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SOCIO-CULTURAL CODE IN KAZAKH AND KHAKASS HYDRONYMS

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ABSTRACT

The article explores the socio-cultural code reflected in Kazakh and Khakass hydronyms, showing how the names of rivers, lakes, springs, and other water bodies preserve ethnic memory, worldview, and traditional ecological knowledge of Turkic peoples. The study involves an analysis of the structural, semantic and etymological features of hydronyms based on field data and regional toponymic data using a comparative onomastic approach based on lexicographic sources. In addition, special attention is paid to the understanding of the property of water and references to lexemes, animals, plants, natural phenomena, mythological figures, expressing the ideas of purity and danger, prosperity and misfortune. During the analysis, it was found that the hydronyms Kazakh and Khakass have a common Turkic basis, as well as intercultural ties and experience in using regional historical sites. Hydronyms explain the signs of collective identity and territorial affiliation through brief cultural texts, preserving ancient beliefs, tribal structures, economic activity and migration routes. The article discusses systematic hydronymic research and the possibility of rethinking the elements of the traditional linguistic worldview and monitoring cultural changes in the context of modernization and globalization through ethnolinguistics and cultural onomastics.

KEYWORDS: Socio-Cultural Code; Hydronyms; Kazakh; Khakass; Turkic Languages; Linguistic Worldview; Ethnolinguistics; Cultural Onomastics; Toponymy; Linguistic Landscape.

1. INTRODUCTION

Aitken (2019) describes hydronyms as the oldest layer of place names, as well as the main repository of cultural memory and linguistic heritage. The names of rivers, lakes, and other bodies of water make a significant contribution to the disclosure of complex socio-cultural meanings for many Turkic-speaking communities. (Aitken, 2019; Anderson, 2011) With these names, traces of previous belief systems, knowledge of the environment, the history of migration, and traditional economic activity preserved as a symbolic system emerged that reflects how society's worldview interacts with the environment. Thus, the study of cultural codes embedded in hydronyms is a very relevant scientific approach that allows a deeper understanding of how language and culture are related to the landscape. Alekseev (2014) believes that the hydronymy of Kazakh and Khakass, although based on a common Turkic basis, is a very valuable source of information for comparative research. In addition, this study clearly demonstrates the influence of various historical trajectories, climatic factors, and intercultural interaction in accordance with regional patterns. Despite belonging to the same language family, it can be seen that the Kazakh and Khakass communities developed unique hydronym models in different natural and geographical environments, especially in nomadic–pastoral territories and Taiga – steppe regions. According to recent studies, although the structural, historical, and lexical-semantic aspects of Turkic toponymy have been examined, the social and cultural dimensions of hydronyms in the Kazakh and Khakas languages remain insufficiently explored (Akmatov, 2016).

Despite the growing body of research on Turkic toponymy, comparative studies specifically focusing on the socio-cultural codes embedded in Kazakh and Khakass hydronyms remain limited. Previous research has primarily concentrated on structural, historical, or lexical-semantic aspects of place names, while the symbolic meanings and cultural functions encoded in hydronyms have received less systematic attention. Therefore, this study aims to address this gap by providing a comparative ethnolinguistic analysis of Kazakh and Khakass hydronyms as carriers of socio-cultural codes and elements of the traditional linguistic worldview. Many hydronyms, which would have appeared as simple geographic features on the surface view, carry strong meanings associated with worldview, spirit, social structure, and perception (Anderson, 2011; Alekseev, 2014).

The examination of these kinds of names reveals hidden cultural codes and reconstructs a part of the traditional linguistic worldview.In this study, the socio-cultural dimensions of the Kazakh and Khakass hydronyms are analyzed using an ethnolinguistic comparative approach. This study was carried out using semantic fields, symbolic associations and cultural references based on the hydronymic vocabulary. Therefore, place names related to water in the Turkic language in the course of the study reflect collective memory, identity and cultural continuity. The need to preserve the local toponymic cultural heritage in the context of globalization, environmental change, intensive modernization was also noted (Aitken, 2019).Research at the interdisciplinary intersection of toponyms, ethnolinguistics, and cultural studies showed that hydronyms served as indicators of historical settlement, migration, and cultural intertwining in Turkic areas (Alekseev, 2014; Akmatov, 2016). Recent works reveal the encoding of cultural oppositions, including purity and pollution, life and death, danger and prosperity, and archaic mythological images of water, through the repetition of color terms such as aq/ak and qara/kara (Amanzholov, 2018).

