



**ФОРМИРОВАНИЕ И РАЗВИТИЕ
НОВОЙ ПАРАДИГМЫ НАУКИ
В ЭПОХУ
ПОСТИНДУСТРИАЛЬНОГО ОБЩЕСТВА**

**Сборник статей
Международной научно-практической конференции
25 июля 2026 г.**

АЭТЕРНА
УФА
2026

УДК 00(082) + 001.18 + 001.89
ББК 94.3 + 72.4: 72.5
ISBN 978-5-00249-642-6
Ф 796

ФОРМИРОВАНИЕ И РАЗВИТИЕ НОВОЙ ПАРАДИГМЫ НАУКИ В ЭПОХУ ПОСТИНДУСТРИАЛЬНОГО ОБЩЕСТВА: сборник статей Международной научно-практической конференции (25 июля 2026 г., г. Воронеж). - Уфа: Аэтерна, 2026. – 318 с.

Настоящий сборник составлен по итогам Международной научно-практической конференции «**ФОРМИРОВАНИЕ И РАЗВИТИЕ НОВОЙ ПАРАДИГМЫ НАУКИ В ЭПОХУ ПОСТИНДУСТРИАЛЬНОГО ОБЩЕСТВА**», состоявшейся 25 июля 2026 г. в г. Воронеж. В сборнике статей рассматриваются современные вопросы науки, образования и практики применения результатов научных исследований.

Все материалы сгруппированы по разделам, соответствующим номенклатуре научных специальностей.

Сборник предназначен для широкого круга читателей, интересующихся научными исследованиями и разработками, научных и педагогических работников, преподавателей, докторантов, аспирантов, магистрантов и студентов с целью использования в научной и педагогической работе и учебной деятельности.

Все статьи проходят экспертную оценку. **Точка зрения редакции не всегда совпадает с точкой зрения авторов публикуемых статей.** Статьи представлены в авторской редакции. Ответственность за точность цитат, имен, названий и иных сведений, а так же за соблюдение законов об интеллектуальной собственности несут авторы публикуемых материалов.

При использовании опубликованных материалов в контексте других документов или их перепечатке ссылка на сборник статей научно-практической конференции обязательна.

Полнотекстовая электронная версия сборника размещена в свободном доступе на сайте <https://aeterna-ufa.ru/arh-conf>

Сборник статей постатейно размещён в научной электронной библиотеке elibrary.ru по договору № 242 - 02 / 2014К от 7 февраля 2014 г.

УДК 00(082) + 001.18 + 001.89
ББК 94.3 + 72.4: 72.5
ISBN 978-5-00249-642-6
Ф 796

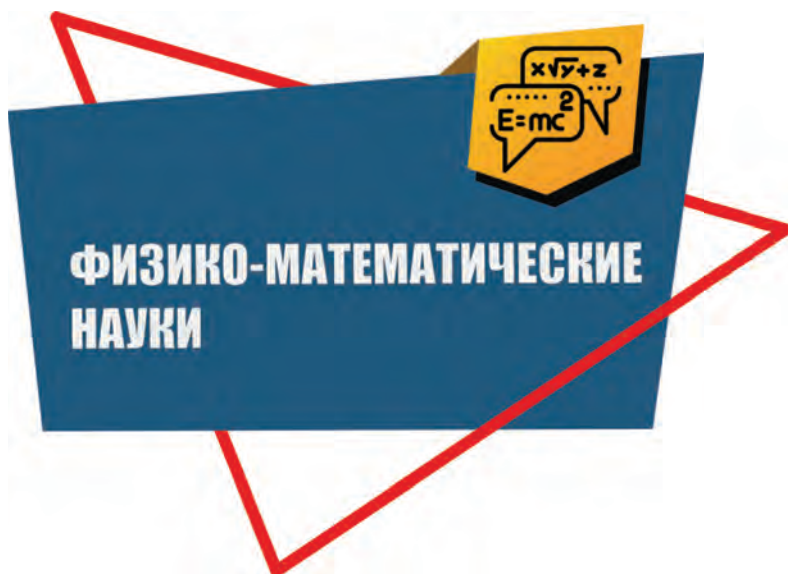
© ООО «АЭТЕРНА», 2026
© Коллектив авторов, 2026

Ответственный редактор:
Сукиясян Асатур Альбертович, к.э.н.

В состав редакционной коллегии и организационного комитета входят:

Абдуллин Тимур Зуфарович, к.т.н.
Абидова Гулмира Шухратовна, д.т.н.
Авазов Сардоржон Эркин угли, д.с. - х.н.
Агафонов Юрий Алексеевич, д.м.н.
Алейникова Елена Владимировна, д.гос.упр.
Алиев Закир Гусейн оглы, д.фил.агр.н.
Андрейчев Алексей Владимирович, к.б.н.
Бабаян Анжела Владиславовна, д.пед.н.
Байшева Зия Вагизовна, д.фил.н.
Байгузина Люза Закиевна, к.э.н.
Булатова Айсылу Ильдаровна, к.соц.н.
Бурак Леонид Чеславович, к.т.н., PhD
Ванесян Ашот Саркисович, д.м.н.
Васильев Федор Петрович, д.ю.н., член РАЮН
Вельчинская Елена Васильевна, д.фарм.н.
Виневская Анна Вячеславовна, к.пед.н.
Габрусь Андрей Александрович, к.э.н.
Галимова Гузалия Абкадировна, к.э.н.
Гетманская Елена Валентиновна, д.пед.н.
Гимранова Гузель Хамидулловна, к.э.н.
Григорьев Михаил Федосеевич, д.с. - х.н.
Грузинская Екатерина Игоревна, к.ю.н.
Гулиев Игбал Адилевич, к.э.н.
Датий Алексей Васильевич, д.м.н.
Долгов Дмитрий Иванович, к.э.н.
Дусматов Абдурахим Дусматович, к. т. н.
Ежкова Нина Сергеевна, д.пед.н.,
Екшикеев Тагер Кадырович, к.э.н.
Епхиева Марина Константиновна, к.пед.н.
Ефременко Евгений Сергеевич, к.м.н.
Закиров Мунавир Закиевич, к.т.н.
Зарипов Хусан Баходирович, PhD.
Иванова Нионила Ивановна, д.с. - х.н.
Калужина Светлана Анатольевна, д.х.н.
Канарейкин Александр Иванович, к.т.н.
Касимова Дилара Фаритовна, к.э.н.
Киракосян Сусана Арсеновна, к.ю.н.
Киркимбаева Жумагуль Слямбековна, д.вет.н.
Кленина Елена Анатольевна, к.филос.н.
Клещина Марина Геннадьевна, к.э.н.,
Козлов Юрий Павлович, д.б.н.,
Кондрашин Андрей Борисович, д.э.н.
Кониовская Наталья Олеговна, к.э.н.

Конопацкова Ольга Михайловна, д.м.н.
Куликова Татьяна Ивановна, к.псих.н.
Курбанаева Лилия Хамматовна, к.э.н.
Курманова Лилия Рашидовна, д.э.н.
Ларионов Максим Викторович, д.б.н.
Мальшикина Елена Владимировна, к.и. н.
Маркова Надежда Григорьевна, д.пед.н.
Мещерякова Алла Брониславовна, к.э.н.
Мухамалеева Зинфира Фанисовна, к.соц.н.
Мухамедова Гулчехра Рихсибаевна, к.пед.н.
Набиев Тухтамурод Сахобович, д.т.н.
Нурдавлятова Эльвира Фанизовна, к.э.н.
Песков Аркадий Евгеньевич, к.полит.н.
Половения Сергей Иванович, к.т.н.
Пономарева Лариса Николаевна, к.э.н.
Почивалов Александр Владимирович, д.м.н.
Прошин Иван Александрович, д.т.н.
Равшанов Махмуд, д.филол. н.
Саттарова Рано Кадыровна, к.биол.н.,
Сафина Зия Закировна, к.э.н.
Симонович Надежда Николаевна, к.псих. н.
Симонович Николай Евгеньевич, д.псих. н.
Сирик Марина Сергеевна, к.ю.н.
Смирнов Павел Геннадьевич, к.пед.н.
Старцев Андрей Васильевич, д.т.н.
Танаева Замфира Рафисовна, д.пед.н.
Терзиев Венелин Кръстев, д.э.н., член РАЕ
Трифоновна Елена Николаевна, к.э.н.
Умаров Бехзод Тургунпулатович, д.т.н.
Хайров Расим Золимхон угли, к.пед.н.
Хамзаев Иномжон Хамзаевич, к. т. н.
Хасанов Сайдинаби Сайдивалиевич, д.с. - х.н.
Чернышев Андрей Валентинович, д.э.н.
Чиладзе Георгий Бидзинович, д.э.н., д.ю.н.
Шилкина Елена Леонидовна, д.соц.н.
Шкирмонтов Александр Прокопьевич, д.т.н.
Шляхов Станислав Михайлович, д.физ. - мат.н.
Шошин Сергей Владимирович, к.ю.н.
Юсупов Рахмьян Галимьянович, д.и. н.
Яковичина Татьяна Федоровна, д.т.н.
Янгиров Азат Вазирович, д.э.н.
Яруллин Рауль Рафаэлович, д.э.н., член РАЕ



