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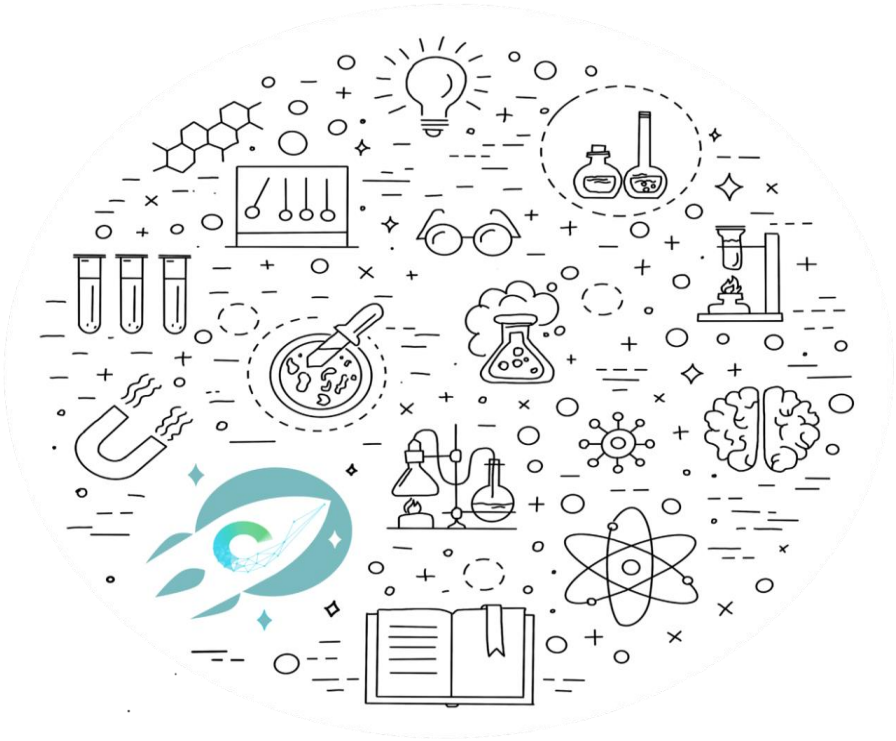

СБОРНИК МАТЕРИАЛОВ

VIII научно-практической конференции с международным участием

«Science Present and Future: Research Landscape in the 21st century»

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Отдельный раздел составляют результаты научно-исследовательской работы школьников, рекомендованные к публикации по итогам работы научно-исследовательского форума «Точка научного старта» (14 апреля 2024 г.). Межрегиональный научно-исследовательский форум состоялся в Частном образовательном учреждении «Образовательный комплекс Точка будущего» (г. Иркутск) при поддержке Благотворительного фонда «Новый дом», Иркутский научный центр СО РАН, Министерства образования Иркутской области.

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2. Life-sciences on the Cutting Edge of Science

3. Linguistics and Language Acquisition

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UDC 621.311.11

FAULT LOCATION ON BRANCHED DISTRIBUTION NETWORKS

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Keywords*: fault location, methods, branch, overhead line, distribution networks.*

The main methods of fault location were developed in the second half of the last century and have recently been improved and combined, taking into account the emergence of new computing capabilities of relay protection equipment and the development of technological communication systems.

At present distance methods of fault location are used in practice [2]:

1. High-frequency methods: wave (one-sided and two-sided) and location methods;

2. Low-frequency methods: capacitive (for cable lines) and emergency mode parameters (one-sided and two-sided) methods.

These fault location methods are successfully used on overhead lines 110 kV and above, having a simple configuration: single-circuit or double-circuit lines with a small number of branches or without them.

For lines of medium voltage distribution networks (6-35 kV), the situation with localization of fault is completely different. This is due to two reasons:

1. Neutral operating mode (isolated or compensated);

2. Complex (branched) network topology.

The majority (70-90%) of damages to 6-35 kV overhead lines are single-phase earth faults that occur when a wire is broken, an insulator is destroyed or a wire is shorted by foreign objects.

In the case of single-phase earth faults in isolated neutral networks, the use of fault location methods based on emergency mode parameters (EMP) is extremely difficult due to the low values of single-phase earth fault currents and the difficulty of separating the emergency components. Maintaining the power supply of the load in an incomplete phase mode, powering the fault site from all branches of the branched line, the presence of compensation devices, the propagation of zero sequence currents according to a complex scheme make the fault location task unsolvable using EMP.

The structure of distribution networks can be radial, annular, radial-ring, tree-shaped, etc. The complex branched network topology (Figure. 1) leads to the fact that distance fault location methods without combination with other methods also do not work.

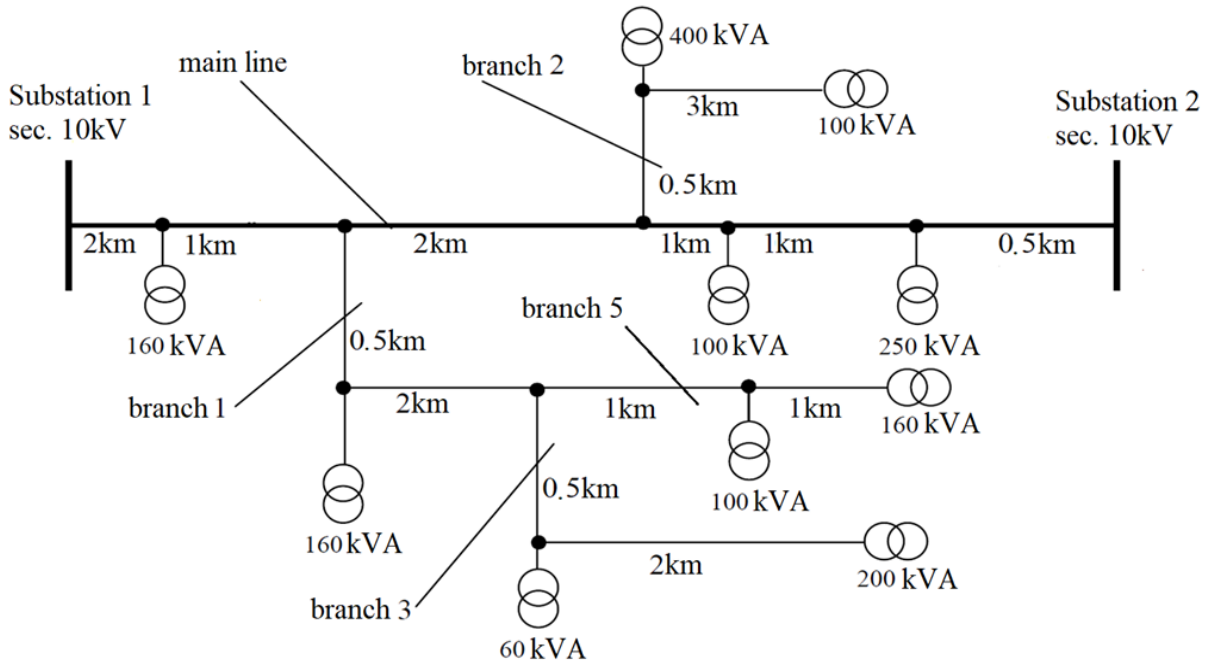

Figure 1. The scheme of the branched radial distribution network

In this regard, it was decided to develop methods of automatic fault location on distribution networks. The research is carried out in two directions:

1. Ensuring the possibility of using existing fault location methods in networks with complex topology.

2. Development of new fault location methods and algorithms in distribution networks.

The first direction provides for changing the network topology by disconnecting consumer solders and branches using Reclosers and remotely controlled Disconnectors during a currentless pause of the autoreclosing cycle. To determine the switching devices to be switched off, information on the operation of short-circuit indicators will be used, as well as information on the emergency mode parameters measured by relay protection devices and multifunctional electric energy metering devices.

After completing the necessary network switching, the line configuration will be as close as possible to a simple branchless line with one-side or two-side power supply. In this case, when the line is switched on again, it will be possible to determine the exact distance to the damage site and localize it by performing a

remote network switch. If there are several network points corresponding to the result of calculating the distance, information about the operation of devices on the line will be used to select the most likely place of damage.

Thus, in order to accurately fault location on branched distribution networks, it is planned to use a combination of distance (impedance and wave) fault location methods and topological methods based on the use of information about the operation of short circuit indicators and other devices installed along the highway and at branching points.

The second direction is to research the fault location method on branched distribution networks using emergency mode parameters recorded by various devices, in particular multifunctional electric energy metering devices. This method is based on determining the actual propagation of zero-sequence currents in a branched network using synchronized measurements of phase currents of all branches and voltages at network points. It is impossible to perform this computationally using a network model and measurement data of emergency mode parameters at power substations, since zero-sequence currents flow depending on the neutral grounding circuits and the distribution of currents is constantly changing. The use of multifunctional electricity meters allows us to calculate the current distribution and its changes in real time in case of damage to the network.

Thus, the precise localization of damage in extensive distribution networks is inextricably linked with the effective use of modern automation, communication and multifunctional metering devices.

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APPLICATION OF ENVIRONMENTALLY FRIENDLY TECHNOLOGIES IN GAS PRODUCTION IN SURKHANDARYA REGION (UZBEKISTAN)

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Keywords: *environmental damage, gas deposits, hydrogen sulfide, corrosion inhibition.*

For exploration and development of gas condensate fields in Southern Uzbekistan, especially with deep wells, it is important to take into account specific geo-ecological requirements to minimize the technogenic impact on the natural environment. Mining regions in this area experience significant environmental stress due to activities in the hydrosphere.

E LLC Surhan Gas Chemical Operating Company, with the involvement of ERIELL Group, began construction of the Boysun gas-processing complex, a key facility for the development of the Boysun group of gas condensate fields in the Surkhandarya region (Uzbekistan) in the south of Uzbekistan. The complex includes gas treatment installations, a collection point that receives fuel from 100 production wells, 10 well pads, as well as 500 kilometers of gas pipelines and 150 kilometers of roads. The design capacity of the enterprise is 10 billion cubic meters of gas per year [2].

The project is aimed at organizing the production and annual processing of 5 billion cubic meters of hydrocarbons. During the construction of wells in the productive sediment interval (3060/3300 – 3600/3880 m), the following complications are predicted:

– influx of salt-saturated formation waters;

- scaling and sticking of drilling tools;
- availability of associated petroleum gas (APG);
- aggression of acid gases (carbon monoxide and hydrogen sulfide).

In order to reduce the emissions of harmful gases, it is necessary to use modern technologies for gas purification and utilization. Effective environmental policies and strict control standards can help minimize environmental impacts.

The flaring of associated petroleum gas (APG) leads to significant environmental problems such as air pollution and greenhouse gas emissions. Instead of burning APG, it can be used to generate electricity, produce fertilizers or as a feedstock for other chemical processes. This will reduce the negative impact on the environment and increase the efficiency of oil production.

It is important to develop APG utilization technologies and take measures for its effective use in order to reduce negative consequences for the environment and ensure sustainable development of the oil and gas industry.

Effective utilization of associated harmful gases really plays an important role in protecting the environment and human health. Technology development in this area is welcomed. The introduction of environmentally friendly and efficient recycling methods will help reduce the negative impact on the environment. Improving processes to remove substances such as hydrogen sulfide from harmful gases is essential for sustainable development. I hope that projects on this topic will be successfully implemented and will benefit both the environment and the country’s economy!

In the oil and gas industry, it is important to reduce hydrogen sulfide levels to ensure the safety and efficiency of oil and gas production and refining processes. The development of new compounds and technologies to combat hydrogen sulfide plays a key role in this process. Through research in this area, effective methods have been created to minimize the presence of hydrogen sulfide, which improves safety and environmental sustainability of production. The following works made a significant contribution to the solution of theoretical

and practical issues of gas purification from hydrogen sulfide: Balatsky O.F., Vakulyuk P.G., Vlasenoko V.M., Barakhtenova L.A., Zinovyeva L.M., Ivanova N.N., Potapov A. G., Kuzmenko N.M., Shpilov D.D., Ashraf Akhmed., Afanasyev Yu.M., Frolov G.S., E.N.Buglov, E.G.Vaseneva and others.

Zinc compounds Zn $(CO_3)_2$ and magnetite absorbers for H_2S are very interesting. Indeed, the amphoteric action of zinc allows efficient handling of H_2S under various conditions, and magnetite, by forming stable pyrite, can also be useful in this process. However, care should be taken with pH levels to avoid the formation of zincate ions, which can negatively affect drilling fluids. Also remember that the formation of reaction products and exposure to alkaline conditions can be a problem when using magnetite. In general, these aspects are important to consider when selecting the optimal absorber for H_2S applications.

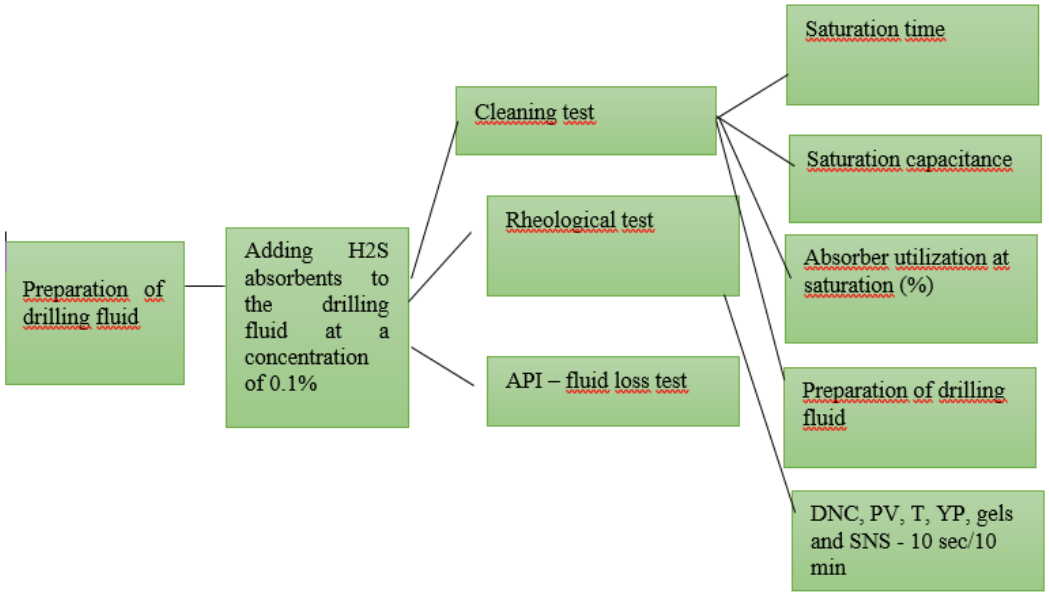

Table 1. Research methodology

Using specialized absorbers to purify gases from H_2S is a good solution. This allows the hydrogen sulfide removal system to operate reliably and efficiently under various conditions such as pressure and temperature. As a result, gas flows become safer and more environmentally friendly.

Polyethers, monoethanolamine and other amine substances are used to remove hydrogen sulfide (H_2S) from gas streams in gas transportation and purification processes. These reagents react with H_2S to form compounds that can be easily regenerated, allowing for multiple uses that are economical for sour gas processing plants. The concentration of H_2S within is in the percentage range, amine solutions successfully absorbH_2S, helping to clear the environment of this harmful gas. Such purification processes are very important in industry, especially in the oil and gas industry. Amine compounds such as monoethanolamine (MEA), diethanolamine (DEA), N-methyldiethanolamine (MDEA) and diglycolamine (DGA) are widely used as acid scavengers in various processes such as gas and liquid purification. Regenerative absorbers are truly effective in controlling the process gas flow from the formation. Using them to control process parameters such as pressure, temperature and amine concentration helps minimize operational problems [1].

Manganese oxide (MnO) is indeed considered one of the most stable forms of manganese oxide in a reducing environment. Other manganese oxides, such as manganese dioxide (MnO_2) or manganese trioxide (Mn_2O_3), can be reduced to MnO in the presence of a reducing agent, such as a reducing atmosphere. The specific sequence and quantities of each additive in the drilling fluid are given in Table 2.

Component	**quantity**
distilled water	316 см ^{3}
Defoamer	0,08 см ^{3}
Green Pac LV	1 г
Clay PBMB	6 г
Potassium Chlorine	34 г
caustic soda	0,25 г
Baryte (calcium carbonate) (50 мкм + 25 мкм)	36 + 24 г
Neutralizers H_2S	0/1 г

Table 2. Recipe

In this study on the performance of MnO and MEA and h-iron, its effect on drilling fluid showed interesting results as an H_2S scavenger to improve the

neutralization of hydrogen sulfide from the drilling fluid during drilling, while simultaneously solving several geo-environmental problems, such as:

1. Reducing the emission of harmful gasses into the atmosphere
2. Restoration and protection of ecosystems
3. Sustainable use of natural resources
4. Purification of water resources from pollution
5. Waste reduction and recycling
6. Protection of wildlife and biodiversity

Addition of MnO to solutions can successfully neutralize hydrogen sulfide H_2S. This will result in environmentally and geo-environmentally safe, improved drilling operations and also provide good fluid rheology, filtration characteristics and corrosion protection. MnO also maintains a safe pH level, making it suitable for drilling acidic hydrocarbon formations. However, additional studies are required for field testing to evaluate the effectiveness under high pressure conditions, as well as to take into account any changes in the composition of the drilling fluid. The use of MEA and h-iron significantly increased the ability of the aqueous solution to remove H_2S, and the use of MnO appears to be even more effective by increasing the neutralization of hydrogen sulfide. Neutralization of H_2S is very important for the oil and gas industries, especially for geo-ecological safety and environmental protection. Adding MnO to the drilling fluid helped maintain the pH at a safe level (11.3), which plays an important role in preventing acid formation during drilling. Indeed, pH (7.9) is a critically low value for drilling fluids.

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UDC 550.370

APPLICATION OF TEM AND MTS ELECTROMAGNETIC SOUNDINGS ON THE TERRITORY OF THE MUNSKY ARCH OF THE ANABAR ANTECLISE

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***Keywords**: electric exploration, magnetotelluric MT sounding, MT field, near-field time-domain electromagnetic sounding, geoelectric structure.*

The present study was conducted on the territory of the Siberian platform in the area of the junction of the Munsky arch of the Anabar anteclise with the Vilyui syneclise. The relevance of the work is due to the oil and gas content of the Vendian-Cambrian complex.

As it is known, one of the most effective methods of electrical exploration for prospecting hydrocarbon reservoirs of the East Siberian Platform is probing by near-field time-domain electromagnetic sounding (TEM) [4].

Method of electromagnetic sounding with an artificial source based on the study of the transient field [3]. The application of the above-mentioned pulse fields for solving geologic exploration problems was substantiated by the works of S.M. Sheinmann, A.N. Tikhonov, O.A. Skugarevskaya, D.N. Chetaev, as well as L.L. Van'yan and V.A. Sidorov [2, 5].

The TEM method is used for depth studies of the sedimentary cover and the upper part of the crystalline basement. Grounded lines and ungrounded loops are used as generator sets for TEM. At distances much larger than their sizes, they are approximated by a horizontal electric dipole and a vertical magnetic dipole, respectively. Thus, excitation of the transient field can occur either galvanically or inductively [1]. SGS-TEM hardware-software complex was used in the

process of performing electrical exploration works by the TEM method (range of investigated depths – from 200 m to 7 km) [4].

On the investigated territory more deep investigations were also supposed, by means of which it was supposed to specify the roof of the crystalline basement. In conjunction with the TEM method the method of magnetotelluric sounding (MTS) was used.

A distinctive feature of the method is the absence of the need to use an artificial source of electromagnetic field. MTS – is based on the study of the Earth's natural alternating electromagnetic field of different frequencies. Due to the skin effect, higher-frequency oscillations of the MT field decay faster with depth, while low-frequency components of the spectrum penetrate to greater depths. The method allows obtaining information about the upper and deep parts of the geoelectric section [1]. The nature of the MT field is based on the interaction of the solar wind with the Earth's ionosphere and magnetosphere, the propagation of thunderstorm discharges and the influence of other sources located at a sufficient distance from the observation point. To record magnetic (Hx, Hy, Hz) and electric (Ex, Ey) field components SMT-32 hardware and software system was used [4].

As a result of the MTS and TEM works, electrical resistivity sections were obtained, which allow to trace changes in the geologic-geoelectric structure of the site (Figure 1).