2. MATERIALS AND METHODS

The study uses a comparative ethnolinguistic and onomastic methodology aimed at identifying socio-cultural codes, as well as embedded in the Kazakh and Khakass hydronyms. This study is based on the analysis of hydronymic data collected from dictionaries, archival materials, published toponymic catalogs and field observations. In addition, the study was combined to reveal semantic, etymological and structural meanings, symbolic associations, as well as the historical depth of hydronymic vocabulary. Comparative methods help to distinguish common Turkic features from regional elements formed by cultural practices in different environmental conditions. And to reveal the main cultural worldviews, components such as color terms, animal names, mythological references and landscape descriptors are studied. In addition, contextual interpretation is used to study the relationship between hydronyms and traditional beliefs, tribal structures, sacred geography, and environmental knowledge (Baskakov, 2010; Atkinson and Yamskov, 2017). This multi-level approach makes it possible to use hydronyms as carriers of collective memory and socio-cultural identity to reconstruct fragments of the linguistic worldview (Butanaev, 2013).

2.1. Context

The socio-cultural code of the Kazakh and Khakass hydronyms can be used to understand the broader historical, environmental and cultural foundations of the community (Baskakov, 2010). In addition, Baskakov (2010) noted that Kazakhs traditionally inhabited the Great Steppe and semi-desert lands in Central Asia. It was also depicted that the use of rivers, lakes, wells and streams for nomadic cattle breeding played an important role in seasonal migrations. Based on this, Butanaev (2013) came to the conclusion that water was not only a practical orientation for the nation, but also the protective spirits of the ancestors and the semantic structure of hydronyms associated with rituals became sacred spaces. Khakass developed in close contact with the taiga-steppe and mountain regions of southern Siberia, river valleys and lakes, limiting hunting, fishing, and animal husbandry. (Butanaev, 2013 and Vajda, 2014). Their hydronym system originated in the area of communication between the Turkic, Yenisei and some other ethnic groups,in addition, they formed several linguistic layers and a very dense network of mythological-epic traditions associated with water (Baskakov, 2010; Butanaev, 2013). In both cultures, industrial development was introduced under the then Soviet rule. Against this dynamic background, the Kazakh and Khakass hydronyms retain archaic lexical elements and symbolic patterns that encode the former patterns of the world, making them a valuable source for restoring ethnic history, cultural memory and changing attitudes towards the natural environment. (Boppe, 2015).

2.2. Measures

According to Butanaev (2013), the analysis is based on a qualitative and quantitative set of hydronyms to solve the linguistic structure and their socio-cultural content. First, names are classified according to their formal type: simple, derivative, complex or hybrid, and according to their lexical composition: color terms, names of animals and plants, landscape descriptors, anthroponyms, mythological elements, and secondly, for each item, semantic fields such as sanctity, danger, prosperity, fertility, spatial orientation, and categories of forms of social organization such as tribal or tribal symbols are defined. Thirdly, the identification of potential components of Turkic roots not only helps to reconstruct historical periods within the hydronymic system, but also allows us to focus on etymological openness and depth. Separation measures are used to monitor the relative frequency of certain lexical groups concentrated in a single region, as well as correlations between environmental conditions and traditional economic practices (Atkinson and Yamskov, 2017). Therefore, these actions, uniting, form the basis for the interpretation of hydronyms as culturally saturated units that connect the linguistic form with collective memory and worldview.

2.3. Data Collection

This study summarizes data from published sources and field materials. The first step was the compilation of hydronyms of Kazakhstan and Khakassia from toponymic dictionaries, regional atlases, historical maps and official lists of Geographical Names. In addition, it helped to ensure the coverage and representation of a wide variety of water bodies in a broad sense. The next step, during the collection, archival documents and ethnographic publications were consulted in order to identify earlier versions of certain names and folk interpretations and legends related to rivers and lakes. Interviews were also conducted with local residents, elders and adherents of traditions in certain areas, which made it possible to record the peculiarities of pronunciation and cultural significance of colloquial words related to hydronyms.

Table 1: Data sources and their research functions in the analysis of Kazakh and Khakass hydronyms.

Source type	Description	Examples	Purpose in the study
Toponymic dictionaries	Published lists of geographical names with linguistic and geographic data	National and regional hydronymic dictionaries	To obtain standardized forms and meanings of Kazakh and Khakass hydronyms
Regional atlases and maps	Cartographic materials showing names and locations of water bodies	Historical and contemporary regional atlases	To identify spatial distribution and typology of rivers, lakes, springs, etc.
Official registries of names	State-approved lists of geographical objects and their official names	Government registries of geographical names	To verify current official usage and variants of hydronyms