Standard by 8.6–15.0 times for level A and 3.44–6.01 times for level B. Total P The majority exceeded level A by 1.2 to 57.8 times and exceeded level B by 1.53 to 19.3 times.

+ *Rainy season*: By comparing the surface water environmental monitoring values from the monitoring periods of 2018 to 2023 during the rainy season on the main channel of the Se San River according to QCVN 08:2023 / BTNMT, it was found that: The parameters DO, NH_4^+ And Coliform levels at most locations were within the A and A limits. According to QCVN 08:2023 / BTNMT, the parameters BOD5, COD, Total N, Total Fe, and Total P mostly exceeded the limits at levels A and B according to QCVN 08:2023 / BTNMT, with the number of times exceeding level B ranging from 2.37 to 21 times. In particular, the highest value of Total N was 8.29 mg / l, exceeding the permissible level B by 5.53 times, measured at location S_{PC2} during the monitoring period of March 2020, and Total Fe was 21 times at location S_{PK5} during the monitoring period of June 2022.

Acknowledgments: *This research was conducted as part of the results of the basic - level science and technology project coded T26 - 33. The authors would like to express their sincere gratitude to the project.*

References

1. Law on Environmental Protection No. 72 / 2020 / QH14 dated November 17, 2020.
2. Law on Water Resources No. 17 / 2012 / QH13 dated June 21, 2012.
3. Decree No. 08 / 2022 / ND - CP dated January 10, 2022 of the Government detailing a number of articles of the Law on Environmental Protection.
4. Decree No. 02 / 2023 / ND - CP dated February 1, 2023 of the Government detailing the implementation of a number of articles of the Law on Water Resources;
5. Kon Tum Provincial Department of Natural Resources and Environment. Water resource planning in Kon Tum province up to 2025, with orientation to 2035, 2017.
6. Kon Tum Provincial Department of Natural Resources and Environment. Kon Tum Province Environmental Report from 2018 to 2022.
7. Kon Tum Provincial Department of Natural Resources and Environment. Current environmental status of Kon Tum province, 2016 - 2020, 2020.

© Nguyen T.H., Dang T.N.T, Vu T.L.A., Tran T.N., 2026

УДК 52

Nguyen Thi Hong

Faculty of Environment, Hanoi University of Mining and Geology

Dao Trung Thanh

Faculty of Environment, Hanoi University of Mining and Geology

GIS - BASED SPATIAL ASSESSMENT OF AIR QUALITY IN LANG SON PROVINCE, VIETNAM

Abstract

Spatial assessment of air quality is essential for identifying pollution hotspots and supporting environmental management, particularly in regions with limited monitoring coverage. This study applied Geographic Information Systems (GIS) and the Inverse Distance Weighting (IDW) interpolation method to map the spatial distribution of ambient air quality in Lang Son Province, Vietnam, during the dry and rainy seasons of 2025. Air quality data were collected from 23

monitoring sites, including total suspended particulates (TSP), PM₁₀, SO₂, NO₂, and other key pollutants. The results indicated that the concentrations of most monitored pollutants complied with the Vietnamese National Technical Regulation on Ambient Air Quality. However, relatively high concentrations of particulate matter were observed at several locations near major roads, border gates, markets, industrial zones, industrial clusters, and mining areas, suggesting localized rather than widespread air pollution. The GIS - based spatial maps effectively identified areas with elevated pollution levels and provided an intuitive representation of seasonal air quality patterns. The findings demonstrate that GIS combined with IDW is a practical tool for regional air quality assessment and can provide useful scientific information to support environmental monitoring, pollution control, and sustainable environmental management in Lang Son Province.

Keywords

Air quality assessment, GIS, IDW, Spatial interpolation, Environmental monitoring.

1. Introduction

Air pollution has become one of the most important environmental challenges worldwide due to its adverse impacts on human health, ecosystems, and sustainable development. Rapid urbanization, industrial expansion, increasing energy consumption, and transportation activities have significantly increased the emissions of particulate matter (PM), nitrogen dioxide (NO₂) and sulfur dioxide (SO₂), resulting in the deterioration of ambient air quality in many regions. According to the World Health Organization (WHO), long - term exposure to air pollutants is associated with respiratory and cardiovascular diseases, premature mortality, and reduced quality of life. In addition to health impacts, air pollution affects agricultural productivity, ecosystem functions, and climate change through complex atmospheric processes. Consequently, improving air quality has become an important component of sustainable environmental management and is closely related to the achievement of several United Nations Sustainable Development Goals, particularly those concerning public health, sustainable cities, and climate action.

Geographic Information Systems (GIS) have become one of the most widely used tools for spatial analysis and visualization of environmental data. In air quality studies, GIS provides an effective platform for integrating monitoring observations with spatial information, generating continuous distribution maps, and supporting environmental management. Because monitoring stations are usually limited in number and unevenly distributed, GIS - based spatial interpolation techniques are frequently applied to estimate pollutant concentrations and AQI values at unmonitored locations. Among these methods, Inverse Distance Weighting (IDW) and Ordinary Kriging (OK) are the most commonly used approaches due to their ability to transform discrete monitoring data into continuous spatial information.

During the past decade, GIS applications in air quality assessment have developed from simple pollutant mapping to more comprehensive spatial analyses. Kanakiya et al. (2015) compared several interpolation techniques for mapping urban air pollutants in India and reported that GIS - based interpolation effectively represented the spatial variability of air pollution under limited monitoring conditions. Later, Vaddiraju (2019) emphasized the role of GIS in identifying pollution hotspots and supporting environmental management, while Jumaah et al. (2019) integrated GIS with statistical analysis to improve AQI prediction. Kamboj et al. (2022) evaluated the performance of IDW and Ordinary Kriging for mapping PM₁₀, SO₂, and NO₂ concentrations and found that both methods showed good agreement with observed monitoring data, demonstrating their applicability for regional air quality assessment. More recently, Afghan et al. (2022) used GIS to evaluate the spatial and seasonal variation of AQI in Kabul, highlighting the importance of spatial analysis in

areas with limited monitoring stations. Other recent studies, including those by Issa and Saqer (2024) and Abdulkareem et al. (2025), further confirmed that GIS - based interpolation remains an effective approach for environmental assessment, while recent developments increasingly integrate GIS with meteorological variables, remote sensing data, and statistical or machine learning models to improve prediction accuracy and spatial representation of air quality.

Although these studies demonstrate the considerable potential of GIS for air quality assessment, most have been conducted in large cities or industrial regions where monitoring networks are relatively dense. Comparatively fewer studies have focused on mountainous regions or border areas, where complex topography and limited monitoring infrastructure present additional challenges for accurately representing the spatial distribution of air quality.