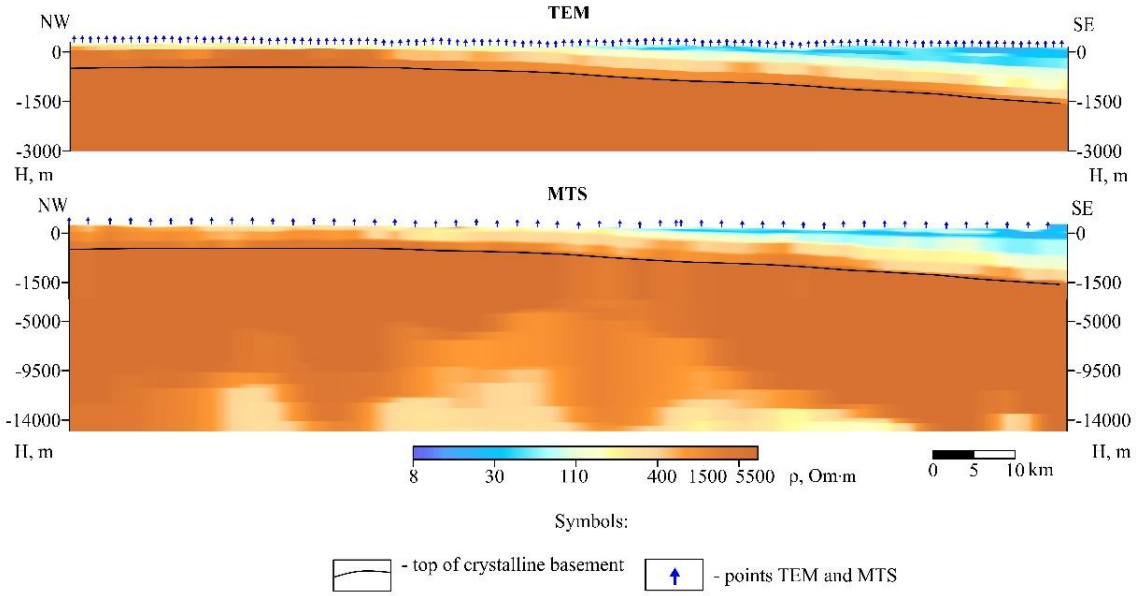

Figure 1. - Geoelectric cross-sections of electrical resistivity based on the results of TEM and MTS [4]

The study showed that, in studying the structure of the crystalline basement the MTS method was more effective, in turn, due to high sensitivity to changes in geoelectric parameters of the section, the TEM in turn allowed to differentiate the thinner and less contrasting layers, within the sedimentary cover [4].

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ENERGY RELEASE DURING A DECAY PHASE OF SOLAR FLARES

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Keywords: *Sun, flares, flare decay phase.*

Solar flares are fast and compact processes of energy release that appear in all ranges of the electromagnetic spectrum. During flares, the energy is transformed not only into radiation, but also into the particle acceleration and coronal plasma ejections to interplanetary space. Reaching the Earth, a plasma cloud of charged particles initiates magnetic storms, disabling the facilities both in orbit and on the terrestrial surface. That is why study of the occurrence and evolution of flares is not only a fundamental task, but also an applied one.

There are two phases of flare evolution: the impulsive phase and the decay phase. A period from the onset of a phenomenon to the maximum of X-rays flux is called the impulsive phase. It is characterized by particle acceleration and fast plasma heating lasting from a few seconds to minutes. The impulsive phase is followed by the decay phase, which is characterized by gradual cooling of plasma, lasting from minutes to hours. Although the majority of scientific interests are focused on the impulsive phase, it does not mean that decay phase research is less important. There are several reasons for its study. The amount of energy released during the decay phase is comparable to energy released during the impulsive phase [3]. Besides, the decay phase is usually accompanied by

wave processes and rapid acceleration processes, which can change an energetic balance of a flare [4].

Numerical and analytical models of flares describe plasma cooling by functioning of only two processes: radiative losses and conductive cooling. However, a comparison of the theoretically predicted cooling time with observations revealed differences, indicating the possible presence of additional heating sources or processes that slow down plasma cooling, such as wave processes [3].

A sensitivity of microwave emission to the types of generation mechanisms makes microwave observations one of the most powerful tools for diagnostics of processes in solar plasma. The Siberian Radioheliograph (SRH) [2] carries out microwave observations with not only spectral but also spatial resolution. This feature allows us to derive numerical plasma parameters for both «the Sun as a star» and in a particular region.

The current state-of-the-art in the decay phase studies, including theoretical models and the preliminary results obtained by SRH, will be discussed.

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OBSERVATIONS OF LONG-LIVED ULF WAVES IN THE EARTH'S MAGNETOSPHERE ACCORDING TO THE SATELLITE DATA OF THE THEMIS MISSION

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Keywords*: ULF waves, wave processes, THEMIS, long-lived waves, satellite data, magnetosphere.*

The paper presents a statistical study of long–lived ultra–low frequency (ULF) [3] waves in the ranges Pc4 (6.7 MHz - 22 MHz) and Pc5 (1.7 MHz - 6.7 MHz) in the Earth's magnetosphere according to the THEMIS mission [2]. The study took the period from January 2017 to February 2018, during which the satellites performed one complete survey of the magnetosphere. A feature of the THEMIS mission is that the orbit crosses the boundary of the magnetosphere, which allows events from Earth to the magnetopause to be recorded. In addition, during the period under review, satellites A, D and E moved in a similar highly elliptical orbit, which allows us to obtain data on approximately the same area of space with a small-time difference, which helps to detect long-lived UHF waves. We will call long-lived waves those that are observed by one satellite for 2 hours or more or are observed in the same area of space during the closest flyby by another satellite. Long-lived UHF waves are of interest, since the very fact that

they have been observed for a long time indicates a constantly operating generation mechanism [4]. Thus, prolonged disturbing processes in the solar wind, for example, transients from the foreshock, can act as a source of generation of such waves. However, in the studies of individual cases of observation of long-lived waves, the source is often the internal instability of the plasma.

Thus, the question of the source of long-lived waves and the reason for their long existence remains open. In this paper, using the statistics of the observation of long-lived waves by satellites A, D and E of the THEMIS mission, we will try to determine the causes of their occurrence.

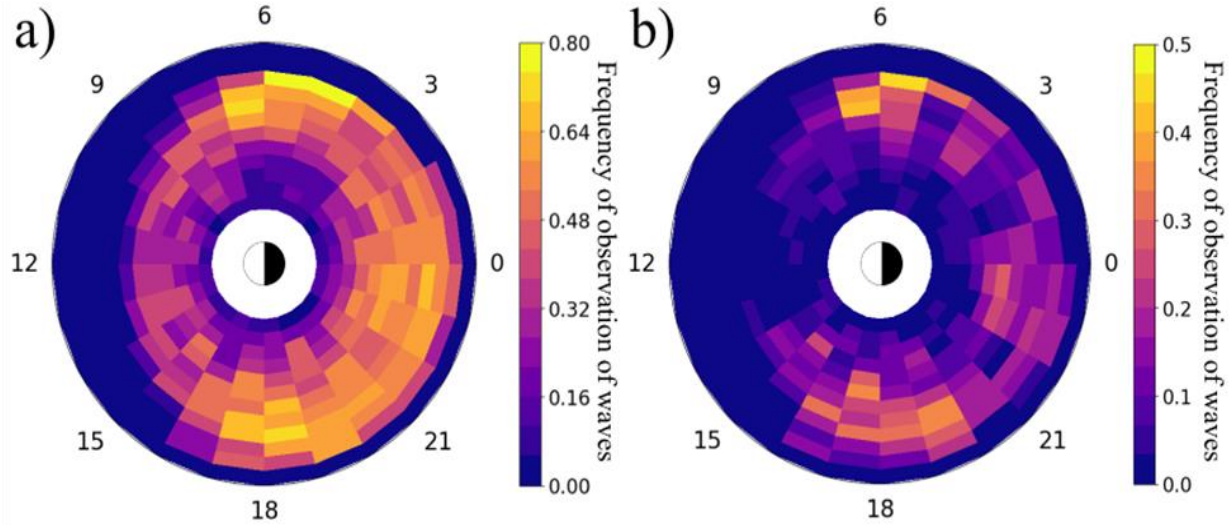

Figure 1. L-MLT (4 < L < 16) diagrams of wave observation frequencies on the complete data set (a) and for long-lived waves (b).

In the course of this work, the distribution of long-lived waves on the L-MLT plane was obtained, where it is possible to notice the features and patterns of this distribution. For example, for a complete set of waves, it can be seen that long-lived ones are most often observed around 6 and 18 pm MLT (Figure. 1). Most likely, this was influenced by instabilities associated with unstable distribution functions of protons and ions in these regions, as well as the Kelvin-Helmholtz instability [1].

The result showed that different groups of long-lived waves have different generation natures and different spatial distributions, but similar mechanisms within their group, which is consistent with clustering of UHF waves [5].

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UDC 537.86

DIURNAL VARIATIONS IN SPORADIC LAYER CHARACTERISTICS OVER IRKUTSK

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Keywords: *sporadic layer, diurnal variations, occurrence, height, semidiurnal tides.*

The subject of this study is the sporadic layer in the E-region of the ionosphere (Es-layer). The Es-layer is a thin layer of metal ions at heights between 90 and 130 km. The generally accepted concept for the formation of the Es-layer is the wind shear mechanism [1]. Vertical shifts of the zonal and meridional wind lead to a counter drift of metal ions of meteoric origin, which leads to the formation of a thin layer with a high electron density. There are different types of diurnal variations. Now there is no complete understanding of why certain types of variation are realized for certain geographical and seasonal conditions.

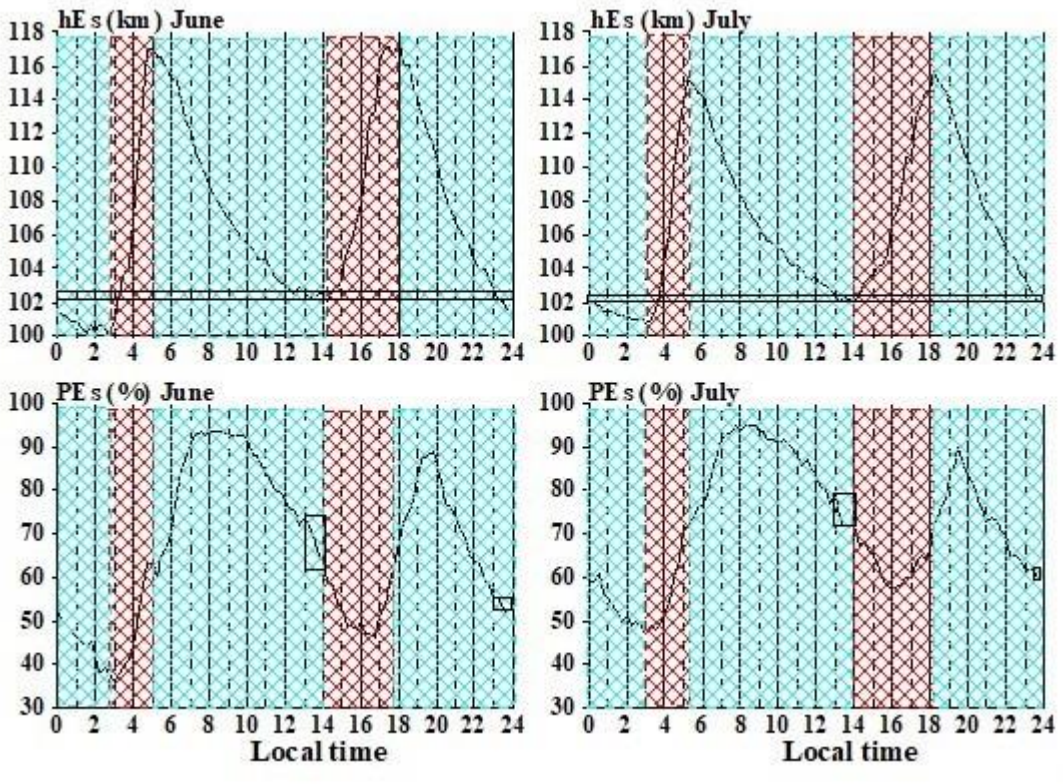

Figure 1. Diurnal variations of height hEs and occurrence frequency PEs. Red area is ascending height area, green area is descending height area

Figure 1 shows the diurnal variations in the occurrence (PEs) and height (hEs) of the Es-layer for June and July. These variations were obtained from the Irkutsk DPS-4 ionosonde by averaging over 2003-2021.

Summer diurnal variations in hEs and PEs show in semidiurnal (maxima in the morning and evening) and diurnal component (daytime values exceed nighttime ones). This means that the diurnal and semidiurnal tides dominantly control the formation and altitude descent of sporadic E layers.

Figure 1 shows that the maxima of hEs are observed after the maxima of height, i.e. daily variations in PEs seem to lag behind variations in height. In order to explain such a pattern, we considered several factors influencing the efficiency of sporadic layer formation depending on the height Es from the paper [2]. As altitude increases, the recombination rate of metal ions decreases, which leads to increase in the Es formation efficiency with increasing altitude. This also reduces the effect of collisions between ions and neutrals, which also leads to increase in the efficiency of Es formation. The process of thermal ablation of metal atoms and ions (release due to intense frictional heating) occurs predominantly at altitudes from 80 to 110 km, which contributes to a decrease in the efficiency of Es formation with increasing altitude. Considering all these factors, it can be assumed that there is an optimal height of the sporadic layer. Based on observations, it can be assumed that optimal height is in the range of 107-110 km in the morning and in the range of 111-115 km in the evening.

Based on the concept of the existence of an optimal height, it is necessary to explain why the minimum appearance is observed during the phase of height growth. To clarify this issue, we considered diurnal behavior of hEs without averaging (Fig. 2). From Figure 2 it is clear that during the growth phases there is reflection from both the lower and upper sporadic layers, while the growth of the middle one is due to the gradual predominance of reflections from the upper layer. The beginning of the growth phase of hEs approximately corresponds to the beginning of appearance of reflections from the upper layer, and the final

phase of growth of hEs corresponds to the end of appearance of reflections from the lower layer. During the growth phase, reflections predominantly occur from the heights that are furthest from optimal heights (both downward and upward), which explains the minimum PE at the growth phases hEs.

The diurnal component of PEs can be explained by the diurnal component of hEs, however, in our opinion, there are factors that require photoionization of metal atoms to explain them. From Figure 1 it is clear that for approximately the same range of hEs, daytime PEs values are noticeably higher than nighttime ones.

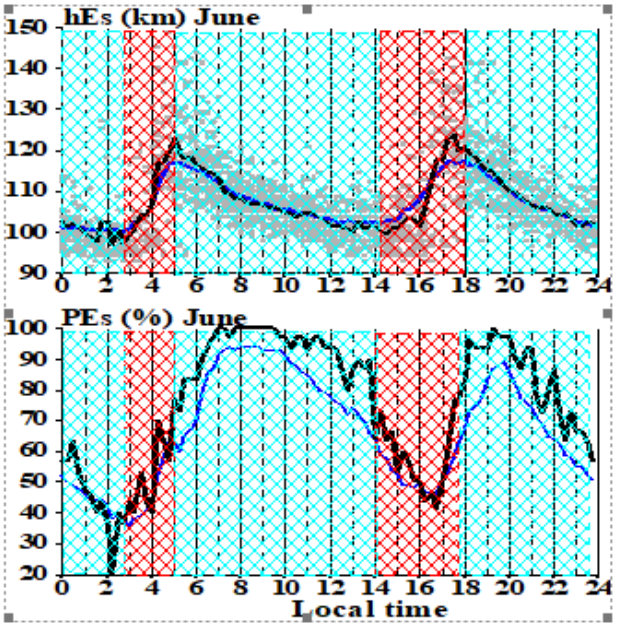

Figure 2. Diurnal hEs behavior in June 2005

In the upper figure, the circles show the values of hEs observed in June 2005, the blue line is the average hEs for all Junes, the black line is the average hEs for June 2005. In the lower figure, the blue line is the average PEs for all Junes, the black line is the average PEs for June 2005. Phases of hEs growth are shaded in red, phases of hEs decrease are shaded in blue.

In June, the hEs range of 102-103 km corresponds to 13-14 LT and 23-23:30 LT, while during the daytime PEs varies from 72 to 79%, and at night it is ~ 62%. In July, hEs ~ 102 km corresponds to 13-14 LT and 23:30-23:45 LT, while

in the daytime PEs varies from 57 to 60%, and at night it is ~ 50%. Another factor explained by the photoionization effect is the asymmetry of the morning and evening maximums PEs. The maximum PEs are greater in the morning than in the evening, and the heights corresponding to the maximum PEs are greater in the evening than in the morning. This asymmetry can be explained by the fact that the morning decrease in hEs is due to an increase in photoionization, and the evening decrease in hEs is due to a decrease in photoionization.

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ASSESSMENT OF HUMAN-INDUCED EVAPOTRANSPIRATION WITH GRACE SATELLITES IN THE CATCHMENT AREA OF LAKE BAIKAL

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Keywords: *evapotranspiration (ET), Gravity Recovery and Climate Experiment (GRACE), human-induced ET (HET), Precipitation, Remote Sensing-Based Vegetation Interface Processes (VIP-RS) model, temperature.*

With the developments in population and economy, it is necessary to assess the increasing impacts of human activities on evapotranspiration (ET) for sustainable water resource management [1, 2, 3, 4]. The discrepancies between the GRACE-based ET (ET_{GRACE}) by water balance method and the simulated ET (ET_{VIP}) using the VIP-RS model were applied to quantify the human-induced ET (HET) in the Lake Baikal basin. It was found that the uncertainty of ETGRACE mainly came from terrestrial water storage changes; ET_{VIP} was noticeably lower than ET_{GRACE} during the study period.

Figure 1 shows seasonal spatial distribution of ET estimated from MODIS dataset

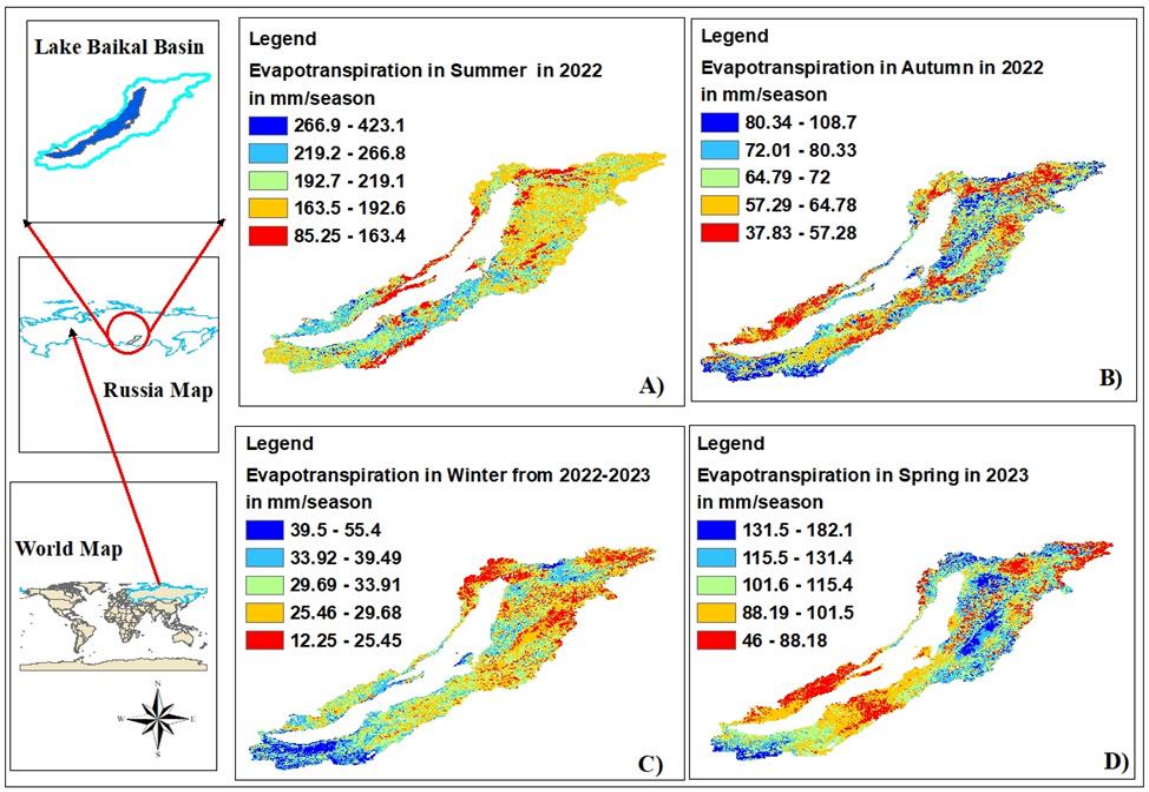

Figure 1. Lake Baikal basin is the study area, A) shows evapotranspiration in summer in 2022 ranging from 85.25 to 423.1 mm per season, B) Shows evapotranspiration in Autumn in 2022 ranging from 37.83 to 108.7 mm per season C) Shows evapotranspiration in Winter from 2022-2023 ranging from 12.25 to 55.4, D) Shows evapotranspiration in Spring in 2023 ranging

from 46 to 182.1 mm per season in lake Baikal Basin. The blue colour indicates the area experiencing very high evapotranspiration, while the red colour shows the area experiencing very low evapotranspiration.

