

## Indigenous place names: the cognitive-matrix analysis

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### Abstract

The importance of this study is fueled by the attention the modern language researchers pay to the relationship between man and environment in a bid to identify the cognitive component of language phenomena. The purpose of the study lies in the comprehensive research into the toponyms (place names) of Central Yakutia using the cognitive-matrix modeling method for classifying the place names and identifying the underlying principles of their formation. The key method for studying this problem is the cognitive-matrix analysis of place names coupled with the statistical analysis method, the method of historical and geographic reconstruction, the systemic approach, the descriptive method and the GIS-mapping method. The authors have examined over 300 place names stored in the database of Khangalas Ulus in Central Yakutia. In the course of the study, the authors identified the cognitive-matrix schemas for the names of the places in the studied region. The method of cognitive modelling helped reveal the internal overlapping of the classes of components in the naming of basic geographic toponyms. This in turn led to their ambivalence. This overlapping of basic geographic toponyms (insulonoms, hydronyms, oikonoms, oronyms) has its specifics. The empirical evaluation of the place names in the studied region helped reveal the diachronic development of geographic situations, particular characteristics of landscape, hydrology, soil, vegetation, and wildlife, as well as re-enact historical events and remodel the population patterns across the territory which are related to the natural landscape. Every individual and the society as a whole evaluate the environment from the perspective of the favorable conditions and the location of the geographic objects in terms of farming. The authors discovered the perception of the world as seen by the Yakuts people through the prism of the landscape. The study also revealed the traditional system of orientation in space and the attitude to the surrounding world through the anthropocentric worldview. Man would develop the skills of spatial orientation and subjective assessment gradually, however he would always employ the cognitive “tools” around him, such as metaphor, comparison, transfer of meaning, etc. The cognitive component covers numerous aspects of cultural knowledge accumulated over centuries in this landscape territory through deciphering the semantics of the toponyms, thus revealing the historical modes in which people used to manage natural resources, engage in agriculture, find their direction in space, history and cultural experience in general; and the special attitude to natural objects and sacred places. The materials of this paper can be of great use to language researchers, historians, ethnographers, culture experts, geographers.

**Key words:** toponyms, place names, geographic objects, landscape, cognitive matrix modeling, cognitive context, worldview, semantics, space, linguistic representations

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### Introduction

The importance of this study is due to a lack of dedicated research into landscape ontology and the problem of non-comprehensive representation of locations as objects of studies in different domains of science in Russia. Unfortunately, there has been insufficiently studied the relations between words and mental maps, the features of spatial terms use in communication. For that reason, it seems reasonable that the problem of the mental representation of local landscape in the context of language and

culture, through the prism of verbal description, should not be limited to reviewing the results derived from the methods and approaches of individual disciplines.

The space and culture of people's settlements have a great connotation when it comes to modeling the cultural worldview. Since the sign system, which was invented as part of the culture, reflects the surrounding landscape, it is therefore connected to the core cultural paradigms and codes.

The main function of a place name is to isolate an object from a set of objects of similar type. By naming a particular geographic object, man generally relies on its specific characteristics. The principles of choosing these characteristics can depend on the particular properties of the object, its location in space, natural properties, historical context, as well as the ethnocultural traditions of a particular people's lifestyle. The cultural, psychological, cognitive component underlying the landscape model is essentially a certain spatial image.

The scientific novelty of the study consists in the fact that it presents partial results of one of the first interdisciplinary studies into landscape ontology on the example of Russia's northern region, Yakutia, undertaken as part of the RSF project №15-18-20047 "Landscape ontology: semantics, semiotics, and geographic modeling". The authors conducted the study to identify the cognitive-matrix schemas for the place names of Khangalassky District in Central Yakutia. The revealed overlapping of the classes of components in the naming of basic geographic toponyms in the languages of the Yakuts of Khangalassky District can be used as a cognitive model of the geographic landscape image in other regions of residence of the Yakuts in the Sakha Republic (Yakutia). The territory of Yakutia – the largest subject of the Russian Federation – incorporates various types of landscapes and accommodates people of multiple ethnicities, which helps identify the special aspects of those people's perception of the nature around them, the dynamics of changes in the representation and utilization of the surrounding landscape, the ethnocultural diversity of the worldview adopted by the peoples who live throughout in territory. The resulting GIS-based cognitive-matrix place-name model drawing on the data from one of Russia's largest regions can be used to carry out similar research in other regions both in and outside Russia.

The contents of the paper start with the introduction and review of academic literature. The section following the review of academic literature describes the materials and methods of the study. This then goes on to present the results derived from the acquired data. The discussion section offers some practical recommendations. The last section sets out the conclusions.

### **Literature Review**

The need to refer to the large volume of academic literature, of both Russian and foreign sources, was due to the interdisciplinary nature of the project. In particular, the authors analyzed the classical geographic approach to landscape evaluation; the concept of scientific views in geography; the approaches to the modeling of geographic space; the concepts of mythological space and the semiotic vision of culture; the cognitive-matrix model. Both Russian and foreign academic publications view place names as an aspect of the landscape that reflects the connection between the surrounding space and human perception. In the scope of the interdisciplinary project, the authors also regard place names as important sources of information about territories, peoples and ethnic communities that used to live there and still do, about their culture, daily life, languages, historical events and the special characteristics of the landscape across these territories, both in the past and at present.

Modern research looks into place names as the means to develop ideas on landscape ontology and concepts of the surrounding landscape through the prism of interdisciplinary studies in the fields of language, culture, geography, GIS technology, spatial modeling.

W. Kuhn (2011) applies the basic idea of ontology as vocabulary specification for studies of the landscape in language.

The toponyms are the aspect of the landscape reflecting the link between a surrounding space and human perception. "Some toponyms are derived from natural landscapes as well as human perceptions and reflect the relationships between humans and the environment, such as water resources and landforms. Other toponyms are human-centric geography names, which merely reflect human entities, such as settlements and civil constructions. Toponyms are not only linguistic forms but also cultural and societal artefacts. Consequently, the interpretation of toponyms and the analysis of their spatial arrangements can help us examine the spatial characteristics of the geographical name landscape" (Chen, Hu, 2014)

As toponyms are names for places, their identity exists in a similar way to place identity. L. Kostanski (2014) explores human interactions with places and their names through theories related to place and place attachment and notes, "the constructs of place and toponymical identity are strongly correlated, as places would not exist without names, and names would have no purpose without places". She develops the study of the field of cultural toponymy by examining whether the social and cultural role of toponyms can be partly defined through a theory on toponymic identity.