In Vietnam, GIS has been increasingly applied in environmental monitoring and air quality assessment during recent years. Previous studies have demonstrated the usefulness of GIS for visualizing pollution patterns, integrating monitoring data, and supporting environmental management in urban and industrial areas. Research by Nghiem Trung Dung et al. (2012) contributed to the development of GIS - based environmental information systems for managing air quality data, while studies by Nguyen Thi Thanh Tram et al. (2014) and Dang Vu Khac and Nguyen Thi Van Anh, (2020) applied GIS techniques to evaluate spatial variations of air pollution in major Vietnamese cities. These studies confirmed that GIS can effectively improve the representation of air quality conditions compared with conventional point - based assessments. Duong Thi Loi et al. (2022) and Tran Hai Dang et al. (2024) further explored GIS applications for environmental assessment and spatial analysis, emphasizing the importance of geospatial information for environmental planning and pollution control. In addition, Pham Quy Giang et al. (2024) highlighted the role of GIS in supporting environmental management through the integration of monitoring data and spatial information systems.

Despite these advances, several limitations remain in the current body of research in Vietnam. First, most studies have focused on major urban centers or highly industrialized regions, whereas mountainous provinces and border areas have received considerably less attention. Second, many studies have primarily reported air quality monitoring results at individual sampling locations, while relatively few have examined the spatial distribution of ambient air pollutants using GIS. Third, spatial analyses based on GIS interpolation remain limited in regions with complex topography, where variations in terrain and emission sources may influence pollutant distribution. Finally, the sparse and uneven distribution of air quality monitoring stations in many provinces restricts the ability to characterize regional spatial patterns using point - based observations alone. These limitations highlight the need for GIS - based approaches to improve the visualization and interpretation of the spatial distribution of air pollutants in areas with limited monitoring data.

These limitations are particularly relevant to Lang Son province, a mountainous border province in northeastern Vietnam. The province is characterized by complex topography, including mountainous terrain, valleys, and large elevation gradients, which may influence the spatial distribution of air pollutants. Air quality in the region is affected by various emission sources, including road transportation, urban activities, industrial production, and mineral exploitation. However, studies providing spatial visualization of ambient air pollutant concentrations using GIS remain limited, restricting the availability of spatial information for environmental assessment and air quality management.

Therefore, this study aims to evaluate the spatial distribution of ambient air pollutants in Lang Son province using GIS - based interpolation. Concentrations of TSP, PM₁₀, NO₂, and SO₂ were interpolated using the IDW method to generate spatial distribution maps. The resulting maps provide a visual representation of the spatial variability of these pollutants, identify areas with relatively elevated concentrations, and support the assessment of potential relationships between

pollutant distribution and major emission sources. Rather than developing a new interpolation algorithm, this study demonstrates the application of a widely used GIS technique for spatial analysis of air quality monitoring data in a mountainous border province with a limited monitoring network. The results provide useful spatial information to support environmental monitoring, pollution assessment, and air quality management in Lang Son province and may serve as a reference for similar mountainous regions in Vietnam.

2. Materials and methods

2.1. Study area

Lang Son province is a mountainous province located in northeastern Vietnam. The province covers approximately 8,310 km² and is characterized by complex mountainous terrain and a tropical monsoon climate with distinct dry and rainy seasons. As a major gateway for cross - border trade between Vietnam and China, Lang Son experiences high traffic volumes around border gates and major transportation corridors. Air quality in the province is influenced by multiple emission sources, including road traffic, border trade activities, industrial production, and mineral exploitation.

Ambient air quality was monitored at 23 sampling sites distributed across the province (from KK01 (X: 2424447; Y: 438994) to KK23 (X: 2430366; Y: 440499)). The monitoring locations were georeferenced using the VN - 2000 coordinate reference system (Transverse Mercator projection, 3° zone, central meridian 107°15'E) (Fig 1), representing major urban, industrial, transportation, border - gate, and mining areas.

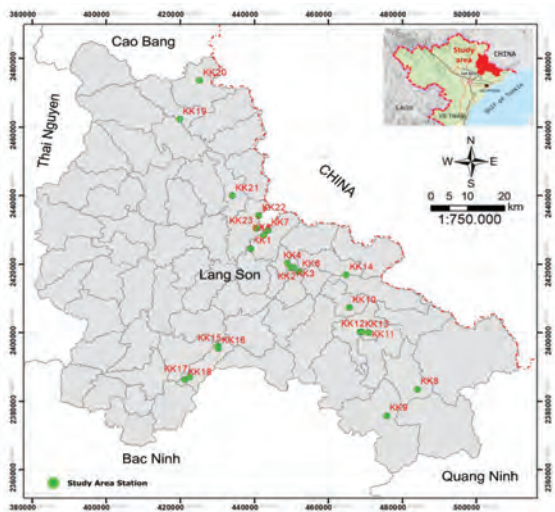


Fig 1. Location of sampling sites in the Lang Son Province, Vietnam

2.2. Spatial mapping of air quality

Spatial air quality maps were developed by integrating geospatial and monitoring datasets within the GIS environment. The geospatial database comprised administrative boundaries, monitoring locations, and air quality observations, while the attribute database contained pollutant concentrations measured at the 23 monitoring sites during the dry and rainy seasons of 2025. Prior to spatial analysis, all datasets were standardized using the VN - 2000 coordinate reference system (Transverse Mercator projection, 3° zone, central meridian 107°15'E) to ensure spatial consistency.

The spatial distribution of ambient air pollutants, including TSP, PM₁₀, SO₂, and NO₂, was first visualized using graduated symbols to illustrate the relative variation in pollutant concentrations among monitoring locations. Subsequently, continuous distribution maps were generated using the IDW interpolation method implemented in ArcGIS. IDW is a deterministic interpolation technique that estimates values at unsampled locations based on the weighted average of neighboring observations, assuming that points closer to the prediction location exert greater influence than those farther away (Ware et al., 1991; Bartier and Keller, 1996). The interpolated value at an unknown location is calculated as:

$$X = \frac{\sum_{i=1}^n W_i X_i}{\sum_{i=1}^n W_i} = \frac{\sum_{i=1}^n X_i d_i^{-\beta}}{\sum_{i=1}^n d_i^{-\beta}} \quad (1)$$

where X is the estimated value at the unknown location, X_i is the observed value at the i th monitoring site, W_i is the distance - based weight, n is the number of neighboring sampling points, d_i is the distance between the prediction location and the i th sampling point, and β is the distance exponent controlling the influence of neighboring observations. In this study, the commonly adopted value of $\beta = 2$ was used, assigning greater influence to nearby observations while gradually reducing the contribution of more distant points.

The resulting interpolation surfaces were classified according to the concentration ranges of each pollutant and compared with the limits specified in the Vietnamese National Technical Regulation on Ambient Air Quality (QCVN 05:2023 / BTNMT). The generated thematic maps were used to identify spatial patterns, pollution hotspots, and seasonal variations in air quality across Lang Son province. This GIS - based mapping approach provides an effective means of transforming discrete monitoring observations into continuous spatial information, thereby supporting environmental assessment and air quality management at the provincial scale.

3. Results and discussion

3.1. Spatial distribution of air pollutants during the rainy season

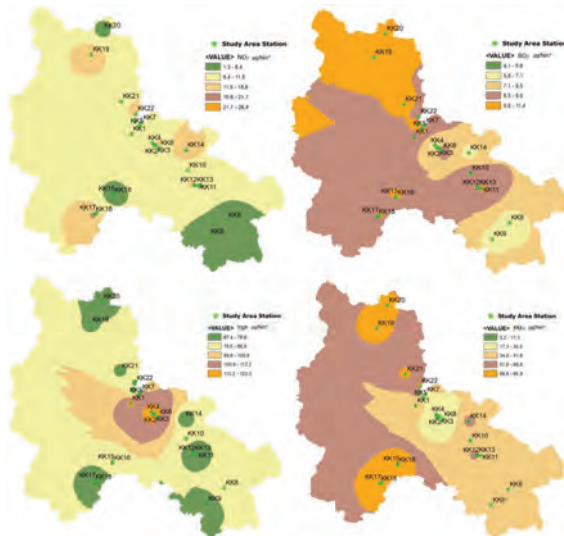


Fig 2. GIS - based IDW interpolation maps of TSP, PM₁₀, SO₂, and NO₂ concentrations during the rainy season in Lang Son province, Vietnam

The concentrations of TSP, PM₁₀, SO₂, and NO₂ measured at the 23 monitoring sites during the rainy season were all below the limits specified in the QCVN 05:2023 / BTNMT, indicating that the overall air quality remained relatively good during the monitoring period. However, the GIS - based IDW interpolation revealed noticeable spatial heterogeneity, with localized areas exhibiting relatively higher pollutant concentrations than the surrounding regions.