As presented in Figure 2, evapotranspiration from the Haregreves method shows overestimation, VIP-RS shows underestimation of evapotranspiration, whereas GRACE and Thornthwaite show high correlation. The human-induced evapotranspiration was obtained by subtracting VIP-RS evapotranspiration from GRACE. The uncertainty of annual GRACE-ET, VIP-ET, and HET was 0.60, 0.86, and 0.95 km3 year-1, respectively. The uncertainty of monthly precipitation, runoff, GRACE based terrestrial water storage, ET-GRACE, and VIP-RS is 1.56, 0.04, 1.3, 0.89, and 0.8. km3 month-1, respectively. The GRACE-ET showed a larger amplitude than the VIP-RS model ET due to the lack of ET contribution by human activities in the VIP-RS model. The human-induced evapotranspiration obtained from the GRACE data set and VIP-RS model ranges from -50.9 to 61.0 mm. The uncertainty of monthly ET mainly comes from terrestrial water storage variation, which agrees with similar findings [1, 2, 3, 4]. Due to increasing population and urbanization, different economic activities were conducted in the lake basin, which affected the ecological and climatic conditions and created variations in evapotranspiration in the lake basin.

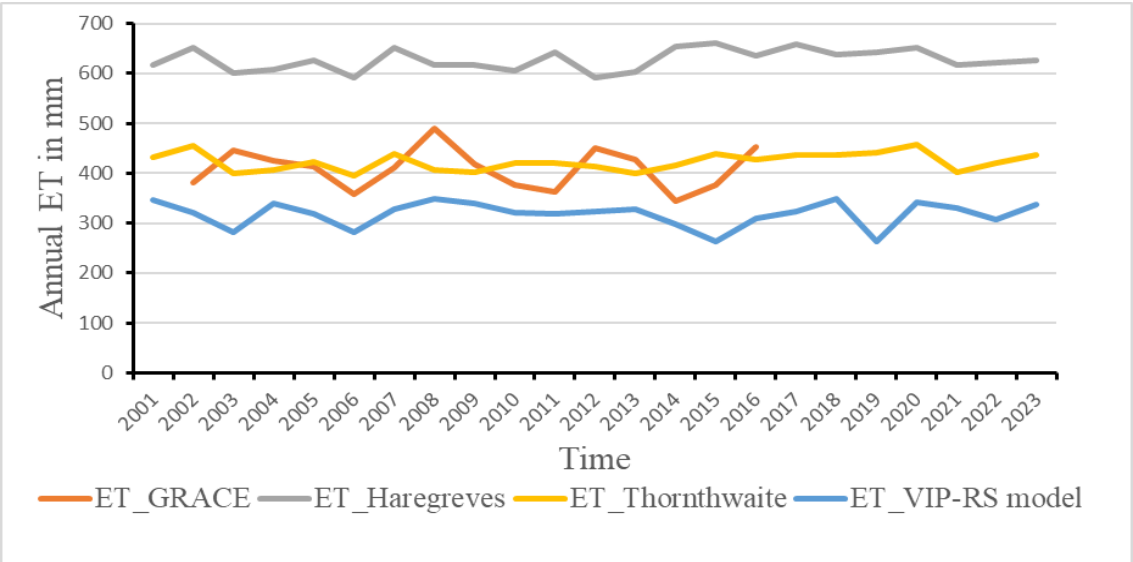

Figure 2. Estimated annual evapotranspiration for Lake Baikal Basin using Thornthwaite, Haregreves, the VIP-RS model and the GRACE dataset.

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Life-sciences on the Cutting Edge of Science

UDC 550.34.012, 550.372

INTEGRATED INTERPRETATION OF SEISMOLOGY AND MAGNETOTELLURIC SOUNDING TO BUILD GEOLOGICAL AND GEOPHYSICAL DEPTH MODELS

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Keywords*: seismology, magnetotelluric sounding, seismic tomography, Python*.

One of the main geophysical methods for investigation of the Earth's deep structure are seismology (seismic exploration methods) and magnetotelluric sounding (MT sounding). Recently, the method of seismic interferometry (seismic tomography) has been actively developed, which makes it possible to study the deep structure of the Earth using continuous records of seismic noise. Cross-correlation of seismic records at pairs of stations allows surface waves to be isolated in a wide frequency range, depending on the network aperture and instrument types. In applied tasks, a typical interval covers frequencies from 0.2 to 5 Hz, which will make it possible to obtain information on depths up to 3-5 km.

In turn, using the MT sounding method it is possible to determine geoelectric characteristics of the section to a depth of 10 km and more. This method is based on the study of the variable electromagnetic field of magnetospheric and ionospheric nature in order to obtain information about the structure of the Earth's layers.

Thus, the joint interpretation of the results of seismic and electrical survey MT sounding allows to build a consistent geophysical model of the deep structure of the Earth.

The authors set the goal of designing and developing software for joint inversion, using MT sounding and seismic interferometry.

The program consists of four large modules. The Graphical Interface module contains elements of the user interface and links the other modules. Special tools for data visualization are placed in the Visualization module. The module ″Calculation Block″ realizes the integration of calculation algorithms. The ″Data Container″ module contains internal representations of processed data, as well as means for their import and export.

At the present stage of our work the block of calculations of the forward and inverse MT sounding problem is being realized.

The program is based on the solution of the direct Tikhonov-Kanyar problem, which is formulated as follows [1]. Let us take a right-handed coordinate system, directing the Z axis downward, and the X and Y axes positioned in the plane separating the air and the Earth. Let us divide the Earth into N horizontal isotropic layers with resistances r1, r2 ... rN-1, rN and thicknesses h_1, h_2 ... h_{N-1} (thickness of the N-th layer is assumed to be infinite).

The model is excited by a plane field varying in time according to a harmonic principle. It is required to calculate the impedance (ratio of mutually orthogonal horizontal components of electric and magnetic fields) on the Earth's surface.

When solving the inverse problem, it is necessary to find the values of electrophysical parameters of the investigated medium so that the sum of squares of deviations of the apparent resistivity modulus obtained when solving the inverse problem from the apparent resistivity obtained when solving the direct problem is minimized for a given set of frequencies. The Levenberg-Marquardt algorithm is used for this purpose.

The program is written in the Python programming language. Since Python is an interpreted programming language and it is much slower than compiled ones [2], we use libraries based on c/c++, such as pyGimli, numpy and numba. The interface is implemented using pySide6 (Fig. 1).

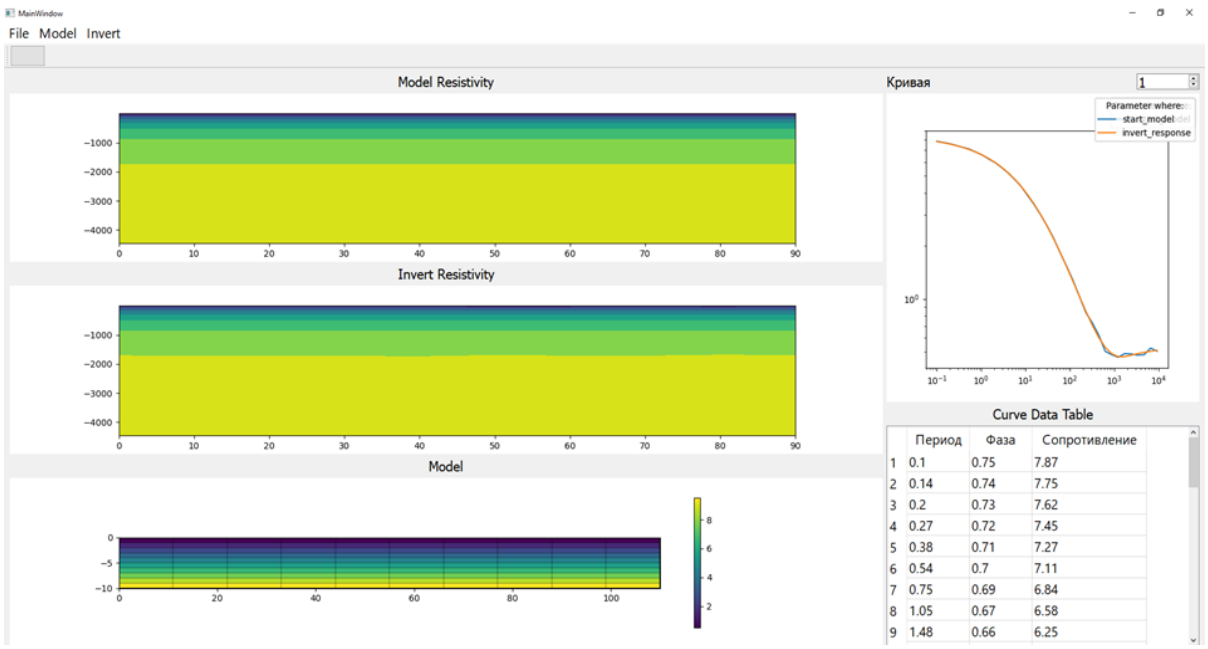

Figure 1. Application interface

The model built in the program can be used for solving fundamental scientific problems and for practical - geological exploration: search for geothermal deposits, accumulations of hydrocarbons and other minerals. In addition, this approach can be applied to the urgent task of studying the structure of the cryolithic zone of the Arctic region of the Russian Federation.

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LEADING MARKERS OF METABOLIC DISORDERS AND ENDOTHELIAL DYSFUNCTION IN PATIENTS WITH OCCUPATIONAL BRONCHOPULMONARY PATHOLOGY

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Keywords: *endothelial dysfunction, metabolic disorders, occupational disease.*

Occupational lung diseases encompass a wide range of benign and malignant pathologies occurring anywhere from the upper respiratory tract to the alveoli [1]. According to the received data, in the structure of occupational diseases associated with the effects of industrial chemical factors chronic obstructive pulmonary disease (COPD) takes the second place (23.26%), chronic bronchitis takes the third place (13.40%), bronchial asthma (BA) takes the sixth place [2]. The issues of pathogenesis of occupational respiratory diseases, as well as comorbid pathologies, are still relevant. This is due to both the practical and theoretical significance of this area of medicine.

A group of 130 aluminum production workers (men aged 55.6±8.1 years), which have occupational bronchopulmonary diseases (OBPD): occupational

chronic non-obstructive bronchitis, occupational chronic obstructive pulmonary disease (COPD), occupational bronchial asthma (BA), combined form of COPD and BA, were examined and divided into two groups. Group 1 consisted of 60 people with initial manifestations of OBPD (the diagnosis was established less than 1 year ago), group 2 – of 70 people with distant manifestations of OBPD (more than 1 year).

When biochemical markers of endothelial dysfunction were examined, was identified that the endothelial NO synthase (eNOS) level in patients from groups 1 and 2 had no differences (24.0 (12.9-28.0) μM/l and 21.0 (16.2-27.5) μM/l, p=0.9). Moreover, more than 90% of subjects in both cohorts had a lower indicator compared to the reference values (32.5-45.6 μM/l).

Medium value levels of endothelin-1 (ET-1) and homocysteine exceeded the reference values (0.3-1.0 fM/ml and 5-15 μM/l, respectively). In group 1 (1.6 (1.0-2.9) fM/ml and 17.3 (13.0-24.2) μM/l, respectively), and in group 2 (1.8 (0.9-2.7) fM/ml and 17.7 (12.8-21, 4) μM/l, respectively).

Correlation dependencies analysis between indicators made it possible to establish the features and patterns of the mechanisms of genesis of cardiovascular system (CVS) disorders in people with OBPD. It was concluded that common pathogenetic links altered vascular tone regulation, caused by a decreasing production of nitric oxide by eNOS and plasmin concentration, atherosclerotic plaques formation, function modification of cardiomyocytes caused, among others, by violation of plasmin production.

The formation of CVS disorders in patients with initial manifestations of OBPD is based on mechanisms of increased cardiomyocyte apoptosis caused by circulatory disorders due to altered vascular tone regulation and coronary vessel elasticity. These established patterns need to be confirmed using functional and ultrasound diagnostic methods.

Funding was provided as part of the implementation of the State assignment for exploratory scientific research.

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UDC 630.561.24

CROSSDATING ISSUES OF SPRUCE AND LARCH WOOD SAMPLES FROM THE ZHOMBOLOK LAVA FIELD

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***Keywords**: dendrochronology, crossdate, crossdating issues, lava field, radial growth, tree ring chronology building, R, dplR.*

Tree-ring data is widely used to reconstruct proxy climate data for spatial scales ranging from single sites to continents. This data supplement extends our knowledge of dynamics of the global climate system, allowing better insighting of the natural variability and trends in climate, at different time scales from decade/century to the last millennium [3].

The Zhombolok lava field is a unique site of Late Pleistocene-Holocene intercontinental volcanism, and was chosen as the study site. It is located in the

Eastern Sayan mountain chain on the border of the Oka Plateau and the Kropotkin Ridge, where it occupies most of the valley of the Zhombolok River. The volcano complex and the flows of basaltic lava (havayites) extend up to 72 km in length and 4 km in width with a maximum thickness of 150 meters. The beginning of formation is timed to the glacier degradation of the Sartan phase of the Late Pleistocene glaciation [1].

Radial growth data of Siberian larch (*Larix sibirica*) and Siberian spruce (*Picea obovata*) growing in the Zhombolok lava field (Sentsa River Valley, Eastern Sayan) were used as objects for the study. The accumulation of thin rings, missing and false rings in series complicate crossdating and in such conditions it is rather difficult or time-consuming to obtain an acceptable result using traditional methods [5]. We have developed a cross-dating strategy that allows us to work even with such complicated material.

Our investigation aimed at developing a new croosdating strategy that allows working with complex dendrochronological data in the most productive way for obtaining high quality tree-ring chronologies.

We developed and applied a cross-dating algorithm in the R programming environment [2, 4], which allows us to obtain a subsample of qualitatively dated individual tree-ring chronologies, which can serve as a basis for further dating. High quality reference tree-ring chronologies were obtained for larch and spruce (Fig. 1), which served as a basis for further dating. Cross-dating of the remaining samples revealed multiple false and missing rings, but this did not prevent them from being cross-dated.

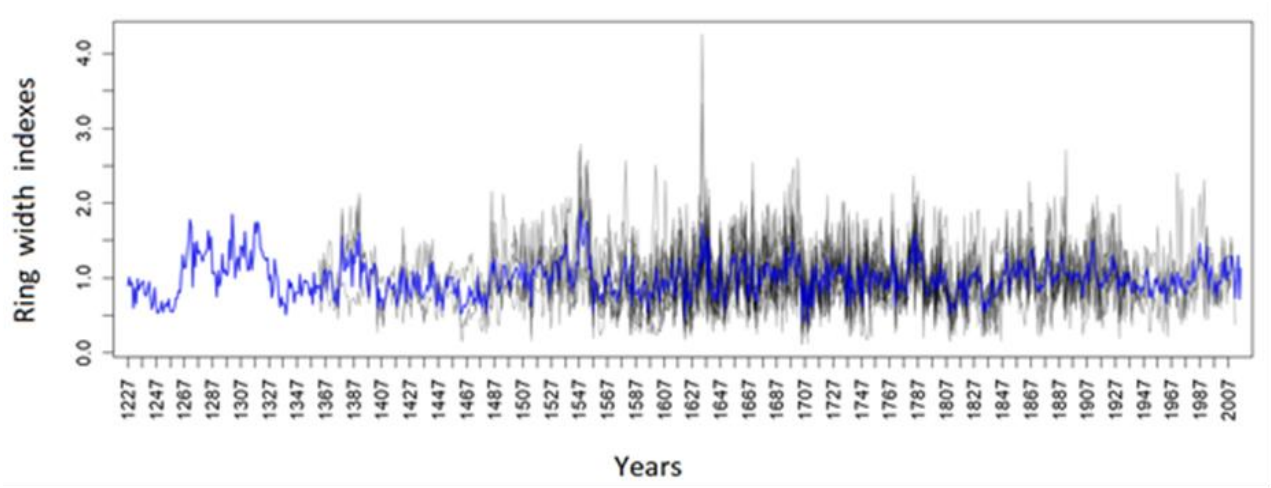

Figure 1. Obtained lava field RWI chronology (*Picea obovata*)

Therefore, with this algorithm, we were able to partially automate, regulate and minimize the influence of the human factor over the crossdating process. The work in this direction will be continued.

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UDC 911.37

SETTLEMENT SYSTEM OF A MUNICIPAL DISTRICT AS A SUBJECT OF SCIENTIFIC RESEARCH

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***Keywords**: settlement networks, settlement systems, population, depopulation, Irkutsk region, Chunsky municipal district.*

One of the problems of population geography is the spatial distribution of the population on the territory of Russia. The presence of vast territories creates difficulties in the management and development of the country, which are exacerbated in conditions of prolonged depopulation and economic decline. Demographic change is a key issue, as inequalities in living standards, migration outflows, and social transformation of the population structure create demographic conditions that contribute to changes in the spatial system of settlements. In this context, the study of rural settlement systems, as the most vulnerable elements of the settlement network, is of particular importance.

Originally, a settlement system was understood as a form (or type) of settlement (e.g., the settlement system of an ethnic group). This interpretation was widespread before the introduction of the system approach in geography. Since the 1960s, a settlement system has been defined as a group of territorially close and functionally interconnected settlements. The term "settlement system" was first used in this sense by the Lithuanian architect K. Sheshyal'gis (1963). However, the issue of studying rural settlement systems was raised as early as 1957 by Sergey. A. Kovalyov [3].

In a general sense, settlement is defined as the territorial distribution of the population, conditioned by natural-economic, historical-economic conditions, and

ethnic characteristics of the population. The settlement system is a naturally formed and purposefully formed network of settlements united on the basis of optimised spatial, economic, social and other relations. Settlement systems are centred entities. As a rule, the centre of a settlement system is the largest settlement within a given territory, which is the nodal point of relations of other settlements within the system.

The classical typology of rural settlements is based on two main criteria: economic specialisation of settlements and the main characteristics of rural settlements (population structure, density, spatial pattern of location), which are closely related to the natural and geographical features of the territory. A number of studies on the subject use the following classification of rural settlements according to population size [1]: 1) the largest (over 1000 inhabitants); 2) large (501-1000 inhabitants); 3) medium (101-500 inhabitants); 4) small (51-100 inhabitants); 5) smallest (up to 50 inhabitants). Functional types of rural settlements are of three main types: agricultural, non-agricultural and mixed [2].

To analyse settlement systems, an integrated approach is used that analyses several subsystems: demographic, socio-infrastructural, and economic. In addition, within the framework of such studies it is necessary to apply the method of geoinformation mapping, which allows to create a basis for visualisation of spatial changes in settlements, which in a comprehensive economic and geographical study will allow to highlight general trends in the development of the territory.

The Irkutsk region is one of the most significant examples for the study of settlement transformation due to a number of factors: 1) remoteness and peripherality of the study region; 2) vastness of the territory with a variety of settlement systems; 3) long-term depopulation, which is characteristic of the region as a whole and especially pronounced in rural areas [4]. The analysis of the dynamics of the rural population of the Irkutsk region in the period from 2002 to 2021 has shown that most of the region's municipalities are depopulating.

However, it is possible to trace the transformation of settlement systems at the microlevel, since the settlement system is characterised on the basis of administrative links, hierarchical settlement system by population, as well as functional types of settlements. Let us consider this using the example of Chunsky municipal district, which has average depopulation rates.

Since the 1990s, the district has been experiencing a downward trend in the number of residents, which is typical of all settlements in the district. Over the last three decades, the population has decreased from 50136 (1989) to 27851 (2021), i.e. by 45.5 %. The district is relatively well provided with social infrastructure facilities (47% of settlements have educational facilities, 58% – have health care facilities). The main factor of degradation of the rural settlements system is economic – pronounced (mainly non-agricultural) mono-specialisation of rural settlements (Fig. 1). The main problem is the lack of sectoral diversification and the instability of existing industrial and agricultural actors.

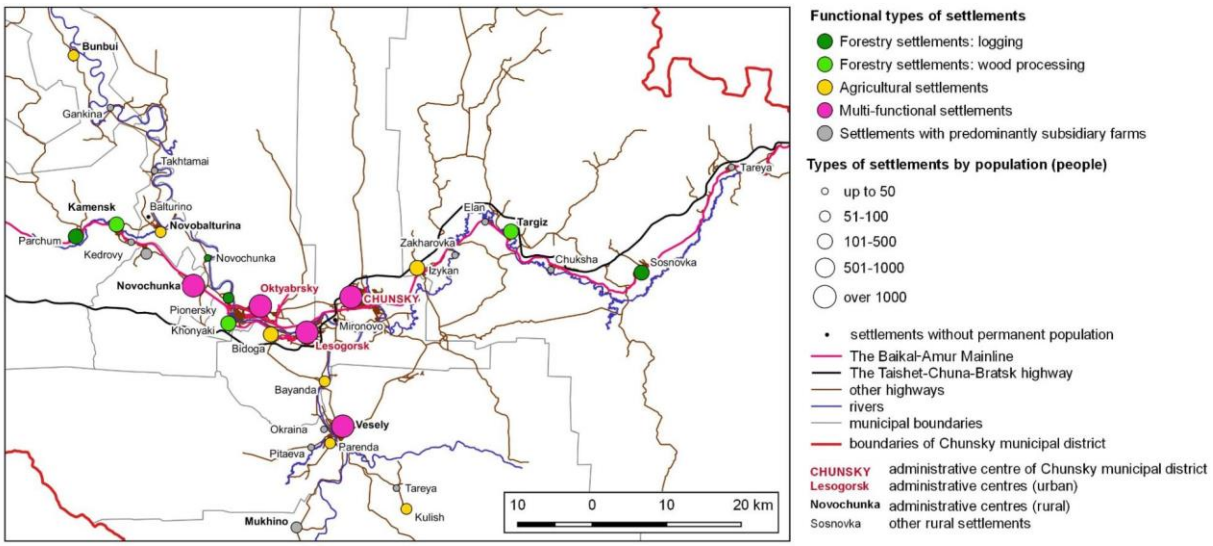

Figure 1. Structural and functional types of settlements in the main settlement zone of Chunsky municipal district

The settlement system may be destabilised in the future in the conditions of natural and strong migration loss of population. The solution to the problem lies primarily in the development of a diversified economy, modernisation of

agriculture, preservation and improvement of the social infrastructure at the expense of the largest, large and medium-sized rural settlements.