N. Burenhult and S. Levinson (2008) explored the linguistic categories of landscape terms and place names in nine genetically, typologically and geographically diverse languages, drawing on data from first-hand fieldwork. There is a great deal of plasticity in how language models the earth and in what is considered to be the essence of its features. "Capturing landscape ontology cross-culturally is about understanding this variation, identifying limits to it, and exploring the balance within and across languages" (Burenhult, Levinson, 2008).

However, as pointed out by D.M. Mark et al. (2011), "The relation of the generic parts of toponyms to geographic categories has received considerably less attention. There has been even less work on cross-cultural and cross-linguistic variations and similarities in delimitation, classification, and naming of geographic features".

In this paper, the authors made an attempt to fill in the gaps in the research of place names through the prism of cross-cultural and linguo-cognitive analysis of the naming of geographic objects, their classification, and systemization within the language.

The geographic image can be reconstructed using the system of interrelated cognitive contexts. Publications of linguistic studies use the term matrix to refer to various groups with systemic characteristics. The multiple aspects of knowledge incorporated in a toponym make it possible to apply the cognitive matrix to analyze it (Alpatov & Boldyrev, 2008).

According to V.V. Alpatov and N.N. Boldyrev (2008), the term "matrix" can denote: 1) multiple aspects of knowledge; 2) multiple notions of the linguistic representation of meaning (verbalization of a concept, synonymy); 3) variability of usage contexts (multiple functionality); 4) polysemanticism of a linguistic unit at the system level. However, it is only in the first case that it is reasonable to speak about a cognitive matrix as a system of interrelated cognitive contexts or conceptualization areas".

Space serves as one of the core objects for modeling the worldview formed by culture or society. Whatever is around us, it will directly reflect the reality encountered by an individual or the society. As O.A. Lavrenova (2010) notice it, "The problem of the connection between culture and space, specifically the spatial characteristics of culture, will draw consistent interest from both the humanities and natural sciences." This work includes research into areas of linguistics, cognitive linguistics, geography, and landscape semantics, where geographic objects serve as symbols, and their nomination as the imprinting of the cognitive image of culture.

In summary, out of the many approaches listed above in the literature review, the authors highlighted the works dedicated to the landscape ontology in linguistics, since

this problem has not yet been an object of research among the Russian academics. The significance of the project is dictated by the inter and multidisciplinary approaches to the study of landscape, namely the widespread use of methods applied both in natural sciences (geography, physics, computer science, space technologies) and liberal arts (linguistics, studies, semiotics, sociology, ethnography, archeology, history, etc.) (Zamorshchikova et al., 2016).

### **Methods and Materials**

The purpose of the study is to make an attempt at reconstructing the cognitive-matrix models of indigenous place names. The materials of the study came from the basic place names of Khangalass Ulu in Central Yakutia. When defining certain toponyms within the studied region, the authors referred to the works by Syulbe Bagdariyn (2004) – a toponymist who researched historical place names throughout Yakutia. The team of researchers under this project has studied the landscape place names and compiled a database of the place names of Khangalass Ulu, which includes over 300 hydronyms, insulonyms, oronyms, and oikonyms.

Khangalass District has a central location in Yakutia, which has predetermined its rich and interesting history. Situated in one of the largest valleys of the Lena River, Erkeeni Valley, the land of Khangalass became home to the ancestors of the Yakut people.

The name Khangalass was mentioned in documents as early as since 1632, i.e. since the Russian Cossacks came to inhabit Yakutia. In 1860, the wide-ranging Khangalass Ulu was subdivided into two districts — West Khangalass and East Khangalass. The ulu with its current boundaries was established on February 10, 1930, when it was named West Khangalass. In 1937, it was renamed to Ordzhonikidzevskiy, after the revolutionary Sergo Ordzhonikidze who used to live here in exile. The original name was reinstated in 1992, after the Sakha Republic (Yakutia) declared its sovereignty as part of the Russian Federation.

The territory of Khangalass Ulu consists of diverse landscapes, including relict steppes, tukulans (sand dunes), lime rocks (pillars), mid-taiga mixed forests, shrubs, floodplain and supra-floodplain meadows, alases. The supra-floodplain terraces and islands are often covered with sod-meadow alluvial soil, with frequent muddy sand-floods. The first floodplain has rich meadow vegetation. Elevated, dry ridges are dominated by mixed-grass barley meadows with a negligible trace of mixed herbs, which account for most of the hay harvested there. The second, elevated, floodplain is characterized by the abundance of shrubs and trees along with meadow plants. The first supra-floodplain terrace, which is separated from the floodplain with a notable scarp, is different from the latter in its unstable water regime and salinized soils. The second supra-floodplain terrace is more developed on the left bank and more afforested, yet it remains a forest-steppe zone almost throughout its entire spread. The supra-floodplain terraces are suitable for inhabitation, and the land here is also used for pastures and cultivated fields. A substantial part of Khangalass Ulu is covered in expanses of taiga forest (Prisyazhny, 2003).

The cultivation of the landscapes of Khangalass and their involvement in the local economic and cultural life were reflected in the corresponding place names. In order to build the cognitive-matrix model for the place names of the studied region, the authors have liberally employed methods from both the humanities and natural sciences. The interdisciplinary approach used by the project team helped conduct the holistic research of the landscape, to discover the special ways in which different ethnic communities modeled and developed that landscape, to conceptualize the landscape, its representation in people's minds and culture through the prism of technical progress, specifically through the use of GIS technologies.