TSP concentrations ranged from 67.43 to 123.34 $\mu\text{g} / \text{Nm}^3$, with an average value of 86.97 $\mu\text{g} / \text{Nm}^3$, substantially lower than the 24 - hour regulatory limit of 200 $\mu\text{g} / \text{Nm}^3$. The highest concentration was recorded at KK4, followed by KK3, KK1, KK2, and KK6, whereas the lowest concentration occurred at KK14. The IDW interpolation identified a persistent high - concentration zone in the northern part of the province, particularly around Cao Loc district. These monitoring locations are situated near industrial clusters, brick manufacturing facilities, cement production plants, and major transportation corridors. The observed spatial pattern therefore likely reflects the combined influence of industrial activities, construction material handling, heavy - duty vehicle traffic, and road dust resuspension. Conversely, mountainous and less - developed areas exhibited considerably lower TSP concentrations, indicating relatively limited anthropogenic emissions.

PM₁₀ concentrations varied more markedly than TSP, ranging from 19.40 to 85.94 $\mu\text{g} / \text{Nm}^3$ at quantified sites, while PM₁₀ was not detected at KK2. The mean concentration of quantified samples was 53.46 $\mu\text{g} / \text{Nm}^3$, remaining well below the Vietnamese standard of 100 $\mu\text{g} / \text{Nm}^3$. Elevated PM₁₀ concentrations were mainly observed at KK15, KK19, KK18, KK16, KK22, and KK21. The IDW map showed several localized hotspots extending across Chi Lang, Trang Dinh, and Van Lang districts, particularly around commercial centers, border gates, railway facilities, industrial areas, and major road intersections. These areas experience relatively intensive freight transport, commercial activities, and vehicle movement, which are likely to enhance dust resuspension and particulate emissions. Nevertheless, the absence of concentrations exceeding the national standard suggests that particulate pollution remained localized rather than regionally extensive.

SO₂ concentrations were consistently low throughout the study area, ranging from 4.09 to 11.43 $\mu\text{g} / \text{Nm}^3$, with an average of 9.08 $\mu\text{g} / \text{Nm}^3$, representing only a small fraction of the regulatory limit. The IDW interpolation displayed a relatively homogeneous spatial pattern without pronounced hotspots. Slightly higher concentrations appeared around KK23, KK20, KK11, KK5, and KK21, which are characterized by residential settlements, transportation routes, and commercial activities. The relatively uniform distribution indicates that sulfur emissions from industrial and transportation sources were limited during the rainy season, while wet deposition associated with seasonal precipitation likely contributed to reducing atmospheric SO₂ concentrations.

NO₂ concentrations ranged from 1.22 to 26.83 $\mu\text{g} / \text{Nm}^3$, with a mean value of 9.35 $\mu\text{g} / \text{Nm}^3$, remaining substantially below the national standard. The highest concentration occurred at KK3, followed by KK18, KK12, KK14, and KK22. According to the IDW map, relatively high NO₂ concentrations were concentrated around industrial areas, mining sites, tourist access routes, and border trade zones. Because NO₂ is primarily emitted from combustion processes, the observed distribution is consistent with the spatial distribution of traffic density, industrial operations, and mining - related activities. Overall, the rainy - season results indicate that although pollutant concentrations complied with regulatory standards, localized emission sources produced distinct spatial patterns that were effectively captured by the GIS - based interpolation.

3.2. Spatial distribution of air pollutants during the dry season

Air pollutant concentrations measured during the dry season also complied with QCVN 05:2023 / BTNMT, indicating that ambient air quality remained generally acceptable across Lang Son province. Compared with the rainy season, however, several pollutants exhibited moderately higher

concentrations and more distinct spatial clustering, suggesting a stronger influence of local emission sources under less favorable atmospheric dispersion conditions.

TSP concentrations ranged from 79.43 to 109.89 $\mu\text{g} / \text{Nm}^3$, with an average concentration of 94.43 $\mu\text{g} / \text{Nm}^3$. The highest concentration was observed at KK6, followed by KK3, KK2, KK1, and KK4, whereas the lowest concentration occurred at KK23. The IDW map indicated that elevated TSP levels remained concentrated in Cao Loc district, demonstrating a relatively stable spatial pattern between seasons. Although concentrations increased slightly compared with the rainy season, they remained well below the Vietnamese regulatory limit. The persistence of this hotspot suggests that industrial production, construction material handling, and transportation activities continue to dominate the spatial distribution of suspended particulate matter regardless of seasonal variation.

PM_{10} concentrations ranged from 16.84 to 91.89 $\mu\text{g} / \text{Nm}^3$ at quantified locations, while KK2 and KK14 recorded non - detectable concentrations. The highest value was measured at KK19, followed by KK15, KK20, KK17, KK16, KK18, KK21, and KK22. Compared with the rainy season, the IDW interpolation revealed a more continuous high - concentration belt extending across Chi Lang, Trang Dinh, and Van Lang districts. These areas include major transportation routes, border gates, railway facilities, industrial zones, and commercial centers where freight transport and logistics activities are concentrated. Reduced precipitation and drier surface conditions during the dry season may have enhanced dust resuspension, contributing to the expansion of PM_{10} hotspots despite concentrations remaining below the regulatory threshold.

SO_2 concentrations ranged from 7.21 to 17.72 $\mu\text{g} / \text{Nm}^3$, with a mean value of 12.49 $\mu\text{g} / \text{Nm}^3$, slightly higher than those observed during the rainy season. The highest concentration occurred at KK10, followed by KK11, KK9, KK16, and KK13. The IDW map showed a modest increase in SO_2 across the Loc Binh-Na Duong area and several transportation corridors. Although these locations are influenced by residential activities, transportation, and nearby mining operations, SO_2 concentrations remained far below the national standard, indicating limited sulfur - related air pollution.

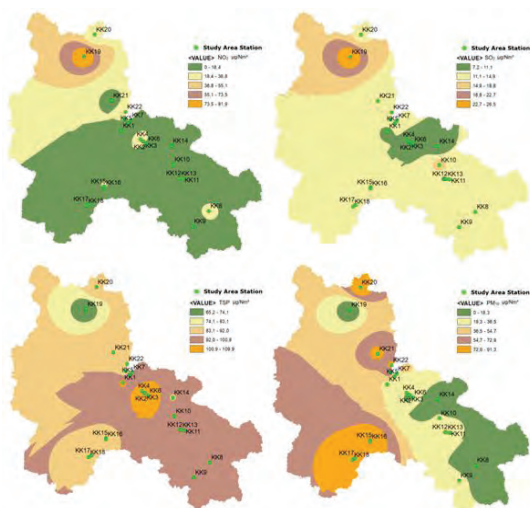


Fig 3. GIS - based IDW interpolation maps of TSP, PM_{10} , SO_2 , and NO_2 concentrations during the dry season in Lang Son Province, Vietnam

NO₂ concentrations ranged from 0.015 to 33.30 µg / Nm³, while no detectable concentrations were recorded at KK13 and KK14. The average concentration of quantified samples increased to 16.91 µg / Nm³, with the highest concentration observed at KK22, followed by KK19, KK3, KK2, KK20, and KK15. The IDW interpolation identified clear NO₂ hotspots around the Tan Thanh border gate, urban centers, industrial areas, and transportation hubs. These spatial patterns are consistent with the distribution of combustion - related emission sources, particularly heavy - duty vehicles, freight transportation, and logistics activities associated with cross - border trade. Nevertheless, all observed concentrations remained substantially below the Vietnamese air quality standard.