Thus, on the basis of the analysis conducted, the following conclusions can be drawn: 1) the study of settlement processes is relevant in connection with the need to develop areas; 2) the concepts of "settlement network" and "settlement system" are not identical: the latter is characterised by the presence of hierarchical, administrative, economic and other links; 3) an integrated approach is used to analyse settlement systems, including geo-information mapping methods, as well as the analysis of demographic, economic and socio-infrastructural subsystems.

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UDC 553.065

INTEGRATED GEOLOGICAL-GEOPHYSICAL MODELS OF HYDROTHERMAL SYSTEMS OF THE BAIKAL RIFT ZONE

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Keywords: *hydrothermal systems, hydrotherms, Baikal Rift zone* (*BRZ).*

Hydrothermal systems are closed systems within geological structures, circulation and heating of groundwater by a regional thermal field or with additional intake of deep heat brought by magma into aquifers. We call thermal waters whose temperature exceeds 20° C. Hydrotherms come to the surface through zones of tectonic disturbances and cracks [2].

A significant part of the hydrothermal vents of the Baikal Rift zone (BRZ) are located along the shore of the lake Baikal from one side and the other. In total, there are over 50 thermal springs within the BRZ, pouring out onto the earth's surface with temperatures up to 84° C and a total flow rate of 600 l/s [1].

In the last century, a number of hydrothermal vents were discovered within the BRZ, including: Goryachinsky, Tolstikhinsky, Gushikhinsky, Zmeiny, Zagza, Pitatelevsky, Davshinsky, Kotelnikovsky, Frolikhinsky, Zolotoy Klyuch, Hakussky, Korikeysky, Dzelindinsky, Kulinye Marshes, etc. However, no new sources have been discovered in recent decades. This fact is explained by the fact that all known sources have manifestations on the surface, which made it possible to open them without the use of special tools and approaches. The hydrothermal systems of the BRZ are currently poorly studied, and there is no systematic approach to the study and search for non-surface hydrothermal vents.

There is a need to develop an approach to the search for hidden hydrotherms. It seems that this problem can be solved by applying a set of

geophysical methods that allows identifying the most promising areas saturated with hot waters.

Geophysical studies were carried out in order to delineate zones of increased prospects for the presence of fractured zones saturated with hot waters. The conducted geophysical studies are of great importance for the further study and development of the hydrothermal resources of this region. The data obtained will allow us to determine the potential of this set of methods and identify promising areas for the search for hidden hydrothermal systems.

The complex of geophysical methods included:

1. Magnetic reconnaissance using drones;
2. Electrical exploration by the mZSB method;
3. Thermal imaging on a drone.

According to the obtained magnetic survey data, maps of the magnetic field gradient and a map of the full vector of the magnetic field intensity were compiled (Fig.1).

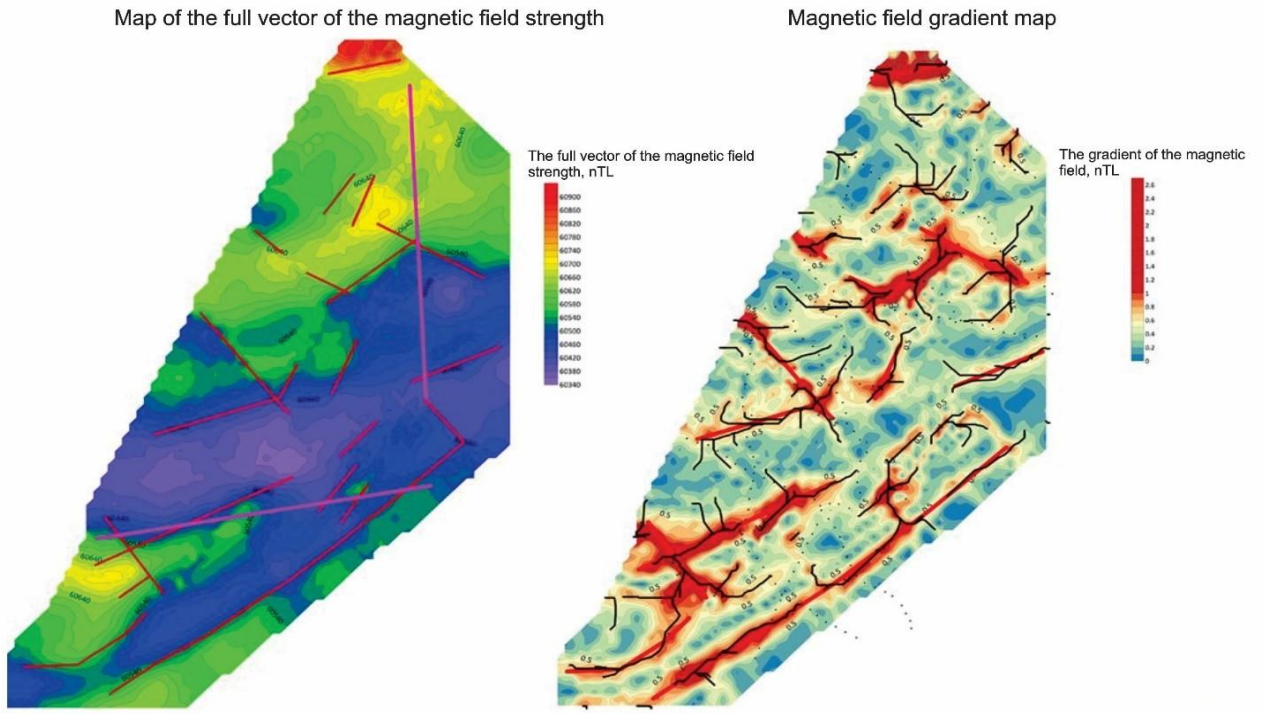

Figure 1. Magnetic field maps

Based on the results of thermal imaging, a map of the thermal field was built and areas of the anomalous field were identified.

On the basis of geophysical materials obtained by applying a set of methods, complex geological and geophysical models of hydrothermal systems of the Baikal rift zone were constructed.

Based on the interpretation of the geophysical data materials, promising fracture zones with thermal field anomalies that may be saturated with hot waters have been identified.

To increase the efficiency of the search and study of hydrothermal systems, it is planned to conduct research using geophysical methods at the Zagza thermal spring to obtain a reference object of the hydrothermal system within the BRZ.

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UDC 332.012.2

ESG CONCEPT: MODERN REALITIES AND CHALLENGES OF THE FUTURE

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Keywords: *ESG principles, sustainable development, green financing, corporate social responsibility, risk management, environmental trends.*

Currently, the ESG concept covers almost all business structures in the world. Over the past decades, it has become one of the few concepts that try to solve the problem of combining economic growth and environmental challenges. The abbreviation ESG stands for "environmental, social, governance" [3].

Nowadays, a few researchers and users of this concept can say what it means and what goals it pursues. This phenomenon gives rise to many different points of view on the essence of the ESG concept, which leads to dithering of its core values and attempts to gain profit out of it. The purpose of this article is to study the most common interpretations of the ESG concept and systematize the main aspects of its understanding in the professional environment.

In 2004, Kofi Annan, being Secretary-General of the United Nations, wrote a formal invitation to 55 major financial institutions to join a treaty called "Who cares wins". This document was the first to include the term ESG, which acted as a recommendation to business structures on new principles of investment and integration of environmental and social issues into their activities [2].

Subsequently, the term, which was seen more as a tool for ensuring green finance policies, showed a rapid rise. In the period from the publication of the "Who cares wins" agreement until 2021, the mention of the ESG concept in various economic reports and scientific publications did not exceed 1%.

However, starting in 2021, the use of this concept began to grow rapidly and today 72% of global investors have begun to apply ESG principles in their activities [2].

Despite this success, the ESG concept still does not have a proper scientific and theoretical basis. At the moment, ESG principles can be correlated with other already existing concepts, starting with its basic concept, as a tool for integrating the environment into investment analysis, as part of risk management, as a branch of the concept of ″socially responsible business″ or as part of the corporate ideology [1].

Such a wide variety of concepts and terms associated with the ESG concept makes it very flexible in terms of use by different economic factors, from the state and large corporations to the ordinary consumer. The combination of letters E, S and G can change over time, evolve based on the existing political context, and attract the attention of a wide range of stakeholders [2].

However, in the same flexibility there are also serious shortcomings that could lead to serious consequences in the future. While the introduction of the term ESG has helped to create a clear language of principles that can gain support from various investor and stakeholder groups, it did not resolve the tension between different views on the ESG goals, resulting in a lack of consensus on the fundamental issues stated in the framework [3].

The concept of ESG and its ambiguity regarding whether it is a tool for financial and risk analysis or a way to create social benefits is closely connected with its challenges and insights. And the lack of a solution in the future could lead to a complete collapse of ESG principles, despite the fact that the concept picks up pace now.

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THE MAIN REASONS FOR SALT FORMATION ON DOWNHOLE EQUIPMENT DURING OIL PRODUCTION

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Keywords: *colmatation, bottom hole zone, salt formation.*

In the development of oil fields with a reservoir pressure maintenance system in many countries of the world, engineers and geologists are faced with the problem of reduced well productivity due to produced water. Frequent reasons for a decrease in production rate are salt formation on downhole and surface equipment, clogging of the near-wellbore zone of the formation, which impede the full operation of the well.

The main types of salts from produced water that precipitate from solution are halite, gypsum and calcite [1]. The goal of oil companies is to prevent or minimize the precipitation of these salts in wells. One of the ways to solve the problem is to prepare the chemical composition of the water injected into the

system for maintaining reservoir pressure and to provide timely treatment of the wells with chemical reagents of different compositions.

In the case of the Yarakta oil and gas condensate field, the formation water has ultra-high mineralization, reaching 500 g/l [1].

Halite is deposited in oil wells from the bottomhole zone to the wellhead. The sources of halite are formation water and injected sodium chloride water. The mixing of these types of water in the formation leads to intensification of the halite formation [2]. Halite falls out in the form of sediment both in the wellbore and in the formation near the wellbore (Fig. 1).

Figure 1. Scale deposits (halite) on downhole equipment

Gypsum is formed in oil wells from the bottom-hole zone of the formation to the wellhead when the concentration of sulfate ions exceeds 600 mg/dm3 [2]. Sedimentation occurs when injected water rich in sulfate ions and formation water rich in calcium ions mix (Fig. 2).

Figure 2. Scale deposits (gypsum) on downhole equipment

Calcite is precipitated when formation water of the calcium chloride type is mixed with injected artesian water of the hydrocarbonate type [2]. The formation of carbonate deposits also occurs with increasing temperature at the pump (Fig. 3).

Figure 3. Sediments (calcite) in downhole equipment

To remove *halite*, reverse and direct flushing of wells with fresh (artesian) water is used. *Gypsum* is removed by injection of a 20% aqueous solution of NaOH for dispersion, with mandatory further treatment of the bottomhole

formation zone with a 12% HCl solution to remove the remaining water-insoluble reaction products of caustic soda and gypsum. *Calcite* is easily removed from downhole equipment and the bottomhole part of the formation using a 12% aqueous solution of hydrochloric acid [2].

The above measures do not completely eliminate the risks of decreased productivity. The main effective measure should be considered to be the one that does not lead to salt formation. And in order to find such an event, it is necessary to study the chemical composition of the formation water of the oil-bearing horizon and the chemical composition of the formation pressure maintenance system planned for injection of water at a specific field in order to model the compatibility of the two waters in formation and surface conditions. If there is a sufficient volume of water in the sedimentary cover, the most suitable water for injection, according to the modeling results, will be the most optimal measure to prevent salt formation on downhole equipment, leading to a decrease in well productivity. And in some areas, the method of preventive treatments with specially selected compounds with the addition of inhibitors and reagents will be beneficial for preventing the formation of salts.

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Linguistics and Language Acquisition

UDC 81

OPTIMIZING SCIENTIFIC COMMUNICATION: USING CHATGPT IN SCIENTIFIC WRITING

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Keywords*: artificial intelligence, ChatGPT, scientific communication.*

From the idea to the implementation of publishing an article, there are just a few prompts: enter a request and receive an answer. Is it really that simple, and what challenges can you encounter when using ChatGPT in writing a scientific paper?

Artificial intelligence attracts attention and amazes with its abilities, however its dream is to "acquire the power of emotions, spontaneity, self-control, and judgment freedom - all that is inherent to the mind" [1]. The question arises: how wise is it to use AI in scientific communication, and can we increase its effectiveness by applying generative language models?

Scientists express mixed opinions about the dialogue tool known as ChatGPT: for some, ChatGPT has significant potential and serves as an assistant in many fields; others emphasize that ChatGPT tends to generate unreliable or inaccurate information (as discussed by researchers E. van Dis, J. Bollen, and others [2]. Scientist M. Halaweh, in his works, holds the view that the sensible application of ChatGPT can enhance the quality of research [3]. The widely recognized term sounds as follows: "ChatGPT is a program that automatically generates text based on textual requests prompts" [4]. ChatGPT is a large-scale language model developed by OpenAI that can generate responses to textual prompts, mimicking human speech.

ChatGPT can identify and propose hypotheses for further research by analyzing a large amount of scientific literature. It can help researchers generate questions and identify gaps in knowledge in their field. Among the most important steps in research methodology, conducting a literature review is a key stage that requires significant time and effort. This is the fundamental part of scientific research activities that is carried out in any research study. In order to better understand the issue, the researcher considers statistical data and conducts a meta-analysis, which serves as an objective confirmation of the discussion. Clear rules and statistical analysis make the work of systematizing scientific results "transparent" and reproducible.

Summarization is a crucial aspect of scientific research, involving the transformation of complex information into concise and coherent statements. ChatGPT offers valuable opportunities to enhance the summarization process, providing researchers with efficient tools for extracting key ideas and conclusions from research articles.

ChatGPT can uncover ideas and innovations that may not be immediately apparent to the human eye, recognizing patterns and connections between different concepts that may not be understood even by the most attentive reader. This can lead to new insights and discoveries that would be impossible without

the assistance of ChatGPT. ChatGPT can be used as an academic writing assistant to create high-quality drafts of research papers, essays, dissertations, and other academic assignments. It can generate creative content for scientific articles, such as abstracts, reviews, introductions, conclusions, headings, summaries, keywords, and more. ChatGPT can be used for language translation tasks as it is capable of translating languages with high accuracy and generating coherent responses in different languages, taking into account the context and tone of the text during translation, rather than simply translating word for word.

Interpreting and visualizing scientific data is crucial for understanding research results and effectively disseminating them. One area that can be highly beneficial in writing scientific articles is data processing. ChatGPT helps interpret complex datasets, identifying trends, patterns, and outliers. Additionally, it can suggest appropriate statistical tests and create data visualizations, such as plots, charts, and graphs, to help researchers better communicate their findings.

Using ChatGPT as a tool for checking spelling and grammar, authors can input their text, and ChatGPT will analyze it for spelling errors. Inconsistent writing can hinder readability and understanding, potentially affecting trust in the author. To address this issue, authors can use ChatGPT as a reliable tool to check consistency and enhance the coherence of their texts.

Choosing the right journal for submitting a research paper is an important step in ensuring the success and impact of the scientific work. With a large number of journals available, determining the most suitable themes and research methodologies can be a challenge for authors. Adhering to ethical standards is of paramount importance in the field of research, ensuring the integrity and credibility of scientific work in the respective area.

ChatGPT and similar language models are useful for various scientific research tasks (Fig. 1).

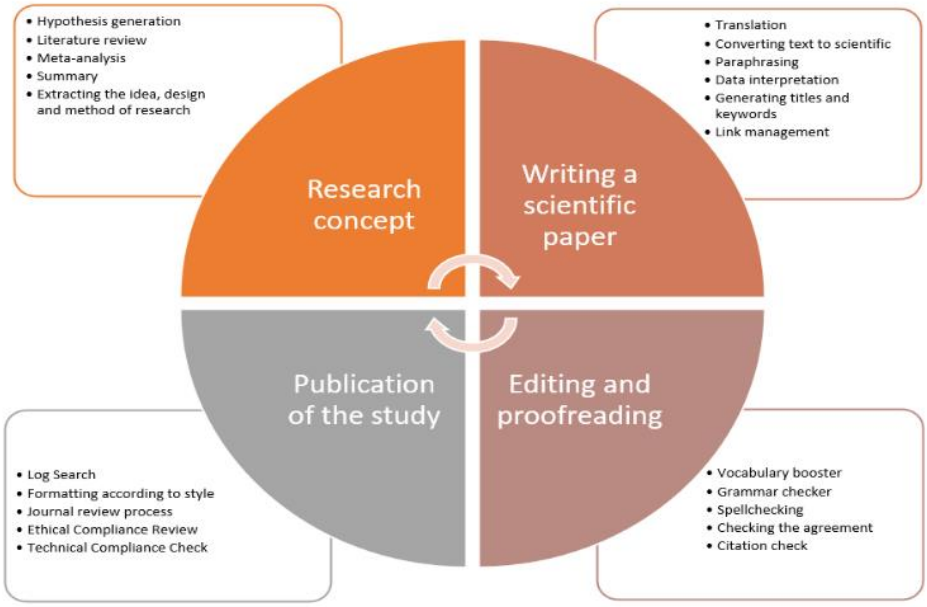

Figure 1. Chat GPT for scientific research tasks.

In this study, we conduct an experiment of writing a scientific text to explore the capabilities of ChatGPT (the version that is freely accessible and does not require registration). Within the study, prompts are conducted on the topic of this article. The formulation of prompts and their sequence is based on the commonly accepted structure of writing a research work: defining relevance; reviewing key concepts and scientific works; gathering material, summarizing and interpreting data; discovering new knowledge; writing a conclusion; compiling a list of literature.

The dialogue began with an introduction and immersion of ChatGPT into the research topic. Maintaining the structure of the research, a prompt was given to identify the relevance of the study. ChatGPT provided generalized information, and the articles it referenced were not real. Replacing the question with a more precise one, we still could not obtain accurate information. After an unsuccessful request regarding the relevance of the study, we moved on to the next section of writing the research paper on identifying key concepts and terms (Fig. 2). When asked to define ChatGPT, referencing articles indexed in the RINC database, we received a general response without specific article references. Subsequent requests and clarifications did not lead to the expected result, as ChatGPT does

not have access to external sources (RINC, Web of Science, Scopus) to cite works by specific authors.

During the initial unsuccessful attempts to obtain the necessary and verified material, we made the decision to immerse ChatGPT in a deep context and provide information that had already been processed and analyzed by us. The interaction between human and machine work led to a more successful outcome, and ChatGPT demonstrated the ability to delve into the context.

It is worth noting that efforts will be required from both the researcher and the AI to obtain quality and reliable information. Can AI be trusted soon? The question remains open, as it will take time.

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FEATURES OF FORMATION OF INTERCULTURAL COMPETENCES AT THE LESSON OF A FOREIGN LANGUAGE (RUSSIAN AND ENGLISH LANGUAGE)

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***Keywords**: lesson, organization of the learning process, cycle of lessons, intercultural competence.*

According to I. Podlasyi the lesson is a form of organization of learning (organizational forms) is the external expression of the coordinated activity of the teacher and students, carried out in a certain order and mode [3, p. 229].

Organizational forms of teaching are classified according to various criteria, having analyzed these criteria it is possible to make the following table (Table 1).

Number of students	**Institution**	**Duration**	**Type of the lesson**
Private	Kindergarten	30 min	Curricular
Group	School	40-45 min	Extra-curricular
	University	60 min	Distance learning
		90 min	

Table 1. Organizational forms of teaching.

In this work, we are going to focus on the school lessons of 40 minutes each. The classroom-lesson form of organizing education is characterized by the following features like constant composition of students (same age and level of class), working according to annual plan (learning planning), the learning process is carried out in separate interconnected, successive parts (cycle of lessons), each lesson is devoted to one subject only (monism), etc.

The key component of the classroom-lesson system of organizing learning is the lesson. A lesson is a segment (stage, link, and element) of the learning process that is complete in terms of meaning, time, and organization. [3, p. 230]

A good lesson is a mixture of different basic parts, following one another consecutively and directed to the raising of motivation of the subject studied. Among the basic requirements the scholars highlight the following: the usage of the modern technologies, realization of all didactic principles and rules in an optimal ratio at the lesson, providing appropriate conditions for productive cognitive activity of students, taking into account their interests, inclinations and needs, etc.

