conceptual extension in geological discourse	Semantic role
Tas (Stone)	Formulates mineralogical and lithological classifications	Lexical Base
Qatlam (Layer)	Denotes stratigraphical and sedimentary layers	Stratigraphical marker
Jer (Earth/Ground)	Serves as the root for geotectonic and geomorphological terms	Planetary/Structural Base
Jinis (Rock/Genus)	Applied to petrographic classifications (taw jinislar)	Taxonomic Category

These terms serve as a foundational source for identifying the linguistic base of specialized terminological systems and forming new scientific derivational chains. This fundamental lexicographical work has proven, both theoretically and practically, the capacity of the Karakalpak scientific style and discourse to absorb, structurally adapt, and standardize international terminological systems.

Conclusion. The geological terminosystem is an intricate linguistic and semiotic system characterized by a deep history of development, a precise conceptual field, and specific structural-semantic, cognitive, and discursive attributes. Its functional position within scientific discourse is determined by its capacity to encode, store, unify, and deliver academic knowledge. In verifying the formation levels, stability of usage, and semantic scope of industry terms in the Karakalpak and Uzbek languages, relying on the contemporary achievements of national lexicography remains an urgent priority. Ongoing research must continue to balance the preservation of national language laws with the integration of the international terminological fund to ensure clarity and precision in global scientific communication.

Foydalanilgan adabiyotlar ro'yxati

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