The issues of defining, discovering, studying the characteristics of and identifying geographic objects are considered fundamental in geomatics, especially after the

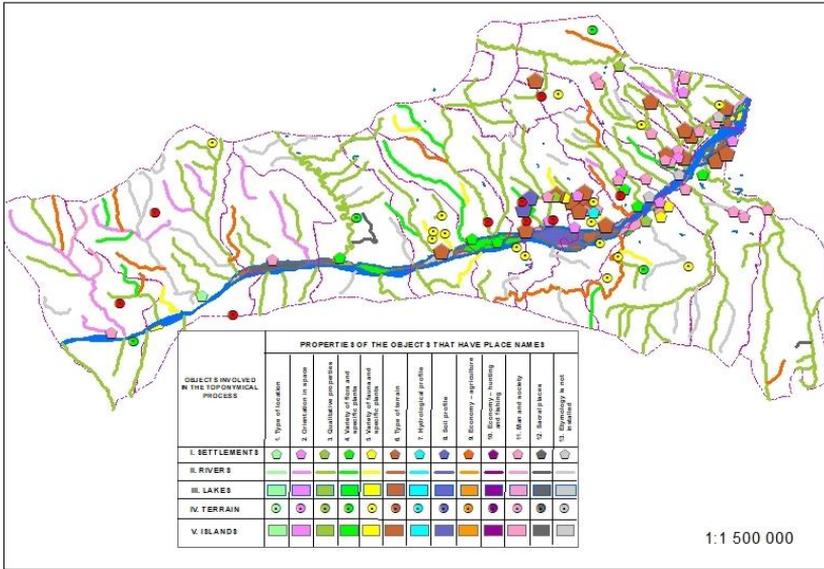
publishing of the book “Universal Ontology of Geographic Space: Semantic Enrichment for Spatial Data” in 2010 (Podobnikat & Ceh, 2010). The advantage of utilizing GIS technology consists in its ability to generate the spatial representation of the authors’ modified cognitive-matrix model (suggested in Alpatov & Boldyrev, 2008) of indigenous place names, which allows tracing the correlation between basic place names and preparing a series of thematic maps on landscape toponymy. The interdisciplinary approach was tried out by the project team at international conferences (Zamorshchikova et al., 2016).

## **Results**

1. The study helped identify the following cognitive-matrix schemas of indigenous place names (italicized further down the text of the paper) in the studied region, which denote the multiple aspects of knowledge:

1) Type of location (the location of the object); 2) Orientation in space (cognition of directions argaa (west), soguruu (south), distinctive features as spatial references); 3) Qualitative properties (evaluation, assessment, smell, color, origins, shape, size, dimensions, etc.); 4) Diversity of flora and specific plants (by species and names of plants); 5) Diversity of fauna and specific animals (by species and names of fish or animals); 6) Type of terrain (tablelands, highlands); 7) Hydrological profile (battures, high water, shallows, low water); 8) Soil profile (sand, boggy soil, salt marsh, etc.); 9) Economy – agriculture (residential and household buildings owned by the local residents for economical purposes, area of household activity); 10) Economy – hunting and fishing; 11) History, ethnonyms, man and society (by the name of a location which has been named after some person or historical event; a thing/object belonging to a person, patronym); 12) Sacred places (e.g. a location named after religious artifacts, a shaman or some objects of reverence in the traditional Yakut culture).

2. Based on the identified cognitive-matrix schemas of indigenous place names, the authors propose the innovative correlation between the basic types of place names and their GIS-based cognitive-matrix models. The resulting GIS-based cognitive-matrix place name model developed on the basis of the data from one of Russia’s largest regions can be used to carry out similar research in other regions both in and outside Russia. The cognitive-matrix schema was used as a legend for preparing a series of thematic maps of the place names in Khangalas Ulus (Figure 1). Each object involved in the toponymical process has its own symbol on the map: a pentagon – for settlements, a circle – for terrain relief, a solid line – for rivers, and zones in different colors – for lakes and islands, with light-blue zones for lakes and brown zones for islands. The properties of the objects reflected in the place names are marked with different colors, e.g. the category of flora and specific plants are denoted in bright green, whereas terrain is denoted in brown. The proposed map demonstrates that most place names were chosen based on the qualitative properties of the related objects.



**Figure 1: Compositions and properties of the objects in Khangalassky District involved in the toponymical process (prepared by Filippova, 2017)**

For the first time, the authors employed the systemic approach to studying and modeling the cognitive-matrix schemas of Yakutia’s place names covering all kinds of geographical landscape groups of the studied region, such as settlements, rivers, lakes, terrain, and islands.

Below follows the review of models for the cognitive-matrix schemas of indigenous place names (italicized) of Khangalassky District in Central Yakutia, broken down by geographical groups.

### 3.1. Settlements

The following cognitive-matrix schemas of place names can be identified in the Settlements group. The category “Type of terrain” (tablelands, highlands, etc.) represents a kernel zone (18.04%) of the cognitive models of oikonyms. This means that those oikonyms were nominated based on the surrounding terrain areas, including partially the raised Khaya-Yurde, literally “the upper part,” “mountaintop” in Yakut; Syyrdakh, literally “mountainous,” “hilly” in Yakut; Tekhtyur, from the Yakut verb [төхтүрүй], which literally means “roll over, roll down,” with [төхтүр] meaning “hillock,” “hummock”; Syngasalakh, from the Yakut “elevated flanged edge (a geographic object), bank, dam”; partially the low-lying Alases, originating from a Yakut word for a round field or a round clearing in the woods, a meadow; Tolon, from the Yakut word meaning “valley”; Sinsk, from [Һиннэ], possibly derived from the Even word [Һин], which means “thicket, dense forest, taiga, overgrowth,” with the Tungus-Manchurian affix [-на]; partially the kettle-hole Alases in the form of depressions in the Onkuchakh River from the Yakut word meaning literally a pit; Jelle, which originates from the Yakut [дьөл] meaning to drill, to make a hole in something, denotes a terrain in the form of a hole, ravine, or Oy from the Yakut word oidubut [ойдубут] meaning “torn off, splintered”, is an old, primordial name of the settlement which existed before the arrival of Tygyn, the ethnolocal leader of the Yakuts, to this land (the old name remains as a postal one, now the village is called Nemyugu).