Nevertheless, all these requirements are applicable to both Russian and English languages, as well as the stages of a lesson. It is worth mentioning the need of teaching the students the intercultural competences, as they play a very important role while studying a language.

E. L. Golovleva defines intercultural competence as an in-demand quality of our time. It is a complex of elements consisting of knowledge of peculiarities of cultures entering into interaction and skills in implementing this knowledge in a particular cultural and non-cultural environment. "It is a positive attitude towards the presence of different ethno-cultural groups in society and voluntary adaptation of social institutions of society to the needs of different cultural groups"[1].

The significant component of any lesson's organization is the format of or method of it, which, at the same time, influences the ways and approaches of forming intercultural competence. This fact must be taken into consideration while setting the goals of the lesson [2, p. 348].

According to A. Sadokhin, it goes without saying that constituent elements of intercultural competence are taken into account while teaching and studying any language (Table 2)[4].

Knowledge	Cultural self-awareness, culture specific knowledge, sociolinguistic awareness, grasp of global issues and trends: explaining the meaning and implications of globalization and relating local issues to global forces
Skills	Listening, evaluating, viewing the world from the others prospectives
Attitudes	Respect, openness, curiosity and discovery

Table 2. The basic elements are knowledge, skills and attitudes.

To conclude, we would like to note that the role of a lesson in the formation of intercultural competence when learning Russian as a foreign language or English as a second language is great and needs to be studied in detail, paying attention to the year of studying (or even level), format (face-to face or distance learning). The ultimate goal of this process is to form an intercultural speaker, a

student capable of seeing, establishing and understanding the links between the languages and the culture of the people who speak the language. Intercultural competence implies knowledge and acceptance of other cultures to discern how a particular culture can be a source of value not only for native speakers, but also for members of other cultural groups.

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A SET OF EXERCISES FOR THE FORMATION OF GRAMMAR VOICE UNDERSTANDING IN THE RFL COURSE (BASED ON THE MATERIAL OF SCIENTIFIC AND TECHNICAL LITERATURE

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***Keywords**: voice, exercise, methodical analysis, language exercises.*

The article deals with a set of exercises aimed at the formation of voice concepts in future engineering students. The article identifies the main difficulties that students may encounter when studying the category of voice. Attention is paid to the methodological approach in the selection of scientific and technical literature. Because of the analysis, a conclusion is made as to what key points are important when selecting material on this grammatical topic and what exercises are the most effective.

Consideration of the category of voice in the course of Russian as a foreign language is an important methodological aspect, since in Russian speech (spoken and written) collateral formations function very productively, being stylistically marked at the same time. It is especially important to understand and study this grammatical topic for those students who plan to study at Russian universities in the future.

When preparing foreign students for higher engineering and technical education, it is necessary to take into account the peculiarities of modern requirements for a specialist graduate [5, p. 22] and, if we talk about the meta-language of scientific and educational communication, it is necessary to take into account the requirements for the first certification profile (general knowledge, professional module), which contains the lexical minimum of natural and

technical profile, communicative tasks and other mandatory requirements of Russian language proficiency with regard to professional orientation, as well as the requirements for the Russian language.

By reaching the TRFL-1 level, the learner deals with the category of the voice, in particular, the phenomenon of transitivity and non-transitivity of the Russian verb, the study of active and passive constructions, learning to distinguish between the postfix "-ся" (-sya), etc. The formation of voice concepts and the development of this grammatical topic is achieved through a high-quality selection of exercises and scientific texts. The aim of this narrowly focused training is to prepare students to master technical disciplines in Russian. As a result of this work, it is important to form the following communicative competences:

1) Understanding of the sound and written text;

2) Participation in dialogue-questioning within the limits of language and speech material, building monological statements on a certain topic on the basis of models peculiar to the scientific style of speech (SSS);

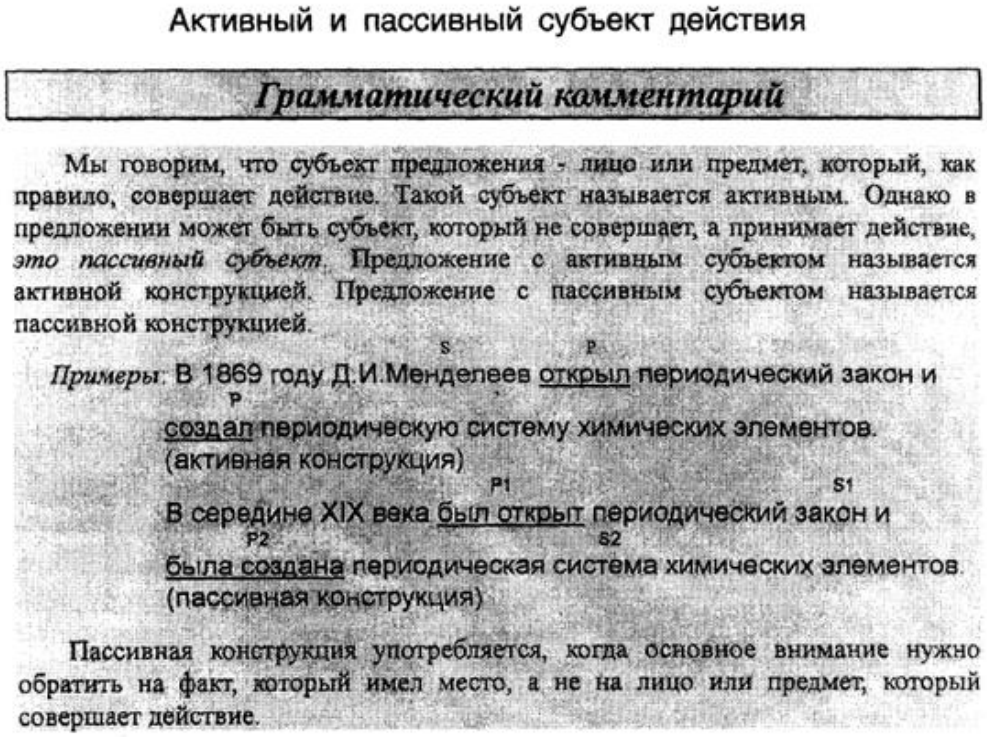
3) Creating types of texts characteristic of technical disciplines (reasoning, proof, inference);

4) Selecting the main information from the text by ear, writing it down in abbreviated form and reconstructing their record.

To solve the tasks of the research we analysed the textbooks «Russian Language for Future Engineers» [1], «Scientific style of speech (technical profile)» [2], «Russian language in professional activity: information technologies» [3], addressed to foreign students of engineering and technical profile, in terms of the formation of collateral representations.

The textbook «Russian to the Future Engineer» contains a section devoted to the relations between the subject and the predicate of action. This lesson studies the grammar of the subject and predicate of action, active and passive subject of action (active and passive syntactic constructions), short passive participles. Each

sub-item has grammatical comments with examples that explain the relationships and functions of the subject and predicate in a sentence (Fig. 1).



Активный и пассивный субъект действия

Грамматический комментарий

Мы говорим, что субъект предложения - лицо или предмет, который, как правило, совершает действие. Такой субъект называется активным. Однако в предложении может быть субъект, который не совершает, а принимает действие, *это пассивный субъект*. Предложение с активным субъектом называется активной конструкцией. Предложение с пассивным субъектом называется пассивной конструкцией.

Примеры: В 1869 году Д.И.Менделеев открыл периодический закон и создал периодическую систему химических элементов. (активная конструкция)

В середине XIX века был открыт периодический закон и была создана периодическая система химических элементов. (пассивная конструкция)

Пассивная конструкция употребляется, когда основное внимание нужно обратить на факт, который имел место, а не на лицо или предмет, который совершает действие.

Figure 1. Example of grammatical commentary on the topic «Voice»

The analysis of this section of the textbook «Russian Language for Future Engineers» has shown that there are different types of exercises ("linguistic" and "speech") for working out subject-predicative relations. "Linguistic" exercises are represented in such types as combinational, substitution, transformation, differentiation exercises (13 units). For example, (Fig. 2):

Задание 3. Составьте предложение из этих компонентов. Выберите нужный предлог: в, при, с помощью, для.

1. натрий, калий, промышленность, метод, электролиз, получать
2. алюминий, электротехника, изготовление, конденсаторы, применять
3. сера, получение, серная кислота, использовать
4. сода, производство, стекло, использовать
5. размер, окружность, диаметр, показывать
6. окружность, циркуль, чертить
7. планеты, телескоп, наблюдать

Задание 9. Скажите, какой предикат нужно употребить в предложении.

а) сделан, -а, -о, -ы (сделать)

Чертеж ... карандашом.

Задание ... правильно.

Чертежи ... без ошибок.

Работа ... быстро.

б) получен, -а, -о, -ы (получить)

В процессе эксперимента ... важные данные.

Это вещество ... в результате реакции меди с кислородом.

Информация об этом открытии ... в прошлом году.

в) принят, -а, -о, -ы (принять)

За единицу длины (расстояния) в Международной системе (СИ) ... метр, за единицу времени ... секунда.

За единицу давления в СИ... давление, которое производит сила в 1 Н на перпендикулярную к ней поверхность площадью 1 $м^2$.

Задание 12.■ Составьте предложения из данных компонентов.

1. Элемент гелий He был открыт ... где? как? (с помощью чего?)	спектр Солнца спектральный анализ
2. Расчет спектра атома водорода был сделан ... кем? когда?	датский физик Нильс Бор, 1913 г.
3. Теория химического строения была создана ... где? когда? кем?	Россия, середина XIX века, русский химик Александр Бутлеров
4. Явление резонанса используется ... где? для чего?	техника, измерение частоты колебаний
5. Аммиак NH_3 применяется ... где? для чего?	промышленность, получение азотной кислоты
6. Азот используется ... где? для чего?	химическая промышленность, получение аммиака
7. Деление окружности на 3 равные части выполняется ... где? как? (с помощью чего?)	чертеж, циркуль

Figure 2. Types of language exercises on the topic «Voice»

Speech exercises pay attention to pre-textual (5 pieces) and post-textual (4 pieces) exercises. For example, (Fig. 3):

Задание 11. Прочитайте предложения и скажите, какие компоненты, кроме субъекта и предиката, они содержат.

1. Связь между валентностью элемента и его положением в периодической системе была установлена Менделеевым. 2. Элемент германий был открыт в 1886 году в Германии немецким химиком Винклером. 3. Долгое время уравнения изучались без помощи отрицательных чисел. 4. Закон сохранения массы был сформулирован в России в 1748 году Ломоносовым, а затем, в 1789 году был установлен независимо от Ломоносова французским химиком Антуаном Лавуазье. 5. В древности информация хранилась в памяти народов; тогда информация передавалась устно от одних людей к другим. 6. Для составления программ на ЭВМ используются различные алгоритмические языки: БЭЙСИК, АЛГОЛ, ФОРТРАН. 7. Первый двигатель внутреннего сгорания был создан в 1860 году французским инженером Э.Ленуаром. 8. Для измерения скорости созданы специальные приборы.

Figure 3. Types of speech exercises on the topic «Voice»

In the textbook «Scientific Speech Style (Technical Profile)» it can also be noted that the authors emphasise language exercises of various types (23 pieces), while speech exercises based on text material are in the smallest number (8 pieces) (Fig. 4).

5. *Закончите предложения, используя названия приборов: амперметр, вольтметр, барометр, весы, манометр, анемометр, динамометр, рулетка, спидометр.*

Модель: Для измерения температуры *пользуются термометром*.

8. *Прочитайте текст и озаглавьте его.*

В механике изучаются два вида энергии: потенциальная и кинетическая. Кинетическая энергия – это энергия тела, которое движется. Если тело находится в покое, то его кинетическая энергия равна нулю. Величину кинетической энергии определяют по формуле. Она равна половине произведения массы тела на квадрат скорости его движения. Кинетическая энергия измеряется в джоулях. Если движущееся тело совершает работу, то его кинетическая энергия уменьшается и может стать равной нулю. Например, когда движущийся автомобиль сталкивается с деревом, совершается работа: деформируется и дерево, и автомобиль. Конечная скорость автомобиля (и его кинетическая энергия) становится равной нулю.

Figure 4. Types of speech exercises on the topic «Voice»

When studying the material devoted to the category of the pledge in the textbook «Russian Language in Professional Activity: Information Technologies», the following was found out: in the section «active and passive constructions» only mixed-type language exercises (12 pieces) are used (Fig. 5).

Задание 17. Прочитайте предложения. Определите, к какому типу конструкций они относятся (активные, пассивные). Укажите субъекты, осуществляющие действия, и объекты, на которые направлены данные действия. Назовите предложения, в которых субъект отсутствует.

1. На занятиях по русскому языку преподаватели применяют компьютерные технологии.
2. В современной системе образования широко используется дистанционное обучение.
3. С помощью онлайн-технологий иностранный студент подготовил сообщение о национальных праздниках.
4. Школьниками был подготовлен концерт для воспитанников детских домов.

Задание 20. Образуйте полную и краткую формы пассивных причастий от инфинитива глагола и запишите их.

написать- ...	приготовить - ...	открыть - ...
сделать- ...	проверить - .. .	закрыть - ...
создать- ...	получить- .. .	развить- .. .
прочитать - ...	решить- ...	принять - ...

Figure 5. Types of speech exercises on the topic «Voice»

Having analyzed the obtained data, we can conclude that the textbooks «Russian Language for Future Engineer» [1], «Scientific style of speech (technical profile)» [2], «Russian language in professional activity: information technologies" [3] (36 author’s sheets in total) use mixed language and speech exercises ("pre-textual" and "post-textual") to form collateral representations at the level of TRFL-1, and in general, in these textbooks the authors emphasize language (grammar) exercises, which are predominant in the sections devoted to the category of voice.

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NLP TOOLS IN TEACHING CHINESE STUDENTS RUSSIAN FOR SPECIFIC PURPOSES

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Keywords*: natural language processing, semantic model, semantisation, specialised vocabulary.*

Natural language processing (NLP) has been increasingly integrated into teaching foreign languages, leveraging technology to improve language learning outcomes. NLP employs computational linguistics and its rule-based modelling of human language to develop semantic models or semantic networks. This rich area of research spans multiple disciplines including linguistics, computer science, cognitive science, and information systems.

NLP technology as a tool of teaching foreign languages has matured significantly, and the results of its application has been discussed in many publications. For example, it can be particularly useful in providing tailored exercises based on a learner's current knowledge and for automating the analysis of learner language [1]. Automated systems using NLP can simulate the functions of a skilled teacher by employing contextualised, communicative language teaching principles, offering interactive exercises, and sensitive responses to student inputs [2]. NLP facilitates the design of Intelligent Computer-Assisted Language Learning (ICALL) systems, which can provide automated feedback and integrate seamlessly into real-world educational settings, enhancing both teaching and learning experiences [3]. NLP-enhanced teaching tools have been shown to be particularly effective in teaching complex linguistic structures, as they provide immediate, sophisticated feedback that aids in deeper understanding and retention of language constructs [4].

In this research, we apply an NLP method of semantic modelling to structure the specialised vocabulary in Russian for Chinese students to enhance their semantisation. This method combines traditional aspects of semantisation, such as semantisation through translation, explanation and demonstration materials [5], and cognitive approach methods based on comparative analysis [6] of deep semantic structures that come from etymological characteristics of Chinese vocabulary units compared to similar elements of English (medium language) and Russian (target language). The method includes visualization of semantic

elements and their relations to identify matching and contrasting aspects to enhance semantisation.

To illustrate the method, we refer to the main component of the expression "**化学键**" in Chinese and its correspondent vocabulary units in English and in Russian "chemical **bond** / химические **связи**". The corresponding terms "键 – bonds – связи" are polysemantic, and they form the key knot of the semantic network in the field of chemistry as their concept represents different types of chemical bonds, such as ionic, covalent, and metallic ones. The Chinese term has a complex structure: 1) 钅(jīn) is associated with metal and implies strength, durability, and stability; 2) 廴(yǐn) symbolizes "stride" or "long step" and is often associated with movement or extending something forward; 3) 聿(yù) historically represents a "writing brush". The combination of the second and the third radicals makes建 (jiàn) meaning "to build" or "to establish", and this concept is often associated with construction, development, and architecture. All the elements of the Chinese term etymologically represent a metal bolt, as part of a door, inserted vertically into the doorframe to secure the door (Fig.1).

The next stage of semantic modelling is to establish correlations with the medium language and the target language terms. In English, "bond" has a rich etymology tracing back to Old English and even earlier roots in other languages. Specifically, Old-English ‘bondage’ or "fetter" derived from the verb "bindan" (to bind), and a Proto-Germanic root "bandan" also means "to bind". Thus, the Germanic root in its deep structure correlates with the notion of being bound or tied up, implying an obligation or a restraint. Going even further back, it connects to the Proto-Indo-European root "bhendh", which means "to bind" or "to tie". This root has given rise to various related words in different Indo-European languages, emphasizing binding or tying. Here, it correlates with the Russian term "связь" that derives from the verb "вязать" coming from the Old-Slavic root "vezati".

The established correlations and their visual representations enhance semantisation of specialised vocabulary in Russian for Chinese students.

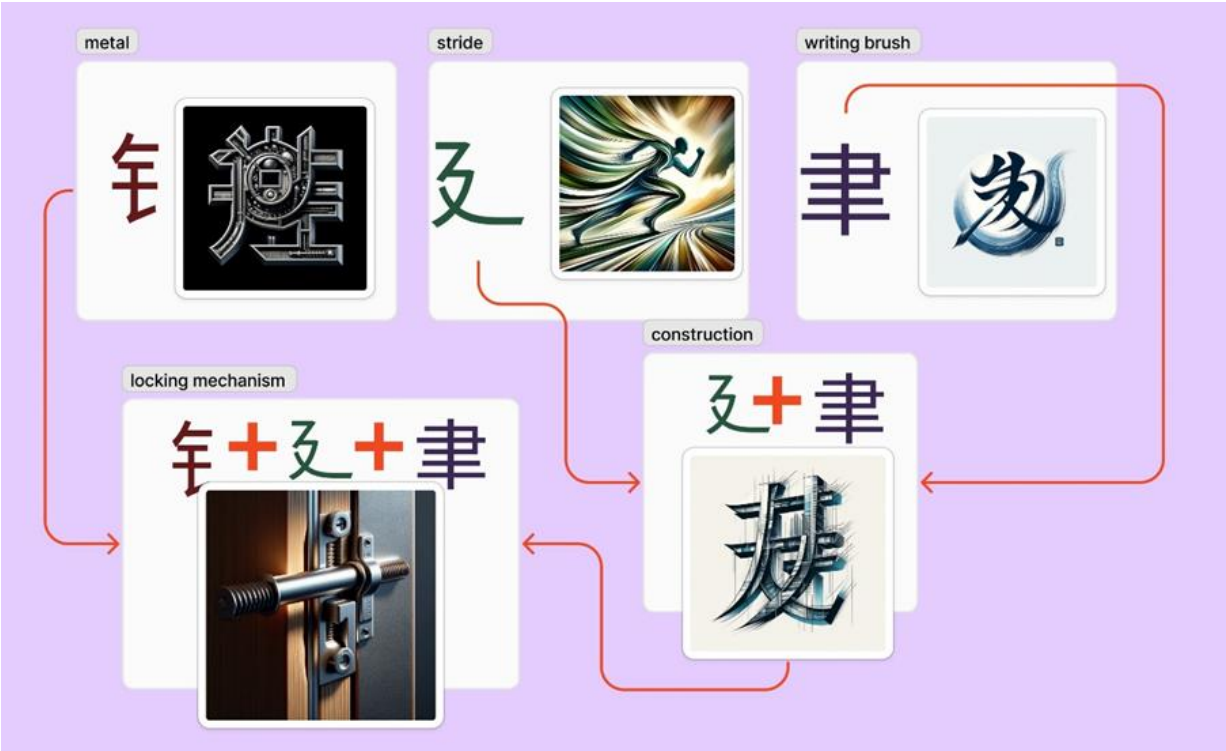

Figure 1. NLP method of semantic modelling (Stage1) "键 – bonds – связи"

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THE HETEROGENEITY OF ECONOMIC DISCOURSE

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***Keywords**: discourse, economics, heterogeneity, archival statements, ideology.*

Economic discourse, like any other form of discourse, is not monolithic. It is made of many voices, ideas and perspectives that interact, compete and sometimes conflict with each other. In this paper the heterogeneity of economic discourse is studied by looking at three ideologies that have shaped the modern economic realm – free market, governmental regulation, and planned economy. This paper aims to derive a definition of the heterogeneity of economic discourse by the method of studying archival statements taken from three different economic discourses.

Michel Foucault, in his work The Archaeology of Knowledge, describes discourse as a group of statements that follow certain rules of formation. For Foucault, discourse does not simply reflect or represent knowledge, but produces it by creating the objects it speaks about. According to Foucault, "The statement is not a structure, or a group of relations, but it is a function of existence,

belonging to signs. The statement is not itself a unit, but rather a function that cuts across a domain of structures and possible unities, revealing some sort of content" [2].