3.3. Discussion

The GIS - based IDW interpolation successfully characterized the spatial variability of ambient air quality across Lang Son province and complemented the point - based monitoring results. Although all measured concentrations satisfied QCVN 05:2023 / BTNMT, the interpolation maps consistently identified localized hotspots associated with industrial areas, transportation corridors, border gates, mining activities, and commercial centers. These findings indicate that current air pollution in Lang Son is primarily localized rather than regionally widespread.

Among the investigated pollutants, PM₁₀ exhibited the greatest spatial variability, followed by TSP and NO₂, whereas SO₂ showed the most homogeneous distribution. This pattern reflects differences in emission sources and atmospheric behavior. Particulate pollutants are strongly affected by road dust resuspension, construction activities, mineral exploitation, and freight transportation, while NO₂ is mainly associated with fuel combustion from vehicles and industrial operations. In contrast, the relatively low SO₂ concentrations suggest limited sulfur emissions and effective atmospheric removal processes.

Seasonal differences were also evident. Concentrations of TSP, SO₂, and NO₂ generally increased during the dry season, and the spatial extent of PM₁₀ hotspots became more pronounced. These changes are likely related to reduced rainfall, weaker wet deposition, and enhanced dust resuspension under drier conditions. Despite these seasonal variations, none of the monitored pollutants exceeded the national ambient air quality standards, indicating that air quality remained generally acceptable during the study period.

Overall, this study demonstrates that integrating routine monitoring data with GIS - based IDW interpolation provides an effective approach for visualizing spatial patterns of air pollution and identifying localized areas potentially affected by anthropogenic activities. The generated air quality maps provide useful baseline information for environmental management, monitoring network optimization, and future air quality assessment in mountainous border provinces such as Lang Son.

4. Conclusion

This study applied GIS and the IDW interpolation method to evaluate the spatial distribution of ambient air quality across Lang Son Province, Vietnam, using monitoring data collected at 23 sampling sites during the rainy and dry seasons of 2025. Concentrations of TSP, PM₁₀, SO₂, and NO₂ at all monitoring locations complied with the limits specified in QCVN 05:2023 / BTNMT, indicating that the overall air quality remained within acceptable levels during the study period. Nevertheless, the IDW interpolation revealed distinct spatial heterogeneity, with localized hotspots consistently associated with transportation corridors, border gates, industrial clusters, commercial areas, and mining - related activities. Seasonal comparison indicated slightly higher concentrations

of several pollutants during the dry season, reflecting the influence of meteorological conditions on pollutant dispersion and accumulation. The integration of routine monitoring data with GIS - based spatial analysis proved effective for visualizing air pollution patterns and identifying areas requiring greater management attention. The resulting air quality maps provide a useful baseline for environmental monitoring, spatial planning, and future air quality management in Lang Son Province and other mountainous border regions of Vietnam.

Acknowledgment: This research was funded by the project with the title of “Application of AirPhyNet to Improve Air Quality Forecasting in the Northeastern Region of Lang Son Province. Code T26 - 34”.

REFERENCES

1. Kanakiya R.S., Singh S.K., Shah U., (2015). GIS Application for Spatial and Temporal Analysis of the Air Pollutants in Urban Area. *International Journal of Advanced Remote Sensing and GIS*, 4(1), 1120 - 1129. DOI:10.23953 / cloud.ijarsg.102
2. Vaddiraju S.C., (2019). Mapping of Air Pollution Using GIS: A Case Study of Hyderabad. *International Journal of Research in Advent Technology*, 7(5), 482 - 487. DOI:10.32622 / ijratt.752019328.
3. Jumaah H.J., Ameen M.H., Kalantar B., Rizzei H.M., Jumaah S.J., (2019). Air quality index prediction using IDW geostatistical technique and OLS - based GIS technique in Kuala Lumpur, Malaysia. *Geomatics Natural Hazards and Risk*, 10(1), 2185–2199. DOI:10.1080 / 19475705.2019.1683084
4. Kamboj K., Sisodiya S., Mathur A.K., Zare A., Verma P., (2022). Assessment and Spatial Distribution Mapping of Criteria Pollutants. *Water Air Soil Pollution*, 233(82), 15. DOI:10.1007 / s11270 - 022 - 05522 - y
5. Afghan F.R., Habib H., Akhunzada N.A., Wafa W, Shirzad M.D., Sahak K., Hashimi S.K., Mujeeb M., Wardak K., Ahmadzai M.R., (2022). Customization of GIS for spatial and temporal analyses of Air Quality Index trends in Kabul city. *Modeling Earth Systems and Environment*, 8, 5097–5106. DOI:10.1007 / s40808 - 022 - 01396 - 5
6. Issa S., Saqer R., (2024). Assessment of air quality in Abu Dhabi Emirate, UAE using geoinformatics. *Seventh International Conference on Engineering Geophysics*, Al Ain, UAE, iceg2023 - 013.1, pp. 60 - 64. DOI:10.1190 / iceg2023 - 013.1
7. Abdulkareem S.K., Alhadithi M., Amer W., (2025). Evaluating of spatial interpolation techniques for accurate air quality prediction: an overview. *E3S Web of Conferences*, 633, 07008. DOI:10.1051 / e3sconf / 202563307008
8. Nghiem Trung Dung, Dinh Thu Hang, Nguyen Thanh Duong, (2012). Application of the Air Quality Index (AQI) for Air Quality Management. *Journal of Hydro - Meteorology*, 613, 13–17.
9. Nguyen Thi Thanh Tram, Bui Ta Long, Pham Ngoc Dang, Bui Su Ly, (2014). Assessment of Ambient Air Quality in Hanoi City Using the Air Quality Index (AQI). *Journal of Hydro - Meteorology*, 638, 43–50.
10. Dang Vu Khac, Nguyen Thi Van Anh, (2020). Application of air quality index and inverse distance weighting for mapping the distribution of air pollution at several urban districts of hanoi city. *Journal of Science: Natural Science*, 65(10), 189 - 200. DOI:10.18173 / 2354 - 1059.2020 - 0063

СОДЕРЖАНИЕ

ФИЗИКО-МАТЕМАТИЧЕСКИЕ НАУКИ

Борисков К. Ф., Елисеев М. Е. ТРАНСФОРМАЦИЯ ЭПИСТЕМОЛОГИЧЕСКИХ ОСНОВАНИЙ ФИЗИКО - МАТЕМАТИЧЕСКИХ НАУК В ЭПОХУ ЦИФРОВИЗАЦИИ: ОТ ДЕТЕРМИНИРОВАННОГО ХАОСА К ВЫЧИСЛИТЕЛЬНОМУ МЫШЛЕНИЮ	5
--	---

Федий Г.Л. АНАЛИЗ ОЦЕНКИ ВЛИЯНИЯ ШУМОВОГО ВОЗДЕЙСТВИЯ ПРИАЭРОДРОМНОЙ ТЕРРИТОРИИ	7
---	---

ТЕХНИЧЕСКИЕ НАУКИ

Галкин А.А., Шперов И.А. РЕКОМЕНДАТЕЛЬНЫЕ СИСТЕМЫ НА ОСНОВЕ НЕЙРОСЕТЕЙ	11
---	----

Галкин А.А., Шперов И.А. НЕЙРОННЫЕ СЕТИ В КРЕДИТНОМ СКОРИНГЕ И ОЦЕНКЕ КРЕДИТОСПОСОБНОСТИ ЗАЕМЩИКОВ	14
--	----

Галкин А.А., Шперов И.А. НЕЙРОННЫЕ СЕТИ В ЗАДАЧАХ ПРОГНОЗИРОВАНИЯ И МАССОВОЙ ОЦЕНКИ РЫНОЧНОЙ СТОИМОСТИ НЕДВИЖИМОСТИ	18
---	----

Галкин А.А., Шперов И.А. МАШИННОЕ ОБУЧЕНИЕ ДЛЯ ВЫЯВЛЕНИЯ АНОМАЛИЙ В ТЕЛЕМЕТРИИ НАСОСНЫХ СТАНЦИЙ И РАННЕГО ПРЕДУПРЕЖДЕНИЯ АВАРИЙ НА ОБЪЕКТАХ ВОДОСНАБЖЕНИЯ	23
---	----