Archival documents	Historical sources containing older forms and variants of toponyms	Imperial/Soviet-era maps, administrative records	To trace diachronic changes and earlier stages of the hydronymic system
Ethnographic publications	Descriptions of traditional culture, beliefs, and place-name explanations	Ethnographic studies, collections of legends	To access folk etymologies and cultural narratives linked to hydronyms
Field interviews	Oral data from local residents and tradition bearers	Interviews with elders, local historians	To record pronunciation, undocumented variants, and culturally salient stories
Researcher's database	Systematized electronic corpus of collected hydronyms and metadata	Internal database created for this project	To organize, code, and analyze hydronyms by form, meaning, and cultural context

Table 1 summarizes the main sources and methods that reflect the multi-level nature of the study and are used to collect data. Each category of sources provides a certain type of evidence, and it can be seen that with their combined use, hydronymic words in Kazakhstan and Khakassia can be restored in depth. Standardized forms of hydronyms are characterized by toponymic dictionaries, regional atlases, maps, official registrations, and they contribute to a reliable geographical and linguistic identification of water bodies. Archival documentation and historically oriented publications provide a diachronic aspect that allows you to trace the earlier forms of hydronyms, changes in usage, and the consequences of administrative or cultural changes over time.Writing traditional interpretations, mythological connections and folk etymologies related to water resources in ethnographic works and collections of Legends-helps to reveal the socio-cultural codes included in the hydronymic lexicon. In addition, interviews with local residents are a valuable additional source of information that conveys linguistic data, oral explanations, unusual stories that are not easily captured in written research. These interviews are of great help in finding hydronyms that exist in the spoken language but are not officially recognized. This aggregated database, which allows you to compare, classify and interpret the corresponding names by region, serves as the main analytical basis for the study.

2.4. Data Analysis

The data analysis was carried out in stages, combining qualitative interpretation with basic quantitative procedures. At the first stage, all collected hydronyms were normalized and compared with verbal and cartographic sources. This made it possible to avoid duplication of different spelling options. Further, each name was entered into the database and encoded according to the type of water body, formal structure (simple, derivative, complex, hybrid) and lexical composition – the presence of color symbols, names of animals and plants, characteristics of the landscape, anthroponyms, mythological and religious components. Based on this designation, semantic fields such as holiness, danger, well-being, fertility, spatial orientation and social affiliation (ancestral or tribal traits) were distinguished. In determining the prevailing models and regional trends in Kazakh and Khakass materials, the calculation of the relative frequency and the analysis of the distribution of these categories made it possible. The next stage included an etymological study aimed at distinguishing common Turkic roots and later borrowings. The etymological study allows us to evaluate historical periods and identify language connections in hydronymic systems. Hydronyms in fairy tales or folk interpretations use a contextual approach to explain deep mythological and symbolic meanings. Consequently, the integration of structural classification, semantic coding, etymological analysis, and intercultural comparison makes it possible to consider hydronyms not only as geographical objects, but also as a place where sociocultural codes are accumulated and as a traditional linguistic component.

Table 2: Stages, Methods and Outputs of Hydronyms Analysis.

Stage of analysis	Main operations	Methods / techniques	Output / result

Data normalization	Checking and unifying hydronym forms, removing duplicates and variant spellings	Cross-checking with dictionaries, maps, registries	Clean, standardized list of Kazakh and Khakass hydronyms
Structural coding	Classifying hydronyms by type of water body and formal structure	Typological classification (simple, derivative, compound)	Structural profile of the hydronymic systems
Lexical-semantic coding	Identifying key lexical groups and semantic fields	Semantic analysis, category assignment	Groups of hydronyms by color terms, animals, plants, landscape, etc.
Socio-cultural categorization	Linking hydronyms to spheres of sacredness, danger, prosperity, social markers	Ethnolinguistic and cultural interpretation	Sets of hydronyms indicating specific socio-cultural codes
Quantitative overview	Calculating relative frequencies and distributions of categories	Basic quantitative counts and percentages	Statistical patterns and regional tendencies in Kazakh vs. Khakass data
Etymological analysis	Tracing origins of name elements and historical layers	Etymological comparison (Turkic roots, substrata, loans)	Stratification of hydronyms by origin and contact-induced change
Comparative analysis	Comparing parallel motifs and structures in both traditions	Cross-linguistic and cross-cultural comparison	Identification of common Turkic patterns and region-specific features

Table 2 shows the process of studying the collected hydronymic material and shows how various methods help to reveal the social and cultural meanings of Kazakh and Khakass names of water bodies. The initial stages — data normalization and structural coding – are aimed at ensuring consistency, comparability and orderliness of the corpus. Bringing names to a standardized form and classifying them by type and formal organization create a solid foundation for further semantic and cultural interpretations. Lexico-semantic coding and socio-cultural categorization occupy a central place in the analysis. At this stage, hydronyms are grouped according to significant components of meaning and correlate with certain cultural spheres, such as sacred geography, ecological symbols, or traditional forms of social organization. Although quantitative procedures are secondary, they help us identify patterns of naming and regional differences, making our qualitative observations more measurable. Etymological studies reveal a diachronic aspect. They help to reveal the historical aspects of hydronyms, to identify ancient Turkic influences, possible earlier linguistic influences and later changes as a result of linguistic interactions. The comparison of Kazakh and Khakass material, in turn, reveals both common Turkic features and local features formed by various natural and cultural conditions.