Foucault defines the statement as a unit of meaning being a function of existence in the realm of discourse. Foucault describes the archive as a general system of formation and transformation of statements. He does not see the archive simply as a repository of documents and texts, but as rules that define the boundaries and forms of acceptable discourse in a particular historical period. An archival statement, then, is not simply a single sentence or statement but a function that allows certain statements to emerge, be preserved, used and transformed within a particular system of thought. This is related to the notion of an "episteme" or structure of knowledge, which defines the conditions of possibility of knowledge in any epoch.

Free market ideology is based on the principles of minimal government intervention in the economy, freedom of enterprise and competition. The origin of this ideology coincides with the period of industrialisation in Europe. The founder of the free market is believed to be Adam Smith, an 18th century Scottish economist and philosopher often referred to as the "father of economics". His famous work "The Wealth of Nations" (1776) laid the foundations for classical economic theory and the idea of "an invisible hand" that regulates the market through the natural economic laws of supply and demand [5]. Let us now consider some examples of archival statements within the free market discourse. Ralph Waldo Emerson's phrase "The less government we have the better" (1844) reflects a classic libertarian idea, as well as his scepticism towards the rapid growth of industrialisation and commercialisation, which he believed could stifle individuality and the creative spirit. Another statement might be the term "market efficiency" closely related to the theory of efficient markets, which was developed in the 1970s by the American economist Eugene Fama [1]. The next statement is "free to choose" associated with the works of Milton Friedman and

being the title of his book which has become one of the most influential works in economic thought and policy [3].

Governmental regulation of the economy as an ideology is based on the assumption that markets are not always efficient and that state intervention can help correct market imperfections, stabilize the economy and promote public welfare. This ideology is opposed to libertarian and neoliberal approaches, which emphasize minimal state involvement in the economy. Protectionism as an element of state regulation involves protecting the domestic market through tariffs, quotas and other trade barriers. It originated in the form of Mercantilism, an economic doctrine that dominated Europe in the 16th-18th centuries and supported the idea that a state's wealth depended on its reserves of gold and silver. An example here is industrial education of the nation that the German economist and advocate of protectionism Friedrich List wrote about. He strongly supported the concept of economic policy involving the use of customs duties to protect young national industries from international competition. In his work "The National System of Political Economy" he states, "An industry entirely left to itself, would soon fall to ruin, and a nation letting everything alone would commit suicide" [4].

Finally let us consider the discourse of a planned economy. It is worth noting that in a planned economy the government makes all decisions regarding the production and distribution of goods and services. The basic ideology of a planned economy is the pursuit of optimal allocation of resources in order to achieve social and economic goals set by the government. "From each according to his ability, to each according to his labour" – this archival statement reflects one of the basic principles of socialist ideology, according to which the distribution of goods and services should be carried out on the basis of individual contribution to social production. It was first mentioned in Karl Marx’s work "Critique of the Gotha programme" where the principles of socialist and communist ideology are discussed. Other examples include such statements as

"Just don't touch the state plan" by John Gelbraith and the words of the First Secretary of the CPSU Central Committee N.S. Khrushchev "Our goals are clear, our objectives are defined, let's get to work, comrades! "

Thus, in the context of economic discourse, heterogeneity refers to the diversity and multi-layering of different approaches, ideas and positions that interact, compete and sometimes contradict each other. This is due to the presence of different ideologies such as free market, state regulation and planned economy that define the modern economic space. To conclude, heterogeneity in economic discourse may be defined as the manifestation of different ideological approaches, opinions and speech strategies that interact and compete with each other in shaping economic realm and understanding socio-economic processes.

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TERMINOLOGICAL DISSONANCE AS AN OBSTACLE IN THE DEVELOPMENT OF AN INTEGRATED SPACE

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Keywords*: term, Russian as a foreign language, educational space, foreign students.*

According to the Russian Law on Education, "higher education aims to ensure the training of highly qualified personnel in all major areas of socially useful activities in accordance with the needs of society and the state, meeting the needs of the individual in intellectual, cultural and moral development, deepening and expanding education, scientific and pedagogical qualifications" [4, p. 210]. By law, foreign citizens are not singled out as a separate category of students, the same educational technologies, methods and means of education are applied to them as to Russian students.

The first conceptual contradiction in the training of foreigners arises in the essence of the proposed education: the Russian education system is aimed at meeting the needs of Russian society and the state and, in accordance with them, develops and supports the individual and professional qualities of students, on the one hand, and on the other hand, educational organizations are dealing with the need to invade (that is, develop, support) the needs of representatives of other states where there are their own requirements for the general scientific and professional competencies of university graduates. Thus, the professional identity of a foreign student is formed under the influence of the Russian educational environment and the Russian professional community.

A preliminary analysis of educational systems, Russian and some foreign, sometimes shows fundamental differences in educational goals and technologies at the stage preceding higher education, including the duration of this stage, the applicant's set of competencies, traditional teaching methods and tools, and educational motivation. Such contradictions were supposed to be minimized by integration trends, which were especially characteristic since 2003, with the agreement on joining the Bologna process: we were obvious. An unambiguous conclusion after a twenty-year experiment of entering the integrated educational space is the use of the ethnopedagogic principle, declaring the need to take into account the peculiarities of the national educational system in the formation of socio-pedagogical conditions. Academic mobility is still characterized by serious integration barriers faced by citizens of one State when they receive education in a different educational environment. Organizational and sociocultural barriers form the external contour of the educational situation. In the internal context, language barriers appear, the extent of which depends on the country of departure of students and the specialty of study. In order to achieve the goals of training national personnel for foreign countries in Russian educational institutions, a number of tasks were defined, namely: to implement the principle of equality of rights of citizens of Russia and citizens of the member states of the Eurasian Economic Community to receive education and create conditions for the formation of a common labor market of the Eurasian Economic Community. In 2011, the member States of the Eurasian Economic Community signed an Agreement on cooperation in the field of education, which provides for the creation of an Education Council under the EAEU Integration Committee, which is responsible for promoting academic exchange [5].

The year 2024 marks the 10th anniversary of the founding of the EAEU. There is little activity in terms of educational activities: individual events indicate the presence of issues of education and academic mobility on the organization's

agenda [9]. An important component of the educational environment for foreigners are projects on learning Russian as a foreign language.

The idea of Russian Ambassadors in the World project, which was initiated by the Pushkin State Institute of the Russian Language in 2015, is interesting from the point of view of the development of an integrated educational space. Over the years of the program, volunteers have visited 19 countries and conducted classes for more than 48 thousand people. In 2023, expeditions of Russian language ambassadors took place in Uzbekistan, Kyrgyzstan, Kazakhstan, Tajikistan, India, Vietnam, and Cuba.

The greatest difficulties in learning a specialty are related to the language of the specialty, which is studied in the country of the profession. The difficulties of socio-cultural adaptation are complemented by the problems of mastering the studied special disciplines in Russian.

351, 127 thousand foreigners arrived in Russia to study in 2022 [1, 2]; in 2023 there were 311.5 thousand foreign students who studied in the following specialties (Table 1.) [6, 8].

Scientific specialty	Share in %
Nursing	23
Fine Arts	22
Vocal art	21
Medical business	21
Dentistry	20
Aircraft engines	19
Optometry	19
Pharmacy	18
Sculpture	18
Ballistics and hydroaerodynamics	18

Table 1. The proportion of international students in different specialties

A comparative analysis of the demand for medical specialties among foreigners in recent years suggests that it is medical universities in the modern national higher education system that are most successful in implementing the educational services export program, are able to integrate into the global educational system faster, offering foreign students more comfortable conditions

and are able to properly compete with universities of other orientation not only in the Russian the market of educational services and on a global scale.

The researchers identify a number of factors that, in their opinion, hinder the full integration of the Russian system of higher medical education into the international educational space [3, p. 175]. These are:

1. The specifics of the national medical education system.

2. The difference in the specifics of the work on the fact of awarding academic degrees.

3. The difference in terminology. As for this factor, medicine is the only science, if we consider it on a global scale, that does not have a common unified terminology.

The same terms in different countries can mean completely different diseases, and the same diseases can have different terminological designations. The problem of inventory (classification and allocation) of terminological units of the language of medical communication is indicated [7, p. 85], but its solution requires additional study.

Terminological dissonance – confusion, communicative discomfort or conflict due to inadequate use of specialty terms, in our opinion, is the cause of disharmonious personal professional development and lack of mutual understanding at the specialty level with colleagues from other countries. In addition, in a broader sense, terminological dissonance can slow down the development of the scientific industry due to the lack of novelty in the proposed scientific discoveries based on the introduction of already known facts, but having a different name than the generally accepted one.

There are several examples that can cause terminological dissonance. "*Angina*" (English equivalent – *Angina*) in English medical terminology refers to angina pectoris, in Russian – acute tonsillitis, an acute infectious disease with damage to the tonsils caused by bacteria, viruses, fungi. "*Cellulite*" (Eng. *Cellulitis*) in English means phlegmon. The English "*kiss of life*" translates as

artificial lung ventilation. In some cases, the names of different scientists are indicated in terms of different national systems, which are called "nominal" (named after the person) diseases. Diffuse toxic goiter in German and Russian terminology is *Basedova's disease*, in Italian — *Flyani's disease*, in Ireland — *Parry's disease*, and in England — *Graves' disease* [3, p. 177]».

One of the solutions to the problem of terminological dissonance is the transition of the teaching system to a language that is the second foreign language in many state educational systems. Thus, a number of Russian medical universities have introduced a teaching program in English.

Specialists have accumulated vast experience, developed a number of techniques, textbooks, workshops, educational and methodological complexes, multimedia programs and many other educational and methodological materials designed to integrate the system of teaching special disciplines into the Russian medical education system.

Certain difficulties do not allow us to completely solve this problem by introducing English as the language of the specialty: – not all Russian teachers, especially of special disciplines, as well as administrative and managerial staff speak English at the proper level; – the difference in educational and methodological complexes and approaches in modern Western and Russian systems of professional medicine; – the existing problem of clinical practice, which is explained by the insufficient number of hours allocated to the study of the Russian language by students enrolled in such programs, and the almost complete absence of English-speaking patients in Russian medical institutions; – the lack of full-fledged socio-cultural and linguistic cultural adaptation of students, which complicates the process of not only intercultural communication in the Russian national socio-cultural environment, but also integration foreign students to the Russian student society, to the intra-university cultural environment and the Russian socio-cultural space.

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TRANSLATOR DOMINANTS OF A LECTURE VIDEO COURSE (EXPERIENCE OF TRANSLATION FROM RUSSIAN TO CHINESE)

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***Keywords**: pre-translation, dominant, Interlingua asymmetry, analysis*

Pre-translation analysis is a crucial stage in the translation process, during which the text in the source language is analyzed before being translated into the target language. It allows the translator to consider translator dominants and the peculiarities of both languages to achieve a high-quality translation.

Cultural specificity: Translating the dominant Banya from Russian to Chinese requires taking into account cultural differences and selecting the most appropriate translation, considering the specific features of both languages.

The word Banya can be represented by two variants: 桑拿 (sāngná) and 澡堂(zǎotáng). The first variant, 桑拿, is a phonetic loanword. It sounds closer to 'sauna' and refers to the Finnish sauna, however, the second variant, 澡堂, better corresponds to the cultural meaning of the word. The word 澡堂 consists of two

characters: 澡 (zǎo), which means 'to wash,' formed by the water radical 氵 (shuǐ) and 'to chatter 臭 (zào). This emphasizes its association with water and the process of washing, reflecting the function and purpose of the place, and also indicates the presence of public baths in Chinese culture, which are called as such. Therefore, considering the importance of the target language in translation, the choice of the second variant, 澡堂, is preferable as it more accurately conveys the meaning and context of the term Banya, meeting the cultural expectations of the Chinese audience. Your analysis of the translation choice for the word Banya is excellent! The variants 桑拿 and 澡堂 each have their own specific features and cultural nuances. Your decision to prefer the second variant, 澡堂, is well-founded, considering its closer alignment with the cultural meaning of the word.

Moving on to the concluding part of the lecture, it is worth noting that the term Interlingua asymmetry exists in the Chinese language. This is evidenced by the work of Cao Jinshan, titled "An Investigation of Interlingua Asymmetry in the Semantic Information of the Russian-Chinese Dictionary", defended at Shandong University in 2018. This term can be translated as 语言间不对称 in Chinese, which is terminology repeated in Cao Jinshan's dissertation.

As mentioned in this work, Interlingua asymmetry can be a key aspect when studying language pairs such as Russian and Chinese. Researching the linguistic features and semantic differences between languages helps to better understand how to translate information from one language to another while considering existing asymmetries.

Cao Jinshan's research is devoted to studying this phenomenon and represents a significant contribution to the field of Interlingua communication. Her dissertation focuses on analyzing the semantic information in the Russian-Chinese dictionary, aiming to identify nuances and differences in the interpretation of words and expressions between these languages.

Therefore, studying Interlingua asymmetry not only helps improve the quality of translation but also enhances our understanding of differences between languages and cultures. It is important to continue research in this area to enhance the effectiveness of Interlingua communication and information exchange between different languages and cultures.

However, when translating into Chinese, such a phenomenon as interlingual asymmetry is not present. In the Chinese language, the word убийца (killer) can be translated as 凶手 (xiōngshǒu), denoting a killer. In turn, киллер (hired killer) can be translated as 雇佣的杀手 (gùyōng de shāshǒu). It is worth noting that while the translation is accurate, it is literal, as it consists of two separate parts: hired (雇佣) and killer (杀手). However, it should be noted that there is also the term 刺客 (assassin), which can also be translated as hired killer. In this case, the first part of the character 刺 (cì) means to stab, and the second 客 (kè) means customer, which directly reflects the same semantic concept. In the context of translation into Russian, this term can also refer to a hired assassin. When translating a lecture, it is important to consider any discrepancies, which implies the need for pre-translation analysis.

Lexical Dominants: The choice of the appropriate word in Chinese may include options such as:

1. 现实 (xiànshí) – this is one of the most commonly used terms, which translates as reality or facts. However, it may be too general and not convey the full richness of the term "reality" in the context of cultural and social specifics.

2. Cultural Phenomena (文化现象 - wénhuà xiànxiàng) – this term emphasizes cultural aspects, which is closer in meaning to the term "realities" in the context of the lecture being discussed. It specifies that the focus is on phenomena specific to a particular culture.

3. Social and Cultural Realities (社会文化现实 - shèhuì wénhuà xiànshí) – this option incorporates both aspects of the term realities: social (社会 - society) and cultural (文化 - culture). Among the presented options, Social and Cultural Realities (shèhuì wénhuà xiànshí) seems to be the most fitting, as it, best conveys the meaning of realities in the context of cultural and social peculiarities. The word clarifies that these realities encompass aspects of both culture and society, which aligns with the description in the lecture.

Conclusion: Pre-translation analysis plays a crucial role in the successful translation of lectures from Russian to Chinese, allowing for the consideration of translation dominants and peculiarities of both languages. This process not only ensures a high-quality translation but also contributes to a deeper understanding of the text and its context in the target language.

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PROJECT TEAM LEADERSHIP: CHALLENGES AND MANAGEMENT STRATEGIES

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Keywords: *group project, management skills, well-coordinated team, collaborative environment, leadership styles, decision making.*

Almost everything in life both in a professional and personal setting takes a team or group effort to make it happen. To be successful in a group project, and achieve a set goal require professional management skills of a group leader. In

the process of managing people, a group leader plays a multifaceted role like leading, motivating, and encouraging the members of the team.

Starting a new group project is a high-risk and challenging task by itself as its implementation directly depends on the efforts of a well-coordinated team and the actions of its leader.

Being undergraduate students of Business school and parallel working in various companies, we very often find ourselves under pressure because of a lack of knowledge and experience in not only how to be an active player in the project team but, what is more, how to perform a part of the project moderator (other terms used: team manager, project leader, project architect, project coach, etc.) efficiently.

The study under consideration was conducted among the first- and second-year undergraduate students of Baikal International Business School of Irkutsk State University. Using student questionnaires, interviews, and observation, we collect multiple psychographic, motivational, and behavioral data allowing us to describe the image of a team leader who may foster a cohesive and collaborative environment and successfully regulate all the processes of a group project.

The first thing, we admit as a postulate, is that the model's leadership styles may be various in different circumstances, but they are related directly to students' maturity: the higher the knowledge and experience of the team members the less guidance the project leader needs to provide. When the team members are of different maturity levels, the leader should apply more effort into the project process.

At the first stage of our study, we interviewed 25 students who usually act as leaders in the teams by asking them questions about the problems they come across in supervising the project. In addition to time management, poor motivation on the part of the team members, low level of the general training in the discipline the topic of which is under discussion, most of the interviewees highlighted the problem of interpersonal communication among project team

members, and also the style of communication of the leader with other members of the group.

The students who more often play the role of the team members were asked to name common weaknesses of a group leader, which level out the success of the project. About 90% of the interviewees put in the first place the incompetency and poor communication skills of the leader, which from their point of view, may lead the project to failure.

On the question about the most important steps of the leader for the successful ongoing of the project, the interviewees focused on the following:

1. Bring together appropriate students, with good knowledge in the discipline concerning the topic of the project who share a common project vision and goals.

2. Start any project with making emotional connection among team members.

3. Facilitate free communication even if the members of the team are very different in education, gender or other social differences.

4. Regularly play the role of the active group member rather than a role of an expert.

5. Sustain positive communication among team members and it will stimulate effective knowledge sharing, conflict-free decision making, efforts coordination, and, eventually, project performance results

We have not included other issues on the list from the questionary as they were not chosen by the majority of the recipients. A number of interviews and answers to the questionaries from both sides leaders and executives show convincingly that most of the problems within the facilitation of the projects are connected with leadership responsibilities and specifically with communication skills. A good team leader should have appropriate communication skills to organize and run a project. Among those crucial skills are *effective listening* to reach consensus and recognize other's contribution into the project; *writing skills*

to state clear goals, exchange messages among team members clearly and vividly*; verbal communication* – clear speech, a confident tone and thoughtful language [2].

We are illustrating an open list which we compiled as a result of our mini research with a target audience; however, it may be added and different communication skills may be focused on, but it is necessary to underline that constructive communication doesn't come naturally [1]; it's an acquired skill which requires conscious effort and skill development on the part of a leader.

Finally, the problem of how similar the image of a student project leader with that of the one in the workplace seems to be interesting for further investigation.

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UDC 81

EMOTIVE LINGUISTICS: EXPLORING CULTURAL PERSPECTIVES THROUGH LANGUAGE

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Keywords: *emotive linguistics, cultural perspectives, language, cross-cultural communication, linguistic expression, emotional decoding.*

Language is not only a means of communication, but it also plays a significant role in shaping our emotions and cultural perspectives. The words we use to describe our feelings can influence how we experience them, and the language we speak can shape our view of the world [1].

Being aware of the influence of language on our emotions and cultural perspectives is crucial, especially in a globalized world where people from diverse backgrounds interact regularly [2]. By understanding and respecting different languages and communication styles, we can bridge the gap between cultures and foster greater understanding and empathy [9].

Emotive linguistics - is a branch of linguistics that focuses on the study of how language is used to express and shape emotional experiences [3]. This field examines the vocabulary, grammar, and syntax related to emotions in different languages, as well as the cultural and social factors that influence emotional expression through language [3]. Emotive linguistics also explores how linguistic expressions of emotions can vary within a single language based on factors such as age, gender, and social context.

By delving into these dimensions, emotive linguistics seeks to elucidate the intricate ways in which language serves as a medium for conveying emotional experiences while reflecting the cultural perspectives and values inherent in a given linguistic community.

The Sapir-Whorf Hypothesis, also known as linguistic relativity, posits that the structure and vocabulary of a language shape the way its speakers perceive and conceptualize the world [7]. This hypothesis suggests that language not only reflects our thoughts and experiences but also actively influences our cognitive processes, including perception, categorization, and reasoning [7].

In the context of emotive linguistics, the Sapir-Whorf Hypothesis underscores the profound impact of language on emotional expression and perception. Different languages may offer distinct frameworks for understanding emotions, which can influence how individuals within a culture experience,

express, and interpret emotions. Cultural perspectives are thus intricately intertwined with linguistic relativity, as cultural norms and values are reflected in the emotional vocabulary, expressions, and communicative styles of a given language [6].

One interesting example of this hypothesis can be seen in the difference in the construction and interpretation of "I'm sad" between English and Russian indeed reflects the linguistic and cultural nuances that influence individual perceptions and attitudes towards emotions and experiences [4].

In English, if you are feeling sad, you might say "I'm sad". The word "sad" directly describes your emotional state. The construction ("I'm sad") is a straightforward expression of personal emotion [4]. However, in Russian, you would say ("Mne grustno"), which literally translates as "To me it is sad". This difference in expression could suggest that Russians view sadness as a temporary state, while English speakers may see it as a more integral part of their identity [4].