Галкин А.А., Шперов И.А. ПРОГНОЗИРОВАНИЕ КАЧЕСТВА ВОЗДУХА В ГОРОДАХ: НЕЙРОСЕТЕВЫЕ МОДЕЛИ НА ОСНОВЕ ДАННЫХ МОНИТОРИНГА И МЕТЕОПАРАМЕТРОВ	28
--	----

Гальцев Ю.М. СИСТЕМЫ БЕЗОПАСНОСТИ СОВРЕМЕННОГО АВТОМОБИЛЯ	33
--	----

Гальцев Ю.М. АНАЛИЗ КОНСТРУКТИВНЫХ ОСОБЕННОСТЕЙ СОВРЕМЕННЫХ ФОРСУНОК И ПРИНЦИП РАБОТЫ	35
---	----

Гальцев Ю.М. АНАЛИЗ ПОДГОТОВКИ И ИСПОЛЬЗОВАНИЯ АКБ В АРКТИЧЕСКИХ ЗОНАХ	37
--	----

Гальцев Ю.М. АНАЛИЗ ТЕХНОЛОГИЧЕСКИХ ПРОЦЕССОВ ВПРЫСКА ТОПЛИВА	40
--	----

Гальцев Ю.М. КОНСТРУКТИВНЫЕ ОСОБЕННОСТИ, ПРИНЦИП РАБОТЫ МАГИСТРАЛЬНОГО ТНВД	42
Гальцев Ю.М. КОНСТРУКТИВНЫЕ ОСОБЕННОСТИ, ПРИНЦИП РАБОТЫ РАСПРЕДЕЛИТЕЛЬНОГО ТНВД	44
Гальцев Ю.М. МАСЛА ДЛЯ ДВИГАТЕЛЕЙ ВНУТРЕННЕГО СГОРАНИЯ И ПРАВИЛА ИХ ИСПОЛЬЗОВАНИЯ	46
Гальцев Ю.М. ОСОБЕННОСТИ ПОДБОРА АКБ ПО ПАРАМЕТРАМ ПУСКОВОГО ТОКА	48
Главчук С.А. ИНТЕНСИФИКАЦИЯ ПРОЦЕССОВ КОАГУЛЯЦИИ ДЛЯ ПОДГОТОВКИ ПИТЬЕВОЙ ВОДЫ	50
Демин А.Ю. ПРИМЕНЕНИЕ ВЕКТОРНЫХ БАЗ ДАННЫХ В RAG – СИСТЕМАХ	54
Демин А.Ю. ЗАЩИТА ПЕРСОНАЛЬНЫХ ДАННЫХ В ВЕБ – СЕРВИСАХ	55
Каштанов Ф.В. ПРОЕКТИРОВАНИЕ И РАСЧЁТ ДВУХОСНОГО ИНДИКАТОРНОГО ГИРОСТАБИЛИЗАТОРА ТЕЛЕКАМЕРЫ	57
Кукушкин А.Н. АРХИТЕКТУРА АЛГОРИТМА ФИЛЬТРАЦИИ ТОВАРОВ	59
Ло Сюань БЕЗОПАСНОСТЬ ИНФОРМАЦИОННЫХ СИСТЕМ СОВРЕМЕННЫХ ПРЕДПРИЯТИЙ	61
Магера М.А. ВЛИЯНИЕ НАРУШЕНИЯ ПРИНЦИПА ЕДИНСТВЕННОЙ ОТВЕТСТВЕННОСТИ НА ТЕСТИРУЕМОСТЬ C# - ПРИЛОЖЕНИЙ	66
Митяков Е.С. ПРОЦЕСС МОДЕЛИРОВАНИЯ УГРОЗ ИНФОРМАЦИОННОЙ БЕЗОПАСНОСТИ В ЦИФРОВОМ ДВОЙНИКЕ ОБЪЕКТА КРИТИЧЕСКОЙ ИНФОРМАЦИОННОЙ ИНФРАСТРУКТУРЫ	69
Синюгина Ю.В. АНАЛИЗ МЕТОДОВ ДИАГНОСТИКИ СОСТОЯНИЯ ДОРОЖНЫХ ПОКРЫТИЙ: ОТ ВИЗУАЛЬНОГО ОСМОТРА К АВТОМАТИЗИРОВАННЫМ СИСТЕМАМ	71

Фокин Д.А.
ОБЗОР МЕТОДОВ ОПТИМИЗАЦИИ
РЕЖИМНЫХ ПАРАМЕТРОВ ПРОЦЕССОВ
СЖИЖЕНИЯ ПРИРОДНОГО ГАЗА 73

Хуринхеев В.И.
ИННОВАЦИИ В СИСТЕМЕ ТЕПЛОСНАБЖЕНИЯ:
ПУТЬ К УСТОЙЧИВОМУ БУДУЩЕМУ 77

ИСТОРИЧЕСКИЕ НАУКИ

Шишкин А.А., Дубниченко С.В.
РОЛЬ ЖУРНАЛА «НОВЫЙ МИР» В ПЕРЕСМОТРЕ ИСТОРИИ:
СТРАТЕГИЯ ПРАВДЫ В ЭПОХУ «ОТТЕПЕЛИ» 82

ЭКОНОМИЧЕСКИЕ НАУКИ

Белоногова Е. В.
АНАЛИЗ ПОДХОДОВ
К ОПРЕДЕЛЕНИЮ СУЩНОСТИ ПОНЯТИЯ РЕКРЕАЦИЯ 87

Бондаренко А.Д.
СИСТЕМАТИЗАЦИЯ МЕР ГОСУДАРСТВЕННОЙ
И РЕГИОНАЛЬНОЙ ПОДДЕРЖКИ МОЛОДЫХ СЕМЕЙ 90

Ван Гуанвэй
ПРОСТРАНСТВЕННОЕ РАСПРЕДЕЛЕНИЕ РЕГИОНАЛЬНОЙ
СОЦИАЛЬНО - ЭКОНОМИЧЕСКОЙ СФЕРЫ 92

Виноградов С. Н.
РАЗВИТИЕ TRAVELTECH - ИНДУСТРИИ:
АНАЛИЗ РЫНКА ЦИФРОВЫХ СЕРВИСОВ В ТУРИЗМЕ 96

Владова В.Д.
ИНСТИТУЦИОНАЛЬНЫЕ ИЗМЕНЕНИЯ
РОССИЙСКОЙ БАНКОВСКОЙ СИСТЕМЫ:
СОСТОЯНИЕ, ПРОБЛЕМЫ, ПЕРСПЕКТИВЫ 100

Жданова В.В.
КЛАСТЕРИЗАЦИЯ РЕГИОНОВ РОССИИ
ПО КЛЮЧЕВЫМ ДЕМОГРАФИЧЕСКИМ ИНДИКАТОРАМ 112

Кондрачук О.Е.
ИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ
В ПРОФЕССИОНАЛЬНОЙ ДЕЯТЕЛЬНОСТИ
КАК ФАКТОР ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ
ТРУДА СПЕЦИАЛИСТОВ 114