Bulgunnyakhtaakh, which means a hill, belongs simultaneously to the “Type of terrain” and “Orientation in space,” since it is a landmark among numerous other objects. The special aspects of the local place names include the special property (from the Yakut [бэлиэ сир]), which is attributable to a certain natural object that serves as a spatial reference. The place name Bulgunnyakhtaakh was given to a lot of terrain objects identified as a high hill (hillock, knoll). The Yakut word [булгунньах] (knoll or hill) connects with the toponym forming particle [-таах], which has a possessive meaning, i.e. “with something” or “having.” Bulgunnyakh is a pingo with an ice core (hydrolaccolith) in the tundra, on the shores of the Arctic seas, in the area of permafrost. The Yakut word [булгунньах] “literally means an isolated highland (knoll, mound), regardless of its origin. However, among geographers, the word bulgunnyakh is used to denote periglacial mounds, i.e. generated as a result of thermal and hydrodynamic processes in the soil. These are solitary domed mounds with an ice core, standing on the plain surface of the tundra or forest-tundra, with heights from 1 to 30–40 m and a very long-term existence. They are common in enclosed, basin-type lowlands. Areas rich in bulgunnyakhs are sometimes classified as a special kind of hilly tundra” (Melkheyev, 1958). F.K. Komarov (1964) spells this word “bulgunnyakh,” “bulgunn’akh” and quotes some misspelled versions, such as buggun’akh, bulgun’ak, bolgunyakh and bulguniakh. Examples: village and river Bulguniyakh, Ikki-Bulgunnyakh, river Bulgunnyakh-Syan, lake and village Bulguniyakhtakh in Yakutia (Murzayev, 1984).

The category “Society and man” of settlement place names also ranks in the kernel position with 16.54%, understandably so, due to the socially important purpose of villages and summer houses. This includes the names of tribal families and individual persons; lands belonging to some person or family, etc; places named according to their social significance or social characteristics, such as Ogolookh, which literally means “the one who has children.” This category is also related to the category “Economy – agriculture” (8.28%), the latter being the measure of land reclamation by the locals for farming purposes, which is a strategic reference point for people, the society and the ethnic community as a whole. “Economy – agriculture” includes the names of objects that have to do with agriculture or indicate the particular household activity based on the names of places in the vicinity, such as horse breeding and the associated cultivation of suitable lands: Ala-Tiy, from the Yakut [ала] – “brindle, spotty, with white stripes, spots (when speaking about the coats of animals or birds)”; [тый] – “a colt from one to two years”; Arangas-Atyyr, meaning “a yellow stallion”; Kyuryuyelyakh – “surrounded with a fence or an enclosure” – a hay land allotment that yielded on average 300–400 Yakut haystacks or approximately 900–1,000 pood (~14,742 to 16,380 kg) of hay. Another place names that could be put into this category are Sayilyk (literally “summer house”), Kystyk (“winter house, wintering”), which are related, on the one hand, to the functional purpose of agricultural lands depending on the favorable weather condition in a particular season, i.e. orientation in time, and on the other hand, with the philosophical worldview, the binary opposites where two contrary notions are viewed simultaneously. In summertime, the Yakuts would come to live in summer houses during the hay harvesting period, while in winter they would move to winter houses, since first, the hay lands were quite far from the settlement, and second, because of the household usage of those lands that needed to be prepared for the next hay harvesting season, they needed to ensure that the soil remained fallow and was suitable for the subsequent haymaking. Summer heralded a new year for the Yakuts, who would cleanse themselves from all negative energy accumulated over winter. Also, the Yakuts associated the relocation to the summer house with a special celebration that involved cleansing rituals.

The categories “Type of location” (12.79%) and “Orientation in space” (12.03%) also take up kernel positions, ranking one after another. The category “Type of location”

includes names for places situated in a specific area, e.g. surrounded by a forest. For example, Alar means a wooded patch in an open area; Toyon-Aryy means something that is in a prominent place (literally, “main, central, prominent, an island”); a place on top of some object could be called Khaya-Yurde – “the mountain top”; and so on for other properties characteristic of a location. These place names also fit in the conceptual category “Orientation in space,” as they serve as a reference point in space. It bears noting that these conceptual categories are related, they belong to the same subcategory, but each has its own specifics, in the authors’ opinion. For example, the locality Isit, which means “dish, vessel,” cannot be used as a reference in space, instead it is just the characteristic of the location, its likening to a vessel being due to its shape. “Orientation in space” also definitely includes nominations referring to cardinal directions, such as Argaa-Sayilik (the Western Summer House), Soguruu-Sayilik (the Southern Summer House).

The place names in this category, being generated using somatisms, serve as ways to point direction in the Yakut language. For example, Kekhse (the Yakut [kəxçə]) means “back” and probably points to the back or the top of an object. In the authors’ opinion, the name [kəxçə] came to exist among the colloquial place names similarly to the traditional geographic term [сис], which means “spine, small of the back, back, the bearing part of smth.” and “a raised place (usually wooded) between two water reservoirs, an expansive forest growing in such a place” (The Great Definition Dictionary of the Yakut Language, 2011).

The place names in “Qualitative properties” demonstrate distinctive features of an object by its composition, quantity, size. Their frequency (11.28%) signals the significance of qualitative properties in the world picture in the minds of the Yakuts. The cognitive component of the “Qualitative properties” category is related to the cognitive categories “Type of terrain” (e.g. Khakhkha – a cover or a safety screen), “Hydrological profile” (Kuduk – a saltwater creek), “Soil profile” (Turannaakh – salt marsh, including attr.).

The place names in the “Specific plants” category were used to name localities that served as habitats to certain species of plants – these amount to 6.77% in frequency. One can judge based on the nominations related to the growth of various tree species: Kharyyalakh (fir tree), Bestyakh (pine tree), Tettinnyakh (aspen tree), Charan (a birch grove). This category is also related to the category “Type of terrain,” e.g. Tiit is the Yakut for “larch tree,” while Aryy – “island” – is translated as the “Larch Island.”

The category “Hydrological profile,” with its frequency of 6.01%, is related to the category “Soil profile” (3.75%), e.g. Bulus means a glacier, a layer of ice, an underground source of water that springs to the surface during winter and forms a large sheet of ice which only melts away by August. This concept is also very specific to the permafrost environment. This category also has a connection to “Qualitative properties,” which has been described above.