The last step is to put legends, traditions and oral history in their places. This method not only finds words, but also allows you to find symbolic meanings that go beyond the literal meaning of the name. All these procedures, together, allow us to consider hydronyms as culturally saturated units of Turkic-speaking communities, in which ideas about the world, historical memory and collective existence are enshrined.

3. RESULTS

According to the results of the analysis of hydronymic information of Kazakhstan and Khakassia, it can be seen that the two have a common Turkic basis, as well as clear differences in the ways of transmitting socio-cultural meanings in each region. One of the most important results is the features of the lexico — semantic structure of water names. In both traditions, color names are widely used, especially the components aq/ak (“white”) and qara/kara (“black”) are common. However, their meaning is not limited only to the description of color. In Kazakh hydronyms, «White» is often associated with purity, prosperity and the life-giving property of water. (Kaskabasov, 2012) And «black» can mean depth, danger or danger in the terrain, in some cases it also hints at bulkiness and significance. (Smith, & Stammler, 2016). Color components also play a symbolic function in Khakass names, but they often reflect the features of the mountain-Taiga

landscape — the contrast of bright light spaces and dark forest areas. (Georg, S. 2010). Thus, color names in hydronyms express not only the way of perceiving nature, but also cultural concepts adapted to a specific ecological environment. At the same time, names related to animals and plants are also found in hydronymic concepts. In the Kazakh tradition, the names of domestic animals (horses, sheep, and camels) and steppe fauna are often found. For example, such hydronyms are associated with pastures, Street roads and seasonal settlements, reflecting the peculiarities of traditional animal husbandry. (Mukhambetov, 2018). In the Khakass tradition, the names of fish, birds, game, forest and river-lake animals are more often mentioned, which represent the historical significance of hunting and fishing. Therefore, it can be concluded that although animal names are used in both systems, their cultural content has been formed due to different natural environments and economic models (Ivanov, 2016, Jaimoukha, 2015).

In both traditions, hydronyms are found that express the concepts of holiness, protection and the presence of the ancestral spirit. In the Kazakh nation, such names are most often characteristic of streams and small rivers associated with Saints, historical events.(Chuluun,2019). In Khakassia, water bodies are closely related to Shamanic and epic concepts and are sometimes perceived as the abode of spirits or the border between worlds. (Harris, 2018). Although religious experience has changed, these names affect the preservation of cultural memory. According to etymological analysis, both traditions show that ancient linguistic periods have been preserved. Although the majority of hydronyms in Kazakhstan are based on clear Turkic roots, the presence of earlier linguistic periods and connections with neighboring peoples can be traced by some ancient or ambiguous elements. In Khakass hydronymy, the trace of non-Turkic layers associated with the complex historical and ethnic development of southern Siberia is more clearly traced. (Helimski, 2007). Some names are the result of the adaptation of ancient local forms to Turkic phonetics. More often in the Kazakh material there are hydronyms with the names of the tribe or the names of historical figures in the steppe regions. This evidence indicates that water bodies occupied an important place in the tribal organization. (Konaka, S. 2017). Although such social features are rare in the Khakass material, the predominance of names characterizing the features of the terrain is evidenced by the names of settlements along river valleys and microdistricts. (Nazarova, 2013). Comparative analysis also shows the effect of name revival. Although some of the traditional names have been replaced by official or Russian versions in both regions, many local names have survived in everyday colloquial use. Often, official and traditional names coexist. Hydronyms are a driving factor as a link between cultural memory and the Earth.

Klein (2014) and Kreinovich (2021) claimed that the Kazakh and Khakass hydronyms contain a complex socio-cultural code that combines environmental knowledge, economic experience, religious concepts, and social structure. Despite the common Turkic basis, each tradition is formed in accordance with its historical and natural conditions. The study of hydronyms allows a deeper understanding of the worldview of the Turkic peoples and is of particular importance for regions with limited written data. (Shirinbekov, 2019, Scharlipp, 2015).

In the context of globalization, the preservation and documentation of traditional hydronymic heritage is an important area for the protection of linguistic and cultural diversity (Mukhambetov, 2018).

Table 3: Comparative socio-cultural characteristics of Kazakh and Khakass hydromyms.