Кондрачук О.Е.
ТЕОРИЯ ОРГАНИЗАЦИИ КАК ОСНОВА ФОРМИРОВАНИЯ
ЭФФЕКТИВНОЙ СИСТЕМЫ УПРАВЛЕНИЯ 116

Мамеко Н.С. АКТУАЛЬНОСТЬ ОЦЕНКИ ФИНАНСОВЫХ И НЕФИНАНСОВЫХ ПОКАЗАТЕЛЕЙ ИНВЕСТИЦИОННОЙ ПРИВЛЕКАТЕЛЬНОСТИ ОРГАНИЗАЦИЙ IT – ОТРАСЛИ	118
Нье Бэй ПУТЬ РАЗВИТИЯ РЕГИОНАЛЬНОГО ЭКОНОМИЧЕСКОГО СОТРУДНИЧЕСТВА	123
Рудницкий А.В. АКТИВИЗАЦИЯ ВОВЛЕЧЕНИЯ ОБЪЕКТОВ КУЛЬТУРНОГО НАСЛЕДИЯ В ХОЗЯЙСТВЕННЫЙ ОБОРОТ ПОСРЕДСТВОМ ИСПОЛЬЗОВАНИЯ ЦИФРОВЫХ ПЛАТФОРМ	127
Талдыкин Н.С. ТРАНСФОРМАЦИЯ МИРОВОЙ ВАЛЮТНОЙ СИСТЕМЫ КАК ОТРАЖЕНИЕ НОВОЙ НАУЧНОЙ ПАРАДИГМЫ	129
Филянина М.Е. ДИФФЕРЕНЦИАЦИЯ КАЧЕСТВА ВТОРИЧНОГО СЫРЬЯ КАК ФАКТОР ПОВЫШЕНИЯ КОНКУРЕНТОСПОСОБНОСТИ ПРЕДПРИЯТИЙ ПЕРЕРАБАТЫВАЮЩЕЙ ОТРАСЛИ	133
Чернышова Л.И. РОЛЬ СЕТЕВЫХ ГРАФИКОВ В ЭКОНОМИКЕ СТРОИТЕЛЬСТВА	136

ФИЛОСОФСКИЕ НАУКИ

Шепилевич А.А. АВРЕЛИЙ АВГУСТИН: ЛИНЕЙНОСТЬ ИСТОРИИ И РАСКРЫТИЕ БОЖЕСТВЕННОГО ПЛАНА	140
---	-----

ФИЛОЛОГИЧЕСКИЕ НАУКИ

Нигматуллина Л. А., Минегулова Ф.Ф. ДИСКУССИОННЫЕ ВОПРОСЫ СОВРЕМЕННОЙ РУССКОЙ ГРАММАТИКИ	144
Талагаева Ю. А. КОГНИТИВНЫЕ ОСНОВАНИЯ МЕТАФОРИЧЕСКОГО ПЕРЕНОСА В ТЕРМИНОЛОГИИ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ И ВОЕННОЙ СФЕРЫ	146

ЮРИДИЧЕСКИЕ НАУКИ

Коцюра Е. И. ОСОБЕННОСТИ ПРОВЕДЕНИЯ ОСМОТРА МЕСТА ПРОИСШЕСТВИЯ ПРИ РАССЛЕДОВАНИИ УГОЛОВНЫХ ДЕЛ О ПРИЧИНЕНИИ ТЕЛЕСНЫХ ПОВРЕЖДЕНИЙ	150
--	-----

Кушнер В.И.
СЛЕДСТВЕННЫЙ КОМИТЕТ РЕСПУБЛИКИ БЕЛАРУСЬ:
СТАНОВЛЕНИЕ, ПРАВОВОЙ СТАТУС
И ОСНОВНЫЕ НАПРАВЛЕНИЯ ДЕЯТЕЛЬНОСТИ 152

Цэн Сида
АНАЛИЗ ПРАКТИЧЕСКИХ ПРОБЛЕМ ГРАЖДАНСКОГО ПРАВА 156

Эксузян А.Г.
КОНСТИТУЦИОННАЯ РЕФОРМА 2020 г.
И ИЗМЕНЕНИЕ СТАТУСА ПРОКУРАТУРЫ РФ 159

ПЕДАГОГИЧЕСКИЕ НАУКИ

Nguyen Anh Hoa
ENGLISH FOR SPECIFIC PURPOSES INSTRUCTION
AT HANOI UNIVERSITY OF MINING AND GEOLOGY
FROM THE PERSPECTIVE OF LECTURERS 163

Nguyen Anh Hoa
THE USE OF ARTIFICIAL INTELLIGENCE
IN ENGLISH LANGUAGE LEARNING
AT HANOI UNIVERSITY OF MINING AND GEOLOGY:
CURRENT PRACTICES AND RECOMMENDATIONS 164

Барабашова Н.Н., Власова М.С., Петрикова Е.В.
ОТ ГЕОМЕТРИЧЕСКИХ ФИГУР К ИНЖЕНЕРНОМУ МЫШЛЕНИЮ 166

Барабашова Н.Н., Петрикова Е.В., Попова М.Ю.
НЕСТАНДАРТНЫЕ МЕТОДЫ В РАЗВИТИИ РЕЧИ И МЫШЛЕНИЯ 168

Барабашова Н.Н., Власова М.С., Коврижных Ю.В.
ОСНОВНЫЕ ПРОБЛЕМЫ СОВРЕМЕННОЙ СИСТЕМЫ
ДОПОЛНИТЕЛЬНОГО ОБРАЗОВАНИЯ 170

Борисейко О.М.
WORKSHOP:
ПРОБЛЕМА ЧИТАТЕЛЬСКОЙ ГРАМОТНОСТИ
СОВРЕМЕННЫХ ШКОЛЬНИКОВ 172

Бурмицкая Н. Н.
ФОРМИРОВАНИЕ ФОНЕМАТИЧЕСКИХ ПРЕДСТАВЛЕНИЙ
У ДОШКОЛЬНИКОВ 4 – 5 ЛЕТ ПОСРЕДСТВОМ
ЛОГОПЕДИЧЕСКИХ ИГР 175

Ван Мэнцзе
ОПТИМИЗАЦИЯ МОДЕЛИ УПРАВЛЕНИЯ ШКОЛЬНЫМ ОБРАЗОВАНИЕМ 177

Ван Ян
АКТУАЛЬНЫЕ ПРОБЛЕМЫ ПРЕПОДАВАНИЯ
ФИЗИЧЕСКОГО ВОСПИТАНИЯ 181

Демин А.Ю. ПРИМЕНЕНИЕ ИНСТРУМЕНТОВ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ОРГАНИЗАЦИИ САМОСТОЯТЕЛЬНОЙ РАБОТЫ СТУДЕНТОВ ИТ - НАПРАВЛЕНИЯ ПОДГОТОВКИ	185
Демин А.Ю. КРИТЕРИАЛЬНОЕ ОЦЕНИВАНИЕ ПРОГРАММНЫХ РАБОТ СТУДЕНТОВ ИТ - НАПРАВЛЕНИЙ В УСЛОВИЯХ ДОСТУПНОСТИ ГЕНЕРАТИВНЫХ МОДЕЛЕЙ	187
Ермоленко Т.Г. ФОРМИРОВАНИЕ АНАЛИТИЧЕСКИХ УМЕНИЙ У СТУДЕНТОВ ПЕДАГОГИЧЕСКОГО КОЛЛЕДЖА В ПРОЦЕССЕ ПОДГОТОВКИ К ДЕМОНСТРАЦИОННОМУ ЭКЗАМЕНУ	188
Коробкина Н.Н., Чеснокова Е.А. СОЗДАНИЕ КОМФОРТНОЙ ОБРАЗОВАТЕЛЬНОЙ СРЕДЫ ДОШКОЛЬНОГО ОБРАЗОВАТЕЛЬНОГО УЧРЕЖДЕНИЯ ДЛЯ ДЕТЕЙ С ОБЩИМ НЕДОРАЗВИТИЕМ РЕЧИ: МЕТОДИЧЕСКИЙ АСПЕКТ	190
Люлина Ю. Ф., Панфилова Е.В. СТРАТЕГИЯ РУКОВОДИТЕЛЯ ДОШКОЛЬНОГО ОБРАЗОВАТЕЛЬНОГО УЧРЕЖДЕНИЯ В СОВРЕМЕННЫХ УСЛОВИЯХ	195
Макарова А.А., Копчинская А.Л. СОЗДАНИЕ УСЛОВИЙ ДЛЯ ФОРМИРОВАНИЯ УСПЕШНОЙ АДАПТАЦИИ ДЕТЕЙ РАННЕГО ВОЗРАСТА	196
Марфутенко Е.И. СУЩНОСТЬ СОЦИАЛИЗАЦИИ МЛАДШИХ ШКОЛЬНИКОВ	198
Махов Б. А. БУЛЛИНГ И КИБЕРБУЛЛИНГ КАК ДЕСТРУКТИВНЫЙ ФАКТОР В ОБРАЗОВАТЕЛЬНОЙ СРЕДЕ: СТРАТЕГИИ ПРОТИВОДЕЙСТВИЯ	200
Мацнева И. В. ИСПОЛЬЗОВАНИЕ СОЦИАЛЬНОГО ПРОЕКТИРОВАНИЯ КАК СРЕДСТВА ПРОФОРИЕНТАЦИИ В НАЧАЛЬНОЙ ШКОЛЕ	202
Минаева Е.В. ФОЛЬКЛОРНЫЕ МОТИВЫ И ОБРАЗЫ В ТЕКСТАХ ПЕСЕН ГРУППЫ «КОРОЛЬ И ШУТ»	205
Петрович И.В. «ИСПОЛЬЗОВАНИЕ НЕТРАДИЦИОННОЙ ТЕХНОЛОГИИ «ЛИТОТЕРАПИЯ» В КОРРЕКЦИОННОЙ РАБОТЕ С ДЕТЬМИ С ТНР»	209
Суркова Л.В., Березий Н.А. ПОНЯТИЕ «ДРУЖБА НАРОДОВ» ДЛЯ ДЕТЕЙ ДОШКОЛЬНОГО ВОЗРАСТА	212