The cognitive category “Sacred placed” (3.75%) includes the names of places where shamans used to live. For example, the locality Kharanay is called so after an udagan (a female shaman) and a shaman’s daughter Uktaa Dyaaryn ([уктаа-] means to ignite, to burn out the dried grass remaining from the last year); Nemyugyu – a shaman’s son or a sacred object; Mokhsogollookh (falconine) – from the name of the totem bird of the Khangalas Yakuts.

The “Specific animals” category accounts for 3.75% of place names, including the names of birds, such as Kubalakh (swan, attr.), Mokhsogollookh (falconine), Khastakh (goose, attr.); and the names of fish, such as Cherke (small crucian), Mundulakh (lake minnow).

The oikonyms in “Society and man” category (2.25%) include place names by their historical significance, references to events, e.g. the name of the town Pokrovsk is a reference to a historical event of 1682: on the day of Holy Protection (Russian “Pokrov”) in the area of the present-day Pokrovsk, a major battle took place between

the local yasak payers and cossacks. This event is known as the last rebellion of the Khangalas residents against the voivode government.

### 3.2. Creeks, rivers

The category “Qualitative properties” is responsible for 30.29% of the names of rivers in Khangalas District, which reflect the ways people attributed different distinctive properties to rivers, such as size: Kuchchuguy – a small river; Kenkeme – a gully, a pit washed around by a stream of water (applies to long distances); shape: Soyulakh – a river shaped as a needle; Tarbakh – a finger; depth: Kyumyuk-Yuryakh – from the Yakut [көмүк], which means “deep snow” (when speaking about large accretions of snow over the winter time) or “a deep river”; quantity: Ikki-Kelyuye (Two Creeks); quality: Dzhukkaya, from the Yakut [джука] – “clean ice (river, lake), rapid (like the river flow), cleaned ice surface (of a lake, river)”; content: Kumakh-Yurekh (Sand River); properties: Belenkey, from the Yakut [Бөлөнкөй], which means “to turn sour” or “fish huddling”; character: Kyukkyuryuy – literally “making a loud, grim noise” which is reflected in the name of the river. The naming of rivers and creeks by distinct features was motivated by their difference from a whole set of other objects.

In performing the cognitive modeling of rivers, the Yakuts tended to connect the conceptual categories “Qualitative properties,” “Hydrological profile” (19.92%) and “Type of terrain” (7.88%). The definition or description of the distinctive features of rivers and the surrounding terrain is one of the major factors in the naming of rivers (high water, shallows, low water, etc.).

The conceptual categories “Type of location” (e.g. Kyndyma-Yuryakh, literally “a creek flowing down a steep edge”) and “Orientation in space” (e.g. Soguruu Salaa – “Southern Tributary”, etc.) rank at a kernel position (8.30%) in the frequency of place names for rivers. A man proceeding through the taiga would remember his path as a series of reference points, thus retaining an image of his position in space. A creek can be a reliable reference point en-route when it offers bearings to the east and the west.

The conceptual category “Society and man” (6.64%) is indicative of the dynamics of land reclamation along creeks and rivers. The relocation of tribal families driven by the need to find food took place along the banks of creeks and rivers. The socially significant characteristics (such as Uedey, literally “lay foundation”), names of residential buildings (Urasalakh – the one having an urasa, i.e. a house), household buildings (Ot-Balagan, literally “house made of a haystack”), names of persons, clans (e.g. Magachary-Yuryakh, named after a man) would thus be projected via the adjacent areas onto the names of rivers and creeks.

The subfactor of practical activity in the category “Economy – agriculture” (5.81%) indirectly affected the naming of rivers and creeks via the names of localities (the names of objects related to agriculture, e.g. the name of the river Ochchut-Uryue, which means “a haymaker, mower”).

The “Specific animals” (5.39%) also found their way into the naming of rivers and creeks, e.g. through a locality named after a bird of prey Kullaty (harrier of the Accipitridae family). Rivers are named after species of Evenki fish, birds, wild animals, e.g. Oldokun (huge fish), Degiletti – from “bird, fowl, hunt for birds, hunt for wild fowl), Negyurchene (wolf). There are traces of Tungus-Manchurian tribes in the names of rivers and creeks, as they would roam looking for fish and game and would find their bearings based on large objects (mainly along rivers and creeks). The place names of the Evenki origin make an ancient layer in the formation of the place names across the region.

In the conceptual category “Specific plants” (3.73%), the names based on plant species growing along rivers and creeks are quite diverse: Sibiktelyakh-Yuryakh (literally “a creek where horsetail is growing”); Khoronnokh-Yuryakh (coarse grass),

Iarga-Yuryakh (a dwarf birch or an osier-bed shrub); Onyugestyakh-Basa (the upper reach where the sprout is thrusting through).

The “Sacred places” category (1.66%) aggregates place names by the name of the area (Pokrovka), or the name of the revered object (Kullaty – a harrier, a totem bird), or the name of a creek (Ebe-Yuryue – the worshiping of the spirits of the creek), or Bytyrystakh (shaman).

The “Soil profile” (1.24%) of the creeks is reflected in hydronyms, such as Kutalakh (marshy), Turannakh (salt marsh), Toyuluk (loamy) and so on.

The “Society and man” category (0.83 %) includes names based on localities that have historical significance, such as Soviet-time collective farms (Chapayevo), events (Pokrovka), so they were also reflected on hydronyms.

### 3.3. Lakes

The cognitive category “Society and man” (20%) takes up a kernel position in the naming of lakes. This includes the names of places based on their social characteristics, such as Tereyebut – from the Yakut verb [тэpee], which means “to emerge, appear, be born (about something new); home”, literally “home lake”; Nuochakha – from the Evenki [очоха], a children’s coverall; on the day-to-day activities of the locals – in the category “Economy – agriculture” (10%) – related to lakes: Khantargan – from the Yakut [хантарга], meaning “a leading rein, a strap linking the cannon-bit and the saddle (so that the horse could hold its head upright); the fastening of a bridle to a shaft bow); Morda – fishing gear; Utelir – from the Yakut [үтэлээ] – to supply victuals and food, a place where the people would feed and stock up on food.