Aspect / category	Kazakh hydronyms	Khakass hydronyms	Shared / comparative observations
Color terms (*ak/aq, kara/qara*)	*Ak* linked to purity, blessing, life-giving water; *kara* – danger, depth, difficult terrain, sometimes respect and magnitude	Color terms tied to contrasts of mountain-taiga landscape (open/bright vs dark/forested, shadowed)	In both traditions color encodes perceptual and mythological oppositions adapted to local ecology
Animal and plant imagery	Frequent references to domesticated animals (horse, sheep, camel) and steppe fauna; connected with pastures and migration routes	More references to forest and riverine species (fish, birds, game animals); linked to fishing and hunting	Both use animal imagery, but reflect different economic models and ecological niches

Sacred and mythological names	Many names for springs, wells, rivers associated with *aulie*, pilgrimage sites, historical events	Rivers and lakes strongly integrated into shamanic and epic traditions; water as dwelling of spirits or boundary between worlds	Hydronyms structure sacred space and preserve mythological representations in both cultures
Historical and etymological layers	Mostly transparent Turkic roots with archaic or partially obscure elements indicating earlier stages and contacts	Pronounced non-Turkic substrata (Yeniseian and other layers) adapted to Turkic patterns, producing hybrid forms	Hydronyms act as conservative units that preserve older ethnic and linguistic strata
Social markers and territoriality	Numerous hydronyms with clan/tribal names, anthroponyms, and markers of collective ownership, especially in steppe areas	Social markers present but less frequent; higher share of microtoponyms tied to specific landscape details	Kazakh names foreground tribal organization; Khakass names foreground localized, valley-based settlement
Ecological and economic encoding	Names reflect nomadic pastoralism, seasonal routes, key watering places in steppe and semi-desert	Names reflect river-valley and lake-centered subsistence based on fishing, hunting, mixed economy	Both systems encode traditional ecological knowledge, but in different environmental frameworks
Impact of modernization and renaming	Russian and standardized forms partly replace traditional hydronyms; parallel use of official and indigenous names persists	Similar processes of Russification and administrative renaming; local oral usage often maintains older forms	Parallel naming systems show hydronyms as markers of continuity, resistance, and identity

Table 3 systematizes the main results of the study and shows how the main semantic and cultural categories are reflected in the Kazakh and Khakass hydronyms in comparison. Each line of the table covers such aspects of the hydronym system as color names, images of animals and plants, sacred and mythological names, historical and etymological layers, social markers, environmental content, the influence of modernization processes and the functioning of hydronyms as a socio-cultural code. The columns show first the features characteristic of Kazakh hydronyms, then the characteristics characteristic of Khakass hydronyms, and finally describe the features common to the two traditions. Such a structure clearly demonstrates both their common Turkic basis, as well as the peculiarities of naming, formed under the influence of various natural environments, economic models and historical experience. The table also shows that in both cultures hydronyms serve as condensed cultural texts that preserve collective memory, worldview and identity, and even in the context of administrative renaming and globalization, this function does not weaken.

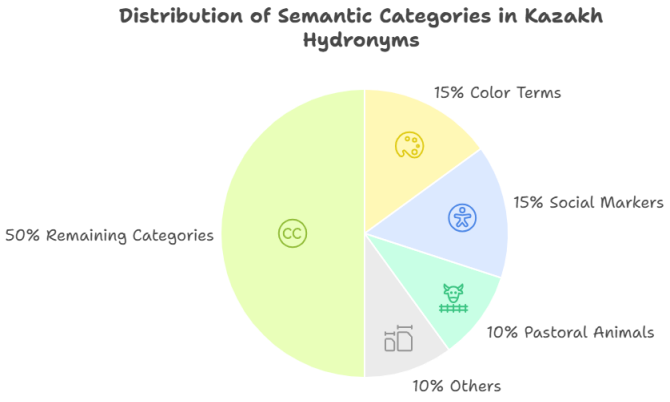

Figure 1: Distribution of Semantic Categories in Kazakh and Khakass hydronyms.

Figure 1 shows the percentage of the main semantic categories in Kazakh hydronyms. According to the diagram, the largest share is occupied by farm-related categories (50%), which indicates that animal husbandry and traditional economic activity played a leading role in the name system. Color names are in second place with a share of 20%, which determines the importance of symbolic colors in the description of water bodies. Sacred and mythological names have a share of 15%, ecological characteristics-10%, and social markers-5%.

In general, the diagram shows the predominance of names related to the economic and natural environment in Kazakh hydronyms, as well as a significant place in cultural and symbolic components.