In English, there is a strong emphasis on personal agency and taking ownership of one's emotions, while in Russian, the emphasis is more on the experience of emotion as part of a broader context [8]. This can influence coping mechanisms and attitudes towards resilience, as well as interpersonal interactions.

Understanding these linguistic nuances can greatly enhance cross-cultural communication and empathy. By recognizing the cultural and linguistic influences on emotional expression, individuals can develop a deeper understanding of others' perspectives and experiences [5]. This can lead to more effective and empathetic communication across cultural boundaries.

Another interesting example comes from the Chinese language. In Chinese, the hieroglyph for 'crisis' (危机‘wēijī’) is composed of two parts: the first one part represents danger or risk, while the second represents opportunity or change.

This suggests that, in Chinese culture, every crisis contains the seeds of opportunity. This perspective is quite different from the Western view, where

problems are often viewed negatively and associated with stress and difficulty [7]. Also, Chinese individuals may be more inclined to approach situations with a balanced consideration of potential benefits and drawbacks, recognizing that challenges often contain hidden opportunities. This linguistic quirk fosters a mindset that encourages individuals to seek solutions, innovate, and adapt in the face of adversity.

Furthermore, this linguistic influence extends beyond problem-solving to encompass a broader worldview. Chinese people may be more attuned to recognizing potential opportunities within uncertain or difficult circumstances, leading to a greater sense of resilience and adaptability.

In essence, "Emotive Linguistics" has illuminated the intricate connections between language, emotion, and culture, inviting us to appreciate the profound ways in which language shapes our perceptions of the world and enriches our human experience [5]. Through our continued exploration of these themes, we aim to deepen our appreciation for the beauty and complexity of language as a gateway to understanding the diverse expressions of human emotion and cultural identity.

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THE CONCEPT OF A TEACHER IN THE CHINESE LANGUAGE WORLDVIEW

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***Keywords**: Chinese language, Chinese language worldview, linguistic concepts.*

This article discusses the concept of TEACHER in the Chinese language worldview through the totality of its representation in the Chinese language, as well as through the identification of common and national components in the conceptual, logical, axiological and figurative components of the concept.

The meaning of "concept" itself is indeed multidimensional, and so different researchers can interpret it in different ways, although in general its essence remains approximately the same. Therefore, the most important point that should be highlighted based on the analysis of interpretations by various researchers is that the concept contains a core layer with the highest specificity, and a periphery layer consisting of more abstract layers [3]. Conceptual, figurative and axiological components can be distinguished within the concept [2].

During the study it was concluded that within the framework of linguoconceptology, the concept of TEACHER in the Chinese linguistic worldview has a clear ″linguocultural type″. According to Karasik and Dmitrieva, "linguocultural type" is a kind of concept that focuses not on speech characteristics, but on the "personality" within the concept as a whole, i.e., on the peculiarity of communicative behavior; which has conceptual, image-perceptual and value characteristics [1]. The linguoculturality of the type of this concept is conditioned and supported by the presence of the prototypicality of the concept TEACHER in the Chinese worldview. On this basis, it was concluded that the images of Confucius and Laozi in particular, have the closest relations to the image of a teacher and therefore are the prototypes of this concept. Not only because these philosophers were the founders of particular traditions indigenous to China, but also because these philosophers themselves could be called not only by their own names, but also by the nickname "Teacher".

Analyzing the internal form of a concept: Based on the "List of frequently used lexical units in modern Chinese" it was revealed that the most frequent lexical unit used in Chinese in the meaning of "teacher" is 老师. Therefore, 老师 was used as the main lexical unit for analyzing the concept of TEACHER from different perspectives. Based on the analysis of the internal form, it should be concluded that the lexical unit 老师 (lǎoshī), formed from two lexemes 老 (lǎo) and 师 (shī), can be literally translated as "old master". Therefore, it can be concluded that in the Chinese worldview, a teacher is usually a person who, firstly, is old enough (or at least mature enough), and therefore has authority by type of seniority; as well as someone who is a master of a particular art or skill. Moreover, according to this interpretation it follows that "laoshi" may not be related to pedagogy, respectively, this appeal may be addressed not only directly to teachers, but also simply to authoritative personalities competent in a particular art, skill, profession.

Lexical representation of linguistic categorization: Although it is **老**师 that is the most frequent in usage, in Chinese language the concept TEACHER can be represented by other 23 synonymous lexemes: **教**师, 师傅, **教**练, 师长, **教**员, 导师, **老先生**, 师资, 师父, **法**师, **教官**, **老**师傅, **夫子**, **禅**师, **宗**师, **教工**, **教**职员, **教**书匠, **教**师爷, 师门, **本**师, 经师, **塾**师, 阁梨, 门墙, 证义 [4].

Conceptual features identified at the level of Chinese paremiology: In their majority, examples of Chinese paremiology that include the concept of TEACHER, are positive, i.e., their meaning either reinforce the status of teachers or praise them. For example, such phraseological expressions as "the one who can correct a wrongly read or incorrectly written character sign will become your teacher, mentor″ «**一字之**师 » belong to such phraseological expressions. Neutral paremiological units were also found, such as" a teacher does not shame a teacher, a doctor does not shame a doctor″ «师不谈师，医不谈医 ». Despite the abundance of positive phraseological units, phraseological units with negative meaning were also found: "one who likes to point a moral" «**好**为人师 », "a heartfelt friend is better than a strict teacher" «严师不如益友».

Linguistic representation of the concept in precedent phenomena of Chinese linguoculture: From the perspective of linguistic culture, the concept of a TEACHER has experienced both ups and downs. "Analects" «论语», "Spring and Autumn Annals" «**春秋**», and "Records of the Grand Historian" «**史**记» formed the basis of the literary tradition in Chinese culture, and therefore are important pieces of China's cultural heritage. The linguistic representation of the TEACHER concept from the point of view of the precedent phenomena of Chinese linguistic culture can be found not only in such canonical works as "Tao Te Ching" «**道德**经» or "Analects" «论语», but also in more modern examples of literature: Ye Shengtao – "Ni Huanzhi" «**倪焕之** », Feng Jicai "The Flower Strewn Path" «**鋪花的歧路**», Lu Xun – "Nostalgia" «怀旧», "Kong Yiji"

«孔乙己». At some point, the image of the TEACHER started to lose its reliance and gain distrust. Instead of developing natural talents, as Confucius had said, teachers forced their students to memorize canonical texts, completely ignoring the interests and abilities of each individual student – all these ideas can be found in the modern literature above.

From the linguistic point of view, the concept TEACHER is multifaceted, and has a large number of representative units in terms of lexical categorization, paremiology, precedent phenomena. 老师, i.e. "laoshi", meaning "old master", is the most frequent in usage in the meaning of a teacher, and can be addressed not only towards the persons who teach others, but also towards those who can be considered masters of their art, skill, craft. In conclusion, according to the results of the study, based on the available data, the concept of TEACHER is quite susceptible to change, so there is a high probability that it will continue to change in the future, so it will be crucial to continue to document the changes and study this issue further.

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FEASIBILITY OF BAM CONSTRUCTION AND ITS ROLE AT THE CURRENT STAGE OF RUSSIA'S ECONOMIC DEVELOPMENT

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Keywords: *Baikal-Amur Mainline, historical period, construction project, economy.*

The possibility of building a railway encircling the northern part of Baikal was considered in Russia in the late XIX-early XX centuries. However, the technological, industrial and financial capabilities of the country did not allow this project to be realized. Nevertheless, in the 30-s of the twentieth century, Soviet Russia returned to the issue of creating a motorway that would connect the western and eastern parts of the country.

The reasons for the construction of the Baikal-Amur Mainline can be identified as the need for large-scale development of Eastern Siberia and the Far East, the creation of strong economic ties with the countries of East Asia (Japan,

China, Korea), the attraction of human resources to the sparsely populated areas of the north-eastern part of Siberia and the Far East [1, 3]. Also, an important factor that influenced the acceleration of the BAM construction project in the post-war period was the political and military tension in relations between the USSR and China, confrontation with Japan and Korea.

The beginning of the construction of the Baikal-Amur Mainline is considered to be the release of the decree of the Council of People's Commissars of the USSR on 13 April 1932, which approved the route of the railway: Taishet - Tyndinsky - Permsky settlement (transformed into Komsomolsk-on-Amur) – Sovetskaya Gavan [2].

The next historical period, when the country's government became closely involved in the issue of laying the railway from Baikal to Amur, falls between 1974 and 1985. At that time, the construction project became not only an economic project, but also a kind of ideological link to attract human resources to the sparsely populated northern territories of Siberia and the Far East. In 1974, BAM was declared the All-Union Komsomol Strike Construction Project, which attracted young people from all Soviet republics, creating settlements along the route.

According to P.V. Negrobova, a young scientist from the State University of Komsomolsk-on-Amur, the beginning of the next stage of BAM development can be considered 2008 [5], when the Government of the Russian Federation approved the Strategy for the Development of Railway Transport in the Russian Federation, which sets strategic indicators for increasing the capacity of the railway line. [4]

What caused the actualisation of the need to continue the construction of the Baikal-Amur Mainline in modern Russia?

Firstly, the heavy congestion of the existing branch of the BAM. For example, more than 2000 carriages pass through Tynda station every day. [2]

Secondly, BAM plays an important geopolitical role, providing a permanent transport link between the west and east of the country. At the same time, the BAM line is safer than the Trans-Siberian railway, which is located near the border with China.

Thirdly, the BAM is a transit main, providing a continuous flow of goods from East Asia to Europe. The Trans-Siberian line cannot cope with this task alone. At the same time, the BAM is the shortest transport mainline capable of connecting two parts of the country.

The main task of BAM development at the present stage is construction of the second line to increase the throughput capacity of the main line. The increase in the number of cargoes should reduce the time of cargo delivery by railway.

The issue of the Baikal-Amur Mainline construction has always been relevant for the economy of the Russian state. The active period of the trunk railway construction covers 64 years. During this time, 280 stations were built, located in the Irkutsk and Amur Regions, the Republics of Buryatia and Yakutia, Khabarovsk and Transbaikal Territories. During the whole period, 4200 bridges were erected [6]. There is a joke among BAM builders that BAM is bridges connected by roads. Twenty-one tunnels were driven into the rocks, the longest of which, the Severomuisky tunnel, is 15343 meters long.

During all the years of construction, the BAM covered 1,500,000 square kilometres of the country's territory. Over 14 million tonnes of cargo have been transported along the main line.

All these figures make the Baikal-Amur Mainline one of the largest construction projects of the century and put it in second place in terms of scale after the Trans-Siberian Railway.

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ARCHITECTURAL FEATURES OF BAM TOWN SEVEROBAIKALSK

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Keywords: *Severobaikalsk, Baikal-Amur Mainline (BAM), BAM settlement, logistics centre, unique natural landscape, architecture.*

The design of settlements in the BAM construction zone was carried out simultaneously with the study of natural and climatic conditions of the cross-

border territories, assessment of local economic and geographical resources, as well as planned and unplanned development of BAM settlements.

The general scheme of district planning of the BAM zone envisaged the location of more than 100 towns and large settlements. In the most developed southern zone, it was planned to locate support cities, in the intermediate zone – base cities, in the undeveloped northern territories – temporary or shift settlements.

The original plan of Severobaikalsk was developed by Lengiprogor in 1975. The population of the city was estimated at 25,000 people. The project envisaged construction of a large railway junction with a railway station and a complex of railway enterprises, five-storey residential micro-districts, a central boiler house, sewage treatment facilities, a palace of culture for railway workers, a shopping and community centre, a large railway hospital, a school, a bakery, etc. It should be noted that Severobaikalsk has become a vivid example of integrated construction of an entire city, taking into account the most modern requirements in the organisation of the urban environment [1].

The sports core of the city, recreation areas, including the city beach, park, and children's playgrounds were distinguished by a special layout. Architects tried to take into account the unique natural landscape of the territory, combining the panorama of the Baikal coast, surrounding snow-capped mountain peaks and taiga forest park zone. Experimental buildings of four structural types, developed in the early 1970s, were adopted for the development.

At the beginning of 1976, soil researchers established the presence of sluggish permafrost, variegated sediments, and faults in the Earth's crust at Cape Kurly. It was decided to limit the growth of Severobaikalsk as much as possible, giving it the status of a railway workers' settlement. The reduced plan included a railway station and a settlement for 14,000 people. At the same time, the actual population at the time of project approval was already 19,000.

The favourable geographical location of Severobaikalsk, the increased concentration of transport construction units and administrative institutions at the Tyisky bridgehead, and the formation of the Severobaikalsk branch of the BAMZhD led to a sharp increase in population.

As a result, on 5 November 1980, by the decree of the Presidium of the Supreme Soviet of the RSFSR, the working settlement of Severobaikalsk was transformed into a city of republican subordination and continued to be built up contrary to the approved general plan.

Design institutes were working on new standard projects for settlements of the Baikal-Amur Mainline, which were to be built "from unified products, have an increased level of comfort and northern character of architecture with differentiated sizes of window openings, good drawing of entrances, porches, details of the ventilated underground and a bright colour solution". The upper limit of the total area in these projects was planned for two-room flats – 60.5 square metres instead of 47-52 square metres, three-room flats – 74.8 instead of 67, four-room flats – 99 square metres instead of 80-84 [3]. The construction of factory-made one and two-storey wooden houses with homestead plots was also discussed, rationalising the scheme of settlement construction organisation, starting from permanent settlements from the outset, thus reducing the estimated cost of housing construction by reducing the cost of temporary structures.

In terms of housing construction, projects were developed for unique large-panel residential buildings with a monolithic frame and brick filling of enclosing structures (house series 122 was specially designed for Severobaikalsk). The sections of the houses are designed taking into account latitudinal and meridional orientation, which ensures their seismic stability.

The layout of residential blocks was carried out in such a way as to protect the yards from strong winds and snow drifts – by the type of enclosed yards (Fig. 1). The flats of the 122 series houses were provided with a higher level of comfort: the total area exceeded the norms for the middle strip of the RSFSR by

10%, the area of the kitchen-dining room was not less than nine square metres, there were built-in wardrobes" for drying clothes and shoes".

Figure 1. "Closed" yards of Severobaikalsk

In the course of construction, the 122 series houses were found to have many drawbacks: complex configuration of exterior walls, lack of loggias and balconies, complicated construction of panel joints, which led to overconsumption of metal, reduced thermal performance of the house, increased labour costs both in the factory and on the construction site. Designers developed residential buildings with flat roofs, which during rains and snowmelt turned into water collection tanks.

The building of the Severobaikalsk railway station deserves special attention: with glass walls, windows in the form of portholes and a curved roof resembling a sail or a Baikal wave. It was built according to the project of the Novosibirsk architect V. Avksentyuk. The townspeople perceive it as a gift of Leningrad builders, comparing it to the cruiser "Aurora" – a symbol of the beginning of the revolution in 1917 in Petrograd, or even to the Baltic fleet

created by Peter the Great [2]. Severobaikalsk as the western capital of BAM – the road to the riches of Siberia, thus ranks on a par with St. Petersburg – ‘a window to Europe’.

A unique solution for Severobaikalsk, as well as for many settlements of BAM, was the construction of a shopping and public centre. At the time, it was a kind of urban innovation, as it was possible to combine the services of the local administration, consumer services, shops, a library, a canteen, a medical service, a meeting place and a post office in the same building. One could say, a city within a city. The decision was driven by the need to take into account the climatic peculiarities of the area: people should be comfortable to fulfill their consumer needs.

Nowadays Severobaikalsk has become one of the 25 cities of the project "A New Look for the Cities of the Far East". The goal of the project is to improve the quality of life of residents of the Far East region. A master plan has been created for each city, the implementation of which will increase the urban environment quality index (Fig. 2). Moreover, the integrated approach to the development of the urban environment of Severobaikalsk is still noticeable today: repetitive elements of architectural forms are present in many expositions of the future. A bet on tourism is also made. After all, more than 60% of surveyed residents identified spontaneous tourism and lack of hospitality industry as a significant urban problem. In this regard, the master plan includes the improvement of tourist-significant areas of the city. Since the city is separated from Baikal by railway tracks, the master plan includes the project of a modern pedestrian overpass – a modern walking area.

Figure 2. Renovation project of the central part of Severobaikalsk city centre

Today Severobaikalsk remains a major logistics centre of the western section of the Baikal-Amur Mainline, an informal capital of northern Baikal and a cultural and recreational centre. The city still attracts the interest of architects and builders as an example of complex planning of urban environments convenient for living, working and recreation. The city remains in demand among young people, which also emphasises its potential for development in the near and long term.

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NAMING IN IRKUTSK: THE LANGUAGE GAME AND THE NAMES OF PUBLIC SPACES

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Keywords: *language game, wordplay, naming, public space.*

The popular saying "Don’t judge a book by its cover" teaches us not to draw quick conclusions based on our first impressions. However, the first impression is especially important when choosing a café, a store, or another place to visit. The language game becomes a valuable tool to create a bright name for a public space. We believe that marketing managers in Irkutsk also use the language game to attract more attention from the visitors. The following research is here to check this hypothesis.

Language game is defined as a deliberate violation of language norms with the aim of adding greater expressiveness. [2] The various types of language game are based on word formation, graphics, orthographics, lexis, phonetics, semantics, and context. [1].

During the research, we compiled a database of 23 public place names in Irkutsk that utilize language game. The database contains names of Irkutsk cafes and restaurants, beauty salons, and one food brand (ice cream "Cool Took"). These names were classified according to the language game techniques used.

Primarily, wordplay is based on the use of homonyms. The most significant examples include the cafe "More Coffee", ice cream "Cool Took", Vietnamese restaurant "Pho Me" and Georgian restaurant "Givi to you".

Students and staff members of the Educational Complex "Point of Future" took part in a survey to verify the hypothesis. The results show that the most memorable and attractive names for the public spaces use the language game, which supports the idea in question.

The use of language game in naming public spaces is a common phenomenon in Irkutsk and can be an effective tool for attracting the attention of residents and tourists. However, using language game requires a certain level of education and erudition from the target audience.

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PHYSICAL AND GEOGRAPHICAL FEATURES OF BAIKAL-AMUR MAINLINE CONSTRUCTION

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Keywords: *Baikal-Amur Mainline, climate conditions, geological peculiarities, special engineering structures, infrastructure facilities.*

The construction of the Baikal-Amur Mainline took place under difficult physical and geographical conditions and by such conditions we mean:

- peculiarities and underlying relief surface
- seismic activity of this territory
- unfavorable climate conditions (both for construction and further operation)
- geological peculiarities of the underlying soils, their instability
- presence of permafrost throughout the railway design area
- crossing of the transport route by water obstacles [1, 2].

It is obvious that without taking these peculiarities into account, the implementation of such a large transport and socio-economic project would be impossible.

The distinctive feature of the Earth's crust structure is largely due to the rise and fall of soils and the complex structure of rocks. The Baikal-Amur Mainline, unlike the Trans-Siberian railway, was initially designed in areas with mountainous terrain. To take into account these peculiarities, designers and builders found special technologies to strengthen soils, to prevent collapses and collapses in construction areas with unstable soils. Necessary and unprecedented for the railways of the Soviet Union measures of enhanced design in the zones of possible influence of seismic processes were provided, including strengthening of structures, application of damping systems and other special constructions. It is known that the Baikal railway line runs right along the Baikal tectonic fault, where the probability of earthquakes is very high.

Climatic peculiarities also became a special challenge for the constructors, as low temperatures in winter could cause the ground to freeze, which made it difficult to work with excavation, construction of foundations. Low temperatures also hindered construction itself, increasing the cost of materials and construction. We cannot ignore the high wind load, freezing of air in

intermountain basins, dryness of air (due to the increased continentality of the climate). Heat pumps and ground heating were used to reduce the climate impact. The specialized drilling rigs, water hammer and other technical means capable of breaking through frozen ground were used.

High humidity in summer, abundant snowmelt required the organization of wooden tracks to reinforce the main roads, drainage systems and protective embankments, as well as special drying facilities and insulation.

The limitation of permafrost is the zones of variable rigidity. As part of the engineering and geological studies, soils were taken, sampled, and transferred to special field laboratories for initial analyses, and then the field materials were sent to the laboratory of the Lengiprotrans Institute for more detailed studies. This two-stage structure allowed for a clearer and more competent solution to the issues of permafrost impact on the future route. If the laboratory studies revealed unfavorable geology, the option of relocating the route structures was considered.

In order to preserve the permafrost properties of soils, a new approach to embankment formation (rock embankment structures – berms and embankment slopes) was applied, and deep cooling technologies with tubular seasonally operating cooling units (SOCU) were used. The construction of rock embankments using this technology is the main cooling method in this region of construction. The necessary effect from its application is achieved due to thermogravitational convection of air in the pores of the rocky soil, shading of the surface under them, reduction of the warming effect of the snow cover.

Special engineering structures such as bridges and overpasses were used to lay the main line across rivers and lakes. At first, there were a large number of temporary structures, which were later replaced by capital ones (such as the Vitimsky bridge). To reduce the risk of erosion and waterlogging of construction sites near water bodies, bank stabilization and reconstruction of water bodies were carried out. Drainage systems were used to control level fluctuations in

rivers and lakes, which are predominantly mountain-fed. Much attention was paid to swampy areas – measures were taken to drain them and drain them [3].