The category “Qualitative properties” is also in a kernel position (18.33%) in the naming of lakes, being also related to the “Type of terrain” (e.g. Kurung-Kharchakh – from the Yakut [курунг] – a “burnt-over forest; dried, withered (forest)”, and kharchakh – from [хаччагай] – a “bald spot, a white stripe,” etc.) with the frequency of 13.33%; and the “Hydrological profile” (Tyolyot – from the Yakut [төлө ас] – to uncover, to open up (with a jerk); [төллө кэт] – “to jump out, break away (with force)”; [төлө тарт] – “to set free, set loose (with one powerful move)” – with the frequency of 13.33%, and the “Soil profile” (e.g. Tustakh - salty) with 3.33%.

A notable phenomenon in the naming of lakes is the relation between the conceptual categories “Hydrological profile” and “Type of terrain.” For example, Lake Atakhtakh is derived from the Yakut word [арax] – a water reservoir shooting out into dry land or a narrowing part of a plain or a meadow. Another example is Lake Byldzhana – from the Yakut [былдьаа] – to take something from someone by force; to flood, drown; to destroy, ruin (in the context of natural disasters); the gerund [былдьана] literally means “flooded, drowned.” This is probably due to the type of terrain where it is located, i.e. a low-level, marshy area.

The frequency of lake names in the categories “Specific animals” (10%) (Byatey – a lake where one hunts for scoters; Kustakh – ducks place, attr.; Tabalakh – a place where one breeds deer) and “Specific plants” (8.33%) (Kharyyalakh – fir tree, attr., Bes-Kyuel – a lake with pines, etc.), is higher than it is in the case of the naming of creeks and rivers.

The conceptual category “Sacred places” (5%) reveals a special attitude to the naming of lakes due to it being an object of worship (e.g. Ebe – literally “granny”; Ichim – probably from the Yakut [иччим], which means “a spirit, my master”).

The frequency of lake names in the conceptual categories “Type of location” (1.67%) and “Orientation in space” (1.67%) is lower than in the case of naming of creeks and rivers in the same categories (Bas-Kyuel – “the major lake”, [бас] meaning “a head, an estuary”).

The conceptual category “Society and man” was not identified in the naming of lakes.

### 3.4. Islands, peninsulas

There are some interesting schemas in the cognitive modeling of insulonyms. The authors observed the relation between such conceptual categories as 1) “Type of terrain” (16.18%) plus “Type of location” (10.77%) – Sis-Kumakh or Toyon-Aryy, etc., “Orientation in space” (9.23%) – Khotochchu-Aryta; 2) “Type of terrain” plus “Hydrological profile” (4.41%) – Ire-Ary – from the Yakut [иэпэ], which means “shallow” (referring to a grassed creek); a drying armllet; 3) “Type of terrain” plus “Soil profile” (7.35%) – Sis-Kumakh – a sandy forest in the mountains; 4) “Type of location” plus “Orientation in space” -- Tit-Kuturuga, literally “the tip of a larch island,” Arkhip-Uehe, where the Yakut [yөc] means “the center, middle, artery, a place close to the center (of a water reservoir),” the island in the center of Arkhip.

The “Qualitative properties” (13.85%) include the features of terrain, water and soil, and this category is linked in the schema to the conceptual categories “Type of terrain” (Namtagar –low), “Hydrological profile” (Khabar – literally “catches, bites”), “Soil profile” (Khara-Ary – a black island, black soil).

The conceptual category “Society and man” is in the core position with 15.38%, as islands and peninsulas situated on the rivers were the places of residence for the locals in the time of collective farming (now practically no one lives there, they are summer nomad camps, i.e. inhabitants of nearby villages can move to these islands in the summer for haymaking). These include islands named after individuals, such as Mitka Kylykynata, Babylyky-Ary, Pavel Island, Arkhip-Uehe, which all hint at the allotment of lands that originated from the yasak system that used to be in place among the Yakuts. Also, this category includes the names of residential buildings, such as Urasalakh, Yam-Aryta (the yam island, through which the tsar post route in Siberia etc.). The relation to the conceptual category “Economy – agriculture” (6.15%) speaks of the huge household role the islands were playing in the life of the ulus. All critical hay lands used to be situated on islands.

The “Specific plants” (9.23%) include such names as Kharyyalakh (fir tree, attr.), Tit-Ary (a larch island), Berdzhigestyakh (pine, attr.), Khatyn-Ary (a birch island) and so on.

The “Specific animals” (7.69%) also play a particular role in the nomination of insulonyms. Judging from the place names, one can observe Kyllakh (a rich wildlife), Tabyskhannaakh (an island as a place to hunt for hare), Eselyakh (a place to hunt for bear), and the favorite place among the locals, Balyktakh-Aryta.

The category “Sacred places” (3.08%) is related to spiritual beliefs (Abasyta-Suokh – literally “an area free from the evil spirit”).

The “Society and man” category (1.54%) includes the name Yam-Aryta – the reference to a yam route that passed through the islands.

The residents of the region found life on an island a comfortable one, as they enjoyed the special island climate thanks to the ever-flowing river, which helped protect the island vegetation against frost well into late autumn. However, in spring, due to the alternating ice drift and freezing-up, the locals were essentially living in isolation, putting up with the temporary inconvenience.

### 3.5. Terrain

The conceptual categories “Type of terrain” (21.15%) and “Qualitative properties” (18.75%) are closely related. In most cases, mountaintops would be named by the features of the surrounding terrain, its size or location. The toponyms Saamys-Kumaga, Kysyl Elesin were given to tukulans – sand dunes. The term tukulan (tukalan) is of the Evenk origin. It means a sand hill, bare plantless sand; the Yakut landscape made of sandhills (Melnikov, 2009). The toponym Saamys-Kumaga is derived from the common Turkic word [кумах/кум] (sand), with the descriptive component “saamys” (from the Yakut verb [саамылаа] – sort out, pour over).