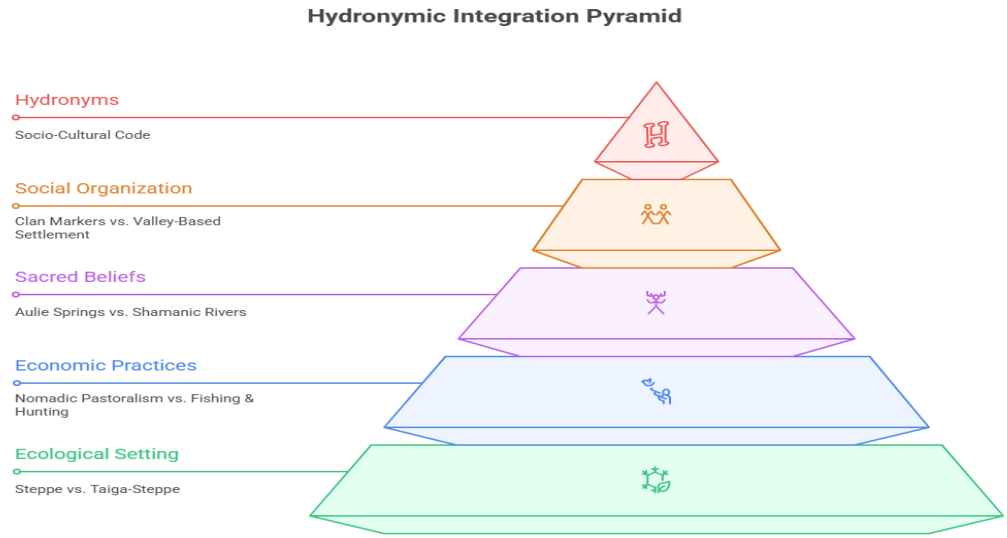

Figure 2: Model of socio-Cultural Codes Encoded in Kazakh and Khakass hydronyms.

Figure 2 depicts the hierarchical structure of socio-cultural layers in the formation of hydronyms in the form of an "integration pyramid". At the base of the pyramid is the ecological environment (steppe and Taiga-steppe zone), which indicates that natural and geographical conditions are the initial factor in naming water bodies. The next level is economic experience (Nomadic animal husbandry and fishing and hunting). This layer determines the economic and practical significance of water bodies. A higher level of sacred beliefs (holy springs and shamanic Rivers) is given, which indicates the relationship of hydronyms with religious and mythological concepts. The layer of social organization (tribal markers and settlement based on river valleys) defines the role of hydronyms in establishing territorial identity and community structures. At the very top of the pyramid are the hydronyms themselves. They are interpreted as a cumulative socio-cultural code that combines environmental, economic, religious and social factors.

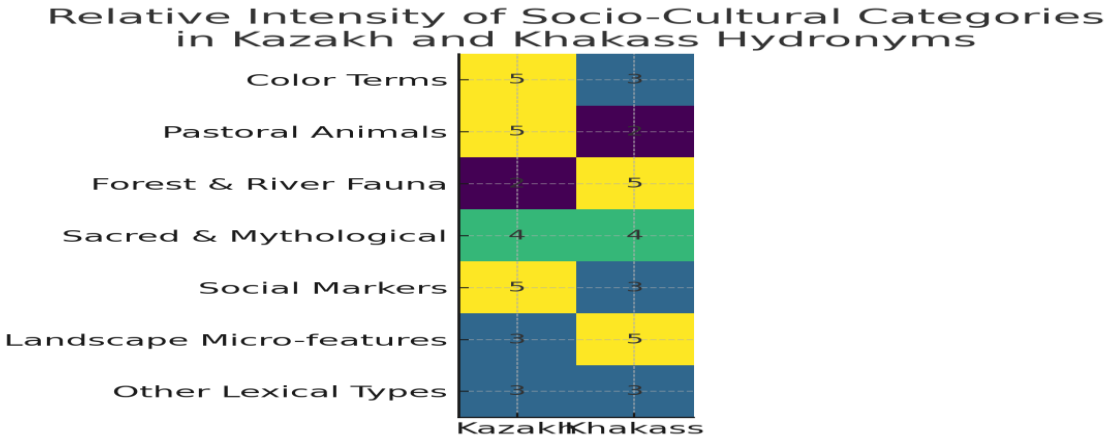

Figure 3: Relative Intensity of Socio-Cultural Categories in Kazakh and Khakass Hydronyms.