It is also important to note that unlike the Trans-Siberian railway, even temporary transport routes and small settlements were absent in the BAM area before the construction of the railway (as, for example, along the Moskovsky tract near the Trans-Siberian railway under construction). Therefore, along with the railway, temporary and permanent transport routes for motor transport and large construction equipment were built. All this was carried out in the same harsh physical and geographical conditions. Helicopters and airplanes were used to deliver materials to remote parts of BAM, which allowed for prompt and efficient delivery of goods. Water delivery options were used: for example, the logistical capabilities of the lake from Baikal port to Severobaikalsk were utilized.

Special temporary settlements and camps with residential and social facilities were organized for the temporary accommodation of construction workers and laborers. Of course, there was a lack of social and medical infrastructure. Therefore, one of the priority tasks in the construction of capital buildings and structures was to erect medical centers, kindergartens, schools, canteens and other social facilities to meet the needs of workers. It should be noted that these facilities were erected in difficult physical and geographical conditions. New standard residential, commercial and public, social and industrial buildings appeared in the construction sphere, taking into account the peculiarities of soils, terrain and climate. In the future, these and many other construction solutions were used to solve the tasks of constructing new infrastructure facilities in the far north.

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PHONETIC FEATURES OF AMERICAN ENGLISH: MASTERING CERTAIN ASPECTS OF PRONUNCIATION

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Keywords*: American English, pronunciation, consonant, vowel, elision, flap “t”, intonation.*

The United States holds a leading position in global trade and innovation. Proficiency in American English can open career opportunities in numerous industries worldwide. It is the primary language of the internet, media, and international business, making it essential for global connectivity and information access.

Mastering the American pronunciation standard can make a lasting positive impact on all aspects of a learner's life.

In Russia, British English is studied as a foreign language at schools. But unfortunately, little attention is paid to phonetics, and a standard American accent is not taught at schools at all, and that is the problem for those students who plan to use the language in their future professional and personal life.

General American (GA) pronunciation is known to be the pronunciation standard of the USA. There are some reasons for it. GA is the form of speech used by the radio and television. It is mostly used in scientific, cultural and business intercourse.

The main types of American pronunciation.

In the United States there may be distinguished three main regional variants of standard pronunciation:

1) the Eastern type of standard pronunciation;

2) the Southern type of standard pronunciation;

3) the Western (Midwestern, Northern, Central Western) type of standard pronunciation.

The first step of the practical part of our project was to learn the theory on this aspect of pronunciation. We found necessary information in the well-known tutorials on American accent [4, 5, 7].

1. If the *t* is the last letter of a word and it's not followed by a vowel, *the sound gets "cut" or "stopped"* (as if you get ready to pronounce it but stop the sound).

Examples: hot dog, cat, abstract.

2. Elision of t ("heldt").

The *t* is the most commonly "held" consonant in American English and this phenomenon is one of the most distinguishing features of the American accent. Other English accents and non-native speakers usually release the final *t* sound when the next word begins with a consonant.

3. The flap t (or fast d).

The *t* is pronounced as a "flap *t*" or "fast *d*" sound in certain cases. This sound is produced when you quickly tap the tip of the tongue just behind your front teeth when pronouncing it.

Examples: *water* sounds like "wadder", *little* sounds like "liddle", *party* sounds like "pardy", *doctor* sounds like "dokder".

All the examples were analyzed using dictionaries [2, 3] and research on the phonetics of the American version of the English language [6, 8].

The most informative feedback were videos that we got from the natives. They said that my pronunciation is rather good but there are some sounds we should practice more.

Also, a great helper was Cambridge Dictionary Online [1] which we used for listening to the American variant of pronunciation because both variants are available.

While completing the project, we concluded that it is possible to master certain aspects of American pronunciation if you follow a certain plan and use the necessary resources. We have gained useful practical experience, and now we can share it with those who also want to sound like a native American English speaker. The product of our project is a leaflet with recommendations, useful information and resources.

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THE ROLE OF BAM IN THE FORMATION OF TERRITORIAL PRODUCTION COMPLEXES

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Keywords: *Baikal-Amur Mainline, economy, pioneer area, territorial production complex, Trans-Siberian Railway.*

The Baikal-Amur Mainline is a truly important facility, but unfortunately its history and significance are not sufficiently highlighted. Many people think that BAM has no functions other than transport, but they are wrong. BAM influenced the development of the economy of the Far East and the lives of people. In fact, everything that was connected with it in one way or another. Territorial-production complexes have formed around BAM and continue to do so.

TPC (Territorial Production Complex) is an economically interdependent combination of enterprises in one industrial point or the whole district, which achieves a certain economic effect due to the planned selection of enterprises in accordance with natural and economic conditions, transport and economic and geographical location of the territory.

One of the first impulses for the creation of BAM was the creation by P.A. Kropotkin of a general essay "On the orography of Eastern Siberia" with maps and several sections of Eastern Siberia. The next time BAM was thought about was in 1920 in the GOELRO plan. It envisaged the development of transport and the construction of a motorway deep into Siberia. In 1937, finally, the full-scale construction of the main line from Sovetskaya Gavan (the fork of Transsib and BAM) to Taishet began [2].

In the course of design and survey work, the territory of Siberia was divided one way or another into districts: more developed, where the population density is >1 person/km2, and pioneer (underdeveloped), where the population density is <1 person/km2. Of course, BAM is a huge pioneer area; earlier this territory was practically not involved in the economic life of the country. This historical peculiarity determined the character of productive forces location on this territory: mainly the focal type carried out development.

The development of the pioneer territories of the north of Siberia was accompanied by the strengthening of meridional links (from "Zone of the South-2" to "Zone of the North of Siberia-3"). At the same time, the development of the southern territories of Siberia was accompanied by the development of latitudinal (horizontal) development routes (from "Zone of the Urals-1" to "Zone of the South-2") [1].

Today we can say that BAM has had two main stages of its development so far. The first was the development of "transportable" resources, when at first resources were transported from the territory of discovered deposits to the places of their enrichment and primary processing, and the second was the creation of territorial production complexes, including not only extraction, but also primary processing (and later deep processing) directly in the territories connected with the BAM.

Here are examples of the most developed (or promising) territorial production complexes. Ust-Ilimsk timber-industrial complex. A vivid representative of the complex is a full production cycle enterprise – Ilim Group of Companies. Ilim Group includes three largest pulp and paper mills and two modern corrugated plants, as well as Sibgiprobum Design Institute. The company's mills produce 77% of all Russian market pulp, 16% of cardboard and 25% of Russian paper, and 3% of corrugated packaging. The company's total annual production of pulp and paper products is more than 3.63 million tonnes.

The role of BAM: development of the production base, transportation of end products.

Verkhnechonskneftegaz. Joint Stock Company Verkhnechonskneftegaz (JSC VCNG) is developing the Verkhnechonsk oil and gas condensate field. 1.production of hydrocarbon raw materials and geological study of subsoil; 2.development of oil and gas fields; 3.survey, design, construction and installation and other works; 4.oil refining, production and sale of oil products. The role of BAM: development of the production base.

Kholodninskoye deposit. The Kholodninskoye deposit in Severobaikalsky District is the largest lead-zinc deposit in Russia (11.2% of lead reserves, 34.1% of zinc reserves). It is located 36 kilometres from the Kholodnaya River crossing by the Baikal-Amur Mainline. The deposit was discovered in 1968, and from 1969 to 1984 it was explored in detail. Its reserves were approved in 1985 for open pit and underground mining methods in the amount of: ore – 339.5 million tonnes, lead – 2.2 million tonnes, zinc – 14.2 million tonnes. On 28 November 2017, the license (UDE 13040 TE) was terminated by order No. 516 of the Federal Agency for Subsoil Use. We consider this area as a promising TPC, which may get its development after changes in environmental legislation.

The Udokan deposit. A copper deposit located 30 kilometres south of the Novaya Chara railway station in Russia's Trans-Baikal Territory on the Udokan Ridge. The largest in the country and the third largest in the world in terms of copper reserves (about 24.6 million tonnes). The first stage of the mining and smelting plant was launched in 2023. The combined capacity of the first and second stages will be about 40 million tonnes of ore per year. The final products of Udokan Mining and Metallurgical Combine will be copper cathode and sulphide concentrate. BAM's role: development of the production base, transportation of end products.

The Elga coal deposit. The Elga coal deposit is a coking coal deposit, the largest in Russia. It is located in the south-eastern part of Yakutia, 415 km east of

the city of Neryungri and 300 km from the Baikal-Amur Mainline. JORC coal reserves as of 31 December 2011 amounted to 2.2 billion tonnes. In 2022, construction of the 500 km Pacific Railway from the Elga coal deposit to the Elga port under construction on the coast of the Sea of Okhotsk began. In 2023, production was 21 million tonnes, with plans to reach 52 million tonnes by 2027. The role of BAM: development of the production base, transportation of end products.

At the moment, both the BAM and the Trans-Siberian Railway are overloaded, their capacities are insufficient for the development of new fields and the growing volume of transport. These highways are our arteries, and if a blood clot occurs somewhere, it leads to the death of the whole organism. The country has great potential, and this potential can be levelled if the transport infrastructure is not developed. It is worth noting that BAM modernisation alone contributes +4% to the country's gross national product (GDP) and +5.2% to Siberia's GDP.

Thus, BAM has played and continues to play a significant role in the formation of the territorial industrial complex. According to economists and specialists in the field of territorial planning, natural and energy resources of the economic region, access to which is provided by the BAM, determine real prospects for the creation of territorial-production complexes and transport hubs in demand in the Asia-Pacific region.

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MANIFESTATION OF NATIONAL PECULIARITIES OF THE PEOPLES OF THE USSR DURING THE CONSTRUCTION OF RAILWAY STATIONS OF THE BAIKAL-AMUR MAINLINE

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Keywords: *Baikal-Amur Mainline, patronage system, architectural images, architecture.*

The construction of permanent settlements and railway stations of the Baikal-Amur Mainline (BAM) was carried out in the form of patronage assistance of construction teams of the Union Republics, autonomies, territories and regions of the RSFSR. The patronage system was widely used in the Soviet economy before the Baikal-Amur Mainline, for example, in the development of virgin lands, in the development of settlements of the West Siberian oil and gas complex. However, it was during the construction of the Baikal-Amur Mainline that the practice of attracting chiefs reached its peak.

It was a peculiar scheme of resource distribution between the centre and the periphery, when the most affluent cities of the USSR had to ″share″ resources with the new settlements being built on the Baikal-Amur Mainline. On the other hand, the introduction of all-union patronage, which covered representatives of more than 80 nationalities of the USSR, had an ideological aspect. This system was designed to demonstrate the international brotherhood of the USSR peoples united in the construction of the motorway. It is not by chance that the mythologeme "BAM is a construction site of friendship" was widely used in the Soviet press of that time. At the same time, special studies showed that in the national composition of the construction teams of the Baltic and Central Asian

republics the share of representatives of titular ethnic groups was less than 10 per cent [1].

Some republics made commitments to build two or more settlements. For example, the Armenian SSR built the settlements of Zvezdny and Yanchukan, the Azerbaijani SSR – Ulkan and Angoya, the Georgian SSR – Niya and Ikabyu, the Moldavian SSR – Alonka and Dugdu, the Moscow Oblast – Dipkun, Tutaul, Baralus, the Saratov Oblast – Gerbi and Fedkin Klyuch, the Penza Oblast – Amgun and Meunchik, the Sverdlovsk Oblast – Kuvyktu and Khorogochi [2].

In total, 13 Union republics and 22 autonomous administrative units of the RSFSR, including Moscow and Leningrad, were involved in the patronage system for the construction of BAM. At the official level, the full list of sponsored subjects appears for the first time only in the third resolution on the BAM in 1985 when determining the deadlines for the completion of permanent settlements [1].

Today the central structures of any settlement along the BAM – railway stations – remain vivid reminders of the all-union patronage assistance. We will focus on the most striking architectural images of railway stations along the mainline.

Tynda is known as the capital of the Baikal-Amur Mainline. The construction of the city was supported by Moscow. This is reflected in the names of streets such as Moskovsky Boulevard, Moscow Builders Street, Krasnaya Presnya and Profsoyuznaya Streets. The city also has its own Sokolniki and Arbat.

The building of the new railway station (Fig. 1), constructed by Glavmosstroy according to the design of Moscow architects, has become a key element of the city. It is often called the "Tynda Kremlin". The Tynda station is swan-shaped and consists of two symmetrical wings at an angle to the railway tracks and two 48-metre-high towers in the centre. Some people see the building as a giant letter "H", others associate it with a space or air ship.

The Chara railway station (Fig. 2) was created through the efforts of Kazakhs to reflect the cultural and cultural characteristics of their people. This is evidenced by the inscription "Kazakhstan to BAM", which is located under the glass dome on the right side of the building. When designing the station, the architects were inspired by the simple and robust design of a traditional Kazakh yurt, so the central part of the building is made in the shape of a yurt. Kazakh decorative bas-reliefs are used inside the station.

Figure 1. The Tynda railway station

Figure 2. The Chara railway station

The village of Niya began its history as a work camp of BAM builders, consisting of representatives of the Georgian SSR. They set themselves the goal of creating a fully landscaped settlement and station complex that would reflect Georgian traditions. For these purpose artists, chasers, stone-cutters and other specialists were involved [3].

They used dark tuff for the station building, and Georgian wooden carving and metal chasing elements to decorate the waiting rooms. In addition, traditional Georgian wooden carvings and metal chasing were used on the doors and walls of the interior. A monument with the inscriptions "Niya", "Russia" and "Georgia", installed at the entrance to the village from the direction of Ust-Kut, emphasises Niya's connection with Georgia.

The settlement and Alonka station (Fig. 3) in the Amur region were built by a team from Moldova, led by engineer A. Zhilkov, who arrived at BAM on 11

August 1975. In three weeks, they created a temporary settlement and industrial base, including dormitories, a vegetable storehouse, a food warehouse, a bathing and laundry centre and a canteen. The white and red building of the station, considered one of the most impressive in the eastern section of the BAM, is decorated with ornaments depicting a stork with a vine – the symbol of the Moldavian SSR. At the main entrance there is a sculpture of two women leaning on a railway traffic light, which symbolises friendship between the Russian and Moldavian peoples. A sculptural group of three construction workers with the inscription "Alonca - BAM - Kishinev" welcomes passengers arriving at the station [3].

Taksimo station (Fig. 4) has an interesting history connected with Latvian architecture and participation of Latvian builders in its construction. Taksimo railway station, designed by architects A. Kronbergs, E. Treimanis and H. Vasilieva, has become a symbol of this settlement, combining traditional elements of Latvian architecture. Taksimo village is also characterised by traditional five-storey buildings and characteristic "Jurmala cottages", which add uniqueness to its architectural appearance. Interestingly, not only Latvians but also workers from the Belarusian SSR took part in the construction of Taksimo, which is reflected in the name of the neighborhood – BelBAM.

Figure 3. Alonka station

Figure 4. Taksimo station

Of course, these are not all the architectural sights of the railway line. About 200 stations (settlements) were designed and built on the BAM, each of which had a railway station as its central building. Today, the unique images of the BAM railway stations are a trademark of this once all-Union construction project and are of great interest to travelers, researchers and ordinary passengers using the BAM as a transport route.

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BAM: UNIQUE CONSTRUCTION SOLUTIONS

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Keywords: *Baikal-Amur Mainline, engineering structure, bridge, tunnel, train traffic.*

The Baikal-Amur Mainline is a unique railroad construction, more than 4000 km long, which runs through the most picturesque parts of Siberia and the Far East. Along the main line one can find a lot of unique construction objects that amaze with their scale and technical solutions. Among them are railroad bridges, tunnels, viaducts, and tunnels that connect remote areas of Siberia and provide reliable communication between cities and towns.

One of the most famous objects is the bridge over the Amur River, which is one of the longest in Russia and has impressive dimensions. It is also worth paying attention to the Khamar-Daban tunnel, which is built through a mountain range and serves as one of the key facilities on the highway.

The Baikal-Amur Mainline is not only a unique engineering structure, but also a real monument to the history of Siberian railway transportation. Traveling along the main line, one can not only enjoy the majestic scenery, but also appreciate the labor of the builders who overcame many technical difficulties to connect the remote corners of Siberia. Below we have characterized the most famous objects [2].

Vitimsky Bridge (also Kuandinsky Bridge, International Friendship Bridge) – a temporary bridge built in the early 1980s for temporary use by railroad transport during the construction of the permanent railway bridge of the Baikal-Amur Mainline, completed in 1989 [3]. The bridge connects the two banks of the Vitim River and is located on the border of the Kalarsky District of Zabaikalsky Krai (formerly Chita Oblast) near the village of Kuanda and the Muisky District of Buryatia near the village of Vitim (Buryatia). Since 2016, traffic and pedestrians have been officially banned on the Vitim Bridge, but the movement of road transport (including heavy vehicles) across it continues, as there are no other options for transportation support besides the new railway bridge. Its uniqueness lies in the fact that having been erected as a temporary structure (it was never put into operation), it served as a “golden link” for a long time.

The old Severomuyskiy bypass was built as a temporary way to bypass the Severomuyskiy tunnel, which was under construction. In 1982, construction of a temporary bypass along the shortest route between Angarakan and Kazankan stations began. The length of the bypass was 24.6 kilometers, not much longer than the future tunnel. On July 3, 1983, the first train with the road builders crossed the North-Muisky Ridge and arrived at the Muyakan station. The temporary bypass presented a serious obstacle to train traffic: it had extreme gradients of up to 40 %.

The Severomuisky tunnel is the longest railway tunnel in Russia with a length of 5,343 meters [3]. The tunnel construction area is characterized by high seismicity. The tunnel was built from two sides – from the east and from the west. The total length of the tunnel excavations is more than 45 kilometers. To maintain the microclimate, the tunnel is equipped with gates on both sides, which are opened only for the passage of trains. After the construction of the Severomuisky Tunnel was completed, the old bypass was closed, but a new bypass with a unique Itykit bridge was built instead.

The bridge over the Itykit River was built in 1986 and began to be used for train traffic in 1989. It is a 360 m long rounded viaduct, which passes at a height of 35 m above the river. The bridge supports are double-decked, and it is the only artificial structure of such design in Russia. The bridge is feared by drivers because of rumors about its unsavory reputation, and some even baptize before entering it. It is considered one of the most beautiful places on the BAM and attracts many amateur tourists.

One of the largest combined automobile-railroad bridges built in the Soviet Union is the Amursky Bridge. For the first time in the domestic practice of bridge building, the method of piers construction was used at the facility using the technology that excluded caisson foundations. Reinforced concrete shells with a diameter of 3 m were used as a basis for anchoring them using jet-turbine drilling of underwater rocky soil. After sinking to the design level, they were filled with

concrete. The technology of hinged erection of spans on high-strength bolts and the technology of welding of span elements during erection were mastered [1].

The lost craft of granite facing masonry was recreated. By the example of these and other engineering structures we note the uniqueness of the Baikal-Amur Mainline (BAM) project as a whole, which lies in the most difficult for construction natural conditions, extremely concentrated on the terrain. This led to the search for new solutions in construction, which had no analogues not only in the Soviet, but also in world practice.

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THE ROLE OF GENDER IN ADVERTISING FASHION VIDEOS

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This work is dedicated to the study of the influence of gender in advertising fashion videos. The main goal of this paper is studying the influence of gender aspects in making the advertisement.

Research objectives:

1. To give explanations to the terms.
2. To analyze the types of the advertising.
3. To study the concept of gender in marketing.
4. To define the role of gender in advertising.
5. To analyze the advertisement videos via gender concept.

The objective of the study is gender aspects. The subject of this work is advertising fashion videos. The hypothesis of the project assumes that there are two completely different worlds: male and female. In addition, men and women speak different languages and express themselves in different ways. Accordingly, advertisements should be created in different ways.

The relevance of the project is to study the role of gender in advertising, which may help to determine whether it is necessary to use gender aspects in advertising and whether they contribute to a more effective construction of advertising communication.

In the main part the concept of gender, types of advertising and gender aspects were explained and examined, whereas the gender stereotypes were analyzed, supported by the examples from the popular fashion video advertisements [1, 2, 3].

Based on this knowledge, we have identified seven advertisements that we can analyzed via gender concept. Among them: Vision Pro by Apple, Fragrance by Chanel, advertising campaign by Dior, perfumes for men and women by Giorgio Armani, watches by Tissot, fragrance by Valentino. We have analyzed the gender of the customers it is aimed at, the colors used in advertisements, music selection, a call to action and symbols through which gender is expressed.

The results of this paper show that gender is primarily used in advertising to exhibit gender products marketing. How gender is displayed in advertisements creates effective models to react against or emulate naturally.

The practical value of the course work was that the analysis of the role of gender in advertising fashion videos presented in this paper helped us understand that gender plays a large role in advertising and with the help of gender aspects, it is possible to build more effective advertising communication.

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