Obviously, this place name reflects the distinctive feature of the *tukulan*, specifically its grains of sand – they are of exceptionally regular globular shape, which is typical for eolian deposits. The *tukulan*-defining toponym *Kysyl-Elehin* (the Yakut [Кыһыл Элэһин]) also has Turkic origins (the common Turkic adjective [кыһыл] – red, [элэһин] – the Yakut word for “sand”). The toponym *Khonuu* means a plain: the Yakut word [хонуу] means a plain, so in this case the place name and the object itself have exactly the same meaning. The *Darkylaakh Mountain* (from the Mongolian [дархы] – “windfall, deadwood”) is called so because of the distinctive properties of the locality that matter in the context of the household activities of the locals. Such areas are heavy-going, so this particular fact often underlies the corresponding place name. On the other hand, the names of the mountains *Symnaky* (from the Turkic [сым]/[шым] – “quiet, placid, soft”) and *Namsylay* (low, placid) have a positive connotation. The name of the *Obyrv* hill incorporates a specific terrain feature, namely the sharp, steep slope. The name *Nokhoroy* (from the Yakut [нѳхочгор] – “stooped,” normally with respect to a person) contains the comparison with a silhouette of a stooped man. The names of *Oybon* and *Khonu* are of particular interest. The Yakut word [ойбон] means “ice-hole, air-hole.” Apparently, somewhere on or near this hill, there is either a lake or a cavity in the shape of an ice-hole. The toponym *Khonu* means “glade,” i.e. the mountain (hill) *Khonu* received its name due to having a flat top with a glade on it.

Exactly 16.67% of oronyms were put in the “Type of location” category. The name of the mountain ridge *Myachay Sihe* [Мячай Сигэ] contains a somatic component since the Yakut noun [сис] means “spine.” The origin of the ethnonym *Maachay* ([Мээчэй] in Yakut) is unclear, it could possibly be derived from a person’s name. The name of the locality *Khonu Saspyt* translates from the Yakut language as “hidden, concealed glade.” The object was named by its location: the glade is hidden either inside a thick forest or behind a sugarloaf mountain.

The “Society and man” category accounts for 14.58% of oronyms. The name of the locality *Nazar Yolyongnyogyo* means “a grassed area of Nazar.” The toponym *Terut* is frequently used throughout Yakutia; it originates from a Yakut word that means “foundation, root, something familiar.” The Yakuts used this place name to refer to areas, in this case a hill, which historically had been homes for specifically the Yakuts, as opposed to other indigenous communities of the North. This category also includes a place name formed in a close relation to the conceptual category “Sacred places,” viz. *Paraskovya-Unuoga* – the place name means “Paraskovya’s (a shaman) Grave.”

The “Specific plants” are responsible for 12.51% of terrain place names. There are some very frequent Yakut toponyms, one is *Kharyyalakh* – a place where fir trees are growing, and *Khomustakh* – a place with abundant bulrush, *Boruulakh* – a place with fen grass, *Kuekh-Khaya* – from the Yakut “Green Mountain,” i.e. a mountain covered with forest, as opposed to bare, “bald” mountains. The toponym *Kurunakh* (the Yakut word [кураанax] – “dry, empty”) means a bare area devoid of trees, or an area with lots of withered trees.

The conceptual category “Economy – agriculture” accounts for 8.33%. The names of the geographic areas *Kuyuurduur*, *Khatyngnaakh Sayilyk*, *Kybytyy*, *Kyra-Butedyakh* are all related to the Yakuts’ traditional farming activities. The area name *Kuyuurduur* comes from the traditional winter fishing on a lake or a river: the Yakut word [куйуур] means “winter finishing with a scoop net.” The area name *Khatyngnaakh Sayilyk* comes from a combination of two words – [сайылык] – a traditional Yakut summer house, and [хатынгах] – a place with lots of birch trees. The place name *Kyra-Butedyakh* means a “small, fenced-in place,” i.e. points to the results of human activity. On the other hand, [бүтэй] also means a “nook, an enclosed place.” In this case, the toponym stems from the conceptual category “Type of terrain.” The name of the *Bysalardakh Mountain* literally means “where there is a

short way, a shortcut.” Therefore, this place name has a link to human activity, as people laid a frequently used shortcut through this area.

The category “Soil profile” (7.69%) includes the name of a place called Kerdyugen, which derives from the Yakut word for “underground fire” or “marshy lake.” This place name brings forward a property of soil, namely the subsoil smoldering and shallowing of the lake, which triggered the formation of marshes.

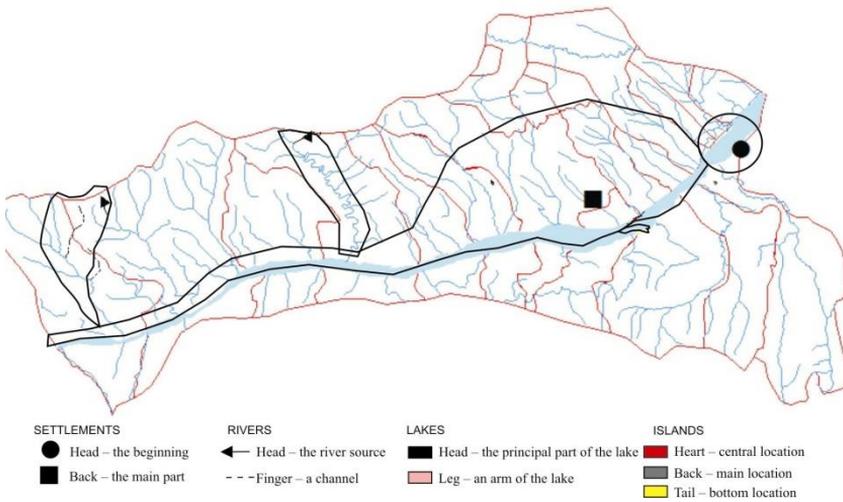
The conceptual category “Sacred places” received 2.08% of place names. The name of the Ytyk-Terite Mountain means “sacred family, the sanctity of the ancestors.” The name Paraskovya-Unuoga means “Paraskovya’s (a shaman) Grave.” The locals believe that these places are sacred, so they tend to stay away from them lest they disturb the local spirits.

The “Hydrological profile” takes up 1.92%. The toponym Tit-Yurekh is among the most frequent ones in Yakutia, it means a “larch-tree river,” i.e. a deciduous forest through which a small river flows.