Figure 3 shows in comparison the intensity of reflection of various socio-cultural categories in the hydronyms Kazakh and Khakass. The visual map quantifies the differences between the two traditions and clarifies the results of qualitative analysis. In Kazakh hydronyms, the highest indicators are observed in color names, animal names related to animal husbandry, and social markers. This proves that the symbolic function of Colors is not just a natural characteristic, but part of the cultural code. At the same time, the leading role of nomadic animal husbandry is clearly reflected in the name system. A high proportion of social markers indicates that water bodies were a means of establishing tribal-territorial identity. Sacred-mythological names and landscape characteristics are presented at an average level, which suggests that they serve as an additional, but important cultural layer. In Khakass hydronyms, on the other hand, names related to forest and river fauna, microlandscape features and sacred-mythological elements show high intensity. This is directly related to the peculiarities of the taiga-steppe ecosystem and the historical significance of hunting and fishing. At the same time, the settlement pattern based on river valleys contributed to the names ' detailed description of the terrain. In comparison with the Kazakh system, the share of color names and social markers is lower, which means a different model of social structure and attitude to space.

In general, the heat map clearly shows the ecological and cultural differences between the two traditions. However, common semantic areas, such as sacred and mythological names, prove that both peoples impose a symbolic meaning on the water space. Thus, visualization summarizes how hydronyms encode different but partially overlapping worldview systems. These results emphasize the need to consider the hydronymic system not only as a linguistic phenomenon, but also as an indicator of cultural experience in relation to space. Quantitative indicators strengthen the qualitative interpretation and clearly prove the structural differences between the Kazakh and Khakass naming traditions.

3.1. Influence of Historical and Demographic Processes

To understand the cultural dynamics of the naming tradition, a demographic analysis of the regions where the Kazakh and Khakass hydronyms are distributed is important. The distribution of hydronyms depends on the historical settlement patterns of Turkic-speaking populations. The Kazakh people maintain a demographic priority in most parts of the country, which help to contribute the preservation of traditional hydronyms in rural areas. However, in northern and urban regions influenced by Russian and other ethnic groups, the use of administrative names and bilingual actively spread, affecting the toponymic space. According to Crystal (2011) many Indigenous names are used in everyday colloquial language.

In Khakassia, the demographic situation is developed absolutely diferently. The Khakass population represents a minority in the Republic, where areas the majority of the population is ethnic Russians. If they use of Russian names on official maps and in public spaces, it can led to a faster displacement of local hydronyms. Nevertheless, the hydronyms of Khakas are still used in small towns, water areas and small towns where the local population is concentrated. Hydronyms related to mythology, shrines and traditional agriculture (hunting, fishing) are transmitted orally from generation to generation. Migration processes affect the hydronymic environment. (Nevskaya, I. 2020). In Kazakhstan, although the orientation of internal migration to cities weakens the connection between the younger generation and traditional names, cultural continuity is still firmly maintained in rural areas. (Harris, 2018). In Khakassia, urbanization and cultural assimilation are contributing to a decrease in knowledge of Indigenous toponyms, and therefore exacerbate the risk of the disappearance of some names. At the same time, in recent years, there has been an increase in interest in cultural heritage among both peoples, attempts have been made to register and modernize traditional names. In general, demographic factors play a key role in the viability and transmission of hydronyms. In regions with different ethnic composition, mixed or concomitant naming systems are formed, while the stable predominance of the indigenous population supports continuity.

3.2. Measurement model

The measurement model used in the study treats the sociocultural code of hydronyms as a set of hidden dimensions that are not directly visible but are inferred from linguistic and contextual indicators. Each hydronym is characterized by its formal type (simple, derived, complex, hybrid), lexical composition (color names, names of animals and plants, landscape characteristics, anthroponyms, mythological elements), and belonging to broad semantic fields (sanctity, danger, well-being and fertility, social affiliation, spatial orientation, environmental features).

Additional indicators also include etymological depth: a pronounced Turkic root, an ancient or obscure form, an element of the substrate, and the name of the entrance. The cultural significance of the name is also taken into account – the presence of legends, connection with ritual practices, or the meeting of social markers.

These indicators are combined to form aggregate indicators characterizing the intensity of certain socio-cultural areas (for example, Sacred geography, economic experience, social organization). The measurement model by comparing Kazakh and Khakass data allows a systematic assessment of which cultural criteria prevail in each tradition and how pronounced they are. Thus, the model creates conditions for the quantitative and qualitative analysis of hydronyms not only as names, but also as a multi-layered cultural structure.

4. DISCUSSION

4.1 Environmental and Economic Factors in Hydronym Formation

The results of the study show that Kazakh and Khakass hydronymy have a common basis and different directions of cultural development. Although both traditions are based on a common Turkic heritage, the naming system was formed under the influence of various natural environments, economic models and social structures. In Kazakh hydronyms, preference is given to color symbols, names related to animal husbandry, and generic markers. This determines the importance of nomadic cattle breeding and tribal organization in shaping cultural space. And the hydronyms of Khakas contain more elements related to forest and river fauna, minor features of the landscape and shamanic beliefs. This corresponds to a settlement pattern based on the taiga-steppe ecosystem and river valleys.