Фанакаева И.А., Караманова О.И.
 ФОРМИРОВАНИЕ ПРЕДСТАВЛЕНИЙ О РОДНОМ КРАЕ
 У ДЕТЕЙ СТАРШЕГО ДОШКОЛЬНОГО ВОЗРАСТА 215

Фролова Л.А., Федотова В.Н.
 НЕЙРОИГРЫ КАК СРЕДСТВО РАЗВИТИЯ МЕЖПОЛУШАРНЫХ СВЯЗЕЙ
 У МЛАДШИХ ШКОЛЬНИКОВ С ТЯЖЕЛЫМИ НАРУШЕНИЯМИ РЕЧИ 217

МЕДИЦИНСКИЕ НАУКИ

Чэнь Лунцзюнь
 ПРИМЕНЕНИЕ СТВОЛОВЫХ КЛЕТОК ДЛЯ СТИМУЛЯЦИИ
 РЕГЕНЕРАЦИИ ТКАНЕЙ ПРИ ОРТОПЕДИЧЕСКИХ
 ХИРУРГИЧЕСКИХ ВМЕШАТЕЛЬСТВАХ 221

ВЕТЕРИНАРНЫЕ НАУКИ

Люст В.А.
 ПРИМЕНЕНИЕ ПЛАЗМЫ КРОВИ ПРИ ЛЕЧЕНИЕ
 ОСТРОЙ ПОСТРЕНАЛЬНОЙ НЕДОСТАТОЧНОСТ У КОШЕК 229

ПСИХОЛОГИЧЕСКИЕ НАУКИ

Гао Сюэфэн
 ВЛИЯНИЕ ПСИХОЛОГИЧЕСКИХ ФАКТОРОВ
 НА УПРАВЛЕНИЕ ПЕРСОНАЛОМ ОРГАНИЗАЦИИ 233

СОЦИОЛОГИЧЕСКИЕ НАУКИ

Губенко В.В.
 СОЦИАЛЬНАЯ АДАПТАЦИЯ УЧАСТНИКОВ СВО 240

Линская Т. А.
 ОРГАНИЗАЦИЯ СОЦИАЛЬНОЙ РАБОТЫ
 С ЛИЦАМИ С ПСИХИЧЕСКИМИ РАССТРОЙСТВАМИ
 В УСЛОВИЯХ ДНЕПРОВСКОГО
 ПСИХОНЕВРОЛОГИЧЕСКОГО ДОМА _ИНТЕРНАТА
 ХЕРСОНСКОЙ ОБЛАСТИ, ГЕНИЧЕСКОГО МО 241

Тарасова Ю.А.
 ЦИФРОВОЙ ДОСУГ КАК ПРОСТРАНСТВО СКРЫТОГО ТРУДА
 И ПРОИЗВОДСТВА ДАННЫХ 243

Шумская Е.М.
 КОНСУЛЬТИРОВАНИЕ НАСЕЛЕНИЯ СОЦИАЛЬНЫМИ СЛУЖБАМИ
 КАК ОДНА ИЗ ТЕХНОЛОГИЙ СОЦИАЛЬНОЙ РАБОТЫ 248

Щербаченко Н.А.
 ПРАВОВЫЕ МЕХАНИЗМЫ ОБЕСПЕЧЕНИЯ ДОСТУПНОСТИ
 СОЦИАЛЬНЫХ УСЛУГ ДЛЯ ИНВАЛИДОВ:
 АНАЛИЗ ФЕДЕРАЛЬНОГО РЕГИОНАЛЬНОГО ЗАКОНОДАТЕЛЬСТВА 249

Ярмоленко О.Н. СОЦИАЛЬНО - РЕАБИЛИТАЦИОННЫЙ ЦЕНТР ДЛЯ НЕСОВЕРШЕННОЛЕТНИХ В СТРУКТУРЕ СОЦИАЛЬНОЙ ЗАЩИТЫ НАСЕЛЕНИЯ	251
---	-----

НАУКИ О ЗЕМЛЕ

Nguyen Thi Hoa, Dang Thi Ngoc Thuy, Vu Thi Lan Anh, Tran Thi Ngoc ASSESSING THE CURRENT STATE OF SURFACE WATER QUALITY IN THE SE SAN RIVER BASIN (THE SECTION THAT PREVIOUSLY FLOWED THROUGH KON TUM PROVINCE)	255
Nguyen Thi Hong, Dao Trung Thanh GIS - BASED SPATIAL ASSESSMENT OF AIR QUALITY IN LANG SON PROVINCE, VIETNAM	263
Nguyen Van Dung, Nguyen Thi Thu Trang RESULTS OF A SURVEY ON THE DISTRIBUTION OF KARST CAVES IN LUC YEN TOWN, LAO CAI PROVINCE USING THE 2D ELECTRICAL GEOPHYSICS METHOD	272
Nguyen Van Dung DOSE - RESPONSE OF POLYVINYL ALCOHOL FILMS DYE BY BROMOCRESOL GREEN UNDER GAMMA RAYS IRRADIATION	280
Nguyen Van Dung THE THIN FILM PVA – METHYL RED DOSIMETER	285
Nguyen Van Quang DEVELOPMENT OF A MULTI - LAYER PERCEPTRON (MLP) MODEL FOR AIR TEMPERATURE PREDICTION IN COAL LONGWALL MINING FACES: A CASE STUDY AT KHE TAM COAL MINE	291
Борисков К. Ф., Елисеев М. Е. СМЕНА НАУЧНОЙ ПАРАДИГМЫ В НАУКАХ О ЗЕМЛЕ: ОТ ГЕОЛОГА - ГЕОФИЗИЧЕСКОГО РЕДУКЦИОНИЗМА К СИСТЕМНОЙ ГЕОКИБЕРНЕТИКЕ	302
Чжан И. ПРОСТРАНСТВЕННАЯ ОЦЕНКА САДОВОГО ЛАНДШАФТА НА ОСНОВЕ ГЕОГРАФИЧЕСКИХ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ	305

Научное издание

**ФОРМИРОВАНИЕ И РАЗВИТИЕ
НОВОЙ ПАРАДИГМЫ НАУКИ
В ЭПОХУ
ПОСТИНДУСТРИАЛЬНОГО ОБЩЕСТВА**

**Сборник статей
Международной научно-практической конференции
25 июля 2026 г.**

В авторской редакции
Издательство не несет ответственности за опубликованные материалы.
Все материалы отображают персональную позицию авторов.
Мнение Издательства может не совпадать с мнением авторов

Подписано в печать 28.07.2026 г. Формат 60х90/16.
Печать: цифровая. Гарнитура: Times New Roman
Усл. печ. л. 19,00. Тираж 500. Заказ 2703.



Отпечатано в редакционно-издательском отделе
НАУЧНО-ИЗДАТЕЛЬСКОГО ЦЕНТРА «АЭТЕРНА»

450076, г. Уфа, ул. Пушкина 120

<https://aeterna-ufa.ru>

info@aeterna-ufa.ru

+7 (347) 266 60 68