The formation of terrain toponyms in this region relies on terrain features related to the traditional ways of land reclamation and farming of the Yakut cattle breeders living in Central Yakutia. The names of terrain objects do not draw upon such categories, as “Orientation in space,” “Specific animals” or “Society and man” (0), which took part in the formation of the place names in the other aforementioned geographic groups.

4. The authors have been the first to use the analysis of the cognitive modeling of toponyms to discover the worldview of the local ethnic groups transferred to the local terrain. In fact, a specific factor in the naming of areas that serve as reference points for the Khangalas Yakuts is the use of a limited, yet conspicuous range of toponyms with somatic components, including the names of body parts of humans or animals/humanlike creatures. For example, the word used by the Khangalas Yakuts for the very middle of some locality is [сүрөрэ], which means “heart, core”; they call the back or the upper side [сиэ], meaning “back, spine”; they call the upper part [бaha], which means “head”; they call an expanse of water running into the dry land or a narrowing end of a plain or a glade [arara] – “leg” etc. As O.V. Starykh points out, the drawing of a parallel between the real world and its presentation through linguistic means via somatisms is by no means incidental, since the semantic information conveyed by the studied words points to specific objects from the world around us. Using language and words, not only does man depict the processes of the real world and the world of subjective assessment, emotions, and feelings, but he himself also acts as a link in the structure of these worlds. Orientation in space and time, the expression of subjective values were all concepts that man would fathom gradually, yet always with the help of the cognitive “tools” around him — his own body parts (Starykh, 2011). Judging from the fact that the Yakuts project the names of body parts onto the names of both vertical geographic objects (the legs, liver, heart, back, head, nape, cheeks of a mountain) and horizontal geographic objects (the leg, eye of a lake; the back, tail, head, beak of a river), it is worth mentioning that the Yakuts’ traditional picture of the world remains centered around an animistic notion about the objects around them.

The GIS-based map (Figure 2) imaging the database of somatic toponyms of Khangalas District demonstrates the direct use of somatisms to describe the Lena River, which is seen as a human or an animal. The part of the Lena flowing through the northeast of the ulus is viewed as the head; the middle reach of the river is thus viewed as the back, the legs in the bottom and the two arms and/or wings along the back.



**Figure 2: The perception of the geographic objects of Khangalass Ulus as body parts of the Lena River (composed by Filippova, 2017)**

The study of the place names of Yakutia denoting various landscape geographic groups (rivers, lakes, settlement, terrain) which act as cores of cognitive modeling due to the multiple aspects of the knowledge they incorporate allows discovering the notions the indigenous people had about the nature and world around them, as well as the dynamics of linguistic representation and the perspective of using the surrounding landscape.

### Discussion

The study was inspired by the fundamental academic research on cognitive linguistics led by professors V.V. Alpatov and N.N. Boldyrev (2008), with due consideration for the modern publications in this scientific domain. The use of linguo-cognitive approach helped reconstruct the view of the landscape through the system of interrelated cognitive contexts arranged in a matrix.

Each component of the matrix can also be overlapped by other interrelated components bleeding into one another, e.g. the component “Features of terrain, water, and soil” overlaps with the component “Qualitative properties,” whereas the component “Orientation in space” can affect the component “Type of location” and vice versa. Therefore, these categories of components have internal overlapping that forms certain ambivalence.

It bears noting that the cognitive matrix has a center (kernel) and the edges, e.g. a structure made of components. This is characterized by the formation of complex components around the kernel of the cognitive matrix, which the authors believe can contain both kernel and edge components, depending on the specific features of the kernel. The authors pinpointed individual kernels in their study, such as oikonyms with their components, the names of rivers and creeks with their separate components, the names of lakes with their components, oronyms with their separate components and insulonyms with their respective components. The components of each kernel have their own specifics, and each kernel is characterized by kernel and edge components, as particular components can prevail over others in respect to each individual kernel. Some components can be identified in one kernel and be missing in others. For example, the kernel TERRAIN lacks such components as orientation in space – 0; specific animals – 0; Society and man – 0, and at the same time, these very components are present in other kernels (oikonyms, insulonyms, the names of rivers

and lakes). As for hydronyms, the “qualitative properties” serve as kernel components for the names of creeks, whereas in the case with lakes, this component is optional, and instead the “Society and man” component is a kernel one here. Yet according to V.V. Alpatov and N.N. Boldyrev, (2008), “Unlike the other components of cognitive context, such as a frame which incorporates both mandatory and optional components that communicate the stereotypical knowledge about the situation, a cognitive matrix summarizes the knowledge about the different aspects of the same phenomenon.” The authors thus identified kernel (mandatory) and edge (optional) components around a kernel phenomenon, but they do not offer just stereotypical knowledge about a particular situation, rather they provide relevant, concrete meanings with cultural content that is imprinted in the language (the linguistic concepts pertaining to nature, humans, history, etc.).

In this paper, the authors made an attempt to fill in the gaps in the research of toponyms through the prism of cross-cultural and linguo-cognitive analysis of the naming of geographic objects, their classification, and systemization within the language.

The theoretical and practical significance of the project lies in the identified toponymical complexes – the groups of place names characterizing the geographic notion of the surrounding landscape and the development of Yakutia’s lands, and in the drawing of landscape-toponymical maps using the cognitive-matrix modeling method (the cognitive matrix). The interdisciplinary nature of the study will, beyond doubt, facilitate the coevolutional strategies of integrated socioeconomic, cultural and ecological development of Russia’s northern regions as well as prove its relevance in the international context, for preserving the unique natural and cultural landscapes and maintaining the civilizational experience of the exploration of cold-weather lands.

## **Conclusion**

To sum up the above, the major result of the study undertaken by the authors is the creation of cognitive-matrix models of indigenous place names for the various objects of Yakutia’s Khangalass District represented by various landscape geographic groups (rivers, lakes, settlements, terrain). The scientific novelty of the study consists in the fact that the cognitive matrix designed and used by the Russian researchers has been completed with kernel and edge components which bring in the multiple aspects of knowledge that allows revealing the system of notions the indigenous people had about the nature and world around them, as well as the dynamics of linguistic representation and the perspective of using the surrounding landscape. The spatial representation of the acquired cognitive-matrix model was possible using GIS mapping, which helped identify the relations between different matrix components and the hierarchy of components within individual geographic groups.

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