4.2 Sacred and Mythological Meanings of Water Names

According to a comparative analysis, it can be seen that mythological elements have been preserved in both nations. This proves the stability of the symbolic meaning of water in the Turkic worldview. In addition, demographic factors and cultural ties have had different effects on the viability of hydronyms. In addition, demographic factors and cultural ties have had different effects on the viability of hydronyms. In Kazakhstan, Indigenous names are also used, and due to the small population of Khakassia, there is a growing trend towards the adoption of traditional names and the emergence of hybrid forms in Khakassia.

4.3 Social and Territorial Markers in Hydronymic Systems

Petrov (2017) and Nichols (2011) have described hydronyms as brief cultural texts that incorporate communal identity, knowledge of nature, and historical experience, adapting to social and linguistic change.

The analysis reveals a number of direct links between the linguistic form, socio-cultural content and the natural environment in Kazakh and Khakass hydronyms. Color names are directly related to the assessment and symbolic perception of water and indicate the purity, danger or specificity of a particular body of water. Lexemes related to animals and plants relate directly to the traditional economic and ecological environment: in the Kazakh context, animal names reflect nomadic animal husbandry, in the Khakass tradition, forest and river animals reflect the importance of hunting and fishing. Sacred and mythological elements are directly related to the organization of sacred space, that is, they designate certain ritual or legendary places. hydronyms are linked to the system of territorial identity and group identity through social traits such as common names and anthroponyms. Thus, hydronyms are not random names, but a structured system that shows how a nation develops, classifies and symbolically owns in a social context.

Indirect connections are also observed in the Kazakh and Khakass hydronymic systems. They are related to broader historical and cultural processes that influence the naming of water bodies. For example, the mythological elements of hydronyms indirectly reflect the historical influence of religious and shamanic beliefs, even if they weaken in everyday life. The processes of linguistic adaptation as a result of Russian influence or administrative renaming indirectly affect the meaning and perception of traditional hydronyms. When used by communities alternating between local and official names, cultural associations of names may also change. These indirect connections indicate the need to understand hydronyms and pay attention not only to their geographical significance, but also to their cultural, historical and linguistic layers.

5. CONCLUSIONS

The study of hydronyms of the Kazakh and Khakass languages - shows a complex and deep connection between language, culture and the natural environment. In both traditions, hydronyms

are not only place names, but also historical, economic and spiritual meanings - carriers of socio-cultural codes. A comparative analysis clearly shows both their common Turkic basis and the special ecological and cultural features, regional differences of the Kazakh steppe and Khakass Taiga steppes. Colors in Kazakh hydronyms reflect the role of nomadic animal husbandry, breeding nationality and sacred places in geography in the formation of cultural space. And in Khakass hydronyms, the meanings of river valleys, hunting and fishing, as well as shamanic beliefs differ more clearly. In addition, it has been studied that more attention is paid here to the names of fauna representatives and secondary features of the landscape. However, despite these differences, in both traditions it was found that water bodies are associated with a sacred and mythological meaning. It reflects the symbolic meaning of the water element, which defines the boundaries of the existence and development of the Kazakh and Khakass worldviews. General cultural traditions characterize the deep connection of man with nature. For example, hydronymic names not only describe the region, but also reflect the history, the spiritual world and the identity of the nation. However, demographic and socio-political changes, such as migration, the influence of Russian colonialism, modernization processes, influenced the fact that these systems underwent enormous changes. In Kazakhstan, local hydronyms are still actively used in regions with a predominance of the Kazakh population, but in some regions urbanization and bilingualism have led to a weakening of traditional names. As a result of Khakassia's small population, Russian names became more common. This has led to a decline in the use of traditional water names and the development of mixed, bilingual naming systems. Also, this study shows the importance of hydronyms for the historical, environmental and cultural development of the Kazakh and Khakass peoples.

Hydronyms indicate that language is a mirror of cultural memory, preserving layers of social structure, economic practices, and spiritual beliefs. The preservation of local hydronyms is not only the protection of names but also the preservation of a deep connection between language and nationality.

In the future, the study of hydronyms will make it possible to comprehensively reason the linguistic landscape and analyze it from a comparative and typological point of view with the materials of other Turkic-speaking regions. An in - depth study of hydronymic systems in the expanses of Central Asia and Siberia shows the role of hydronyms as a cultural and cognitive mechanism connecting the past and the present. The names of water bodies are an important semiotic means of preserving collective memory and cultural heritage, reflecting the attitude of an ethnic group to the natural environment, sacred space, and historical experience.

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