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List of Publications Reflected in the Present Issue

1. **Agrarian-Economic Science and Technologies, #1, 2009**
2. **Collected Papers of V. Bagrationi Institute of Geography, #2(81), 2008**
3. **Proceedings of A. Janelidze Institute of Geology, 2008**
4. **Energy, #4(48), 2008**
5. **Economics and Business, March-April, 2008**
6. **Theses of the International Scientific Conference *Modern Technologies and Materials*, 2008**
7. **Bulletin of the Georgian National Academy of Sciences, vol.2, #3, 2008**
8. **Proceedings of the Georgian National Academy of Sciences – Chemical Series, #2, 2008**
9. **Georgian Oil and Gas, # 23, 2009**
10. **Bulletin of the Centre of Strategic Development of Georgia, ##110,111, 2008**
11. **Georgian Chemical Journal, ##3, 4, 2008**
12. **Transport and Machinebuilding, #3(11), 2008**
13. **Works - Appendix to the Newsletter of the Georgian Academy of Education Sciences, #11, 2008.**
14. **Transactions of the Institute of Hydrometeorology, volume #115, 2008**
15. **G. Varshalomidze, I. Goguadze, Main Oil and Gas Pipelines and Underground Gas Storages (Design, Constructiin and Exploitation), 2009**
16. **Bulletin of the Abastumani Astrophysical Observatory, volume #78, 2008**
17. **Revaz Ghigladze, Modern Study of Solar System Planets and Satellites, 2007**

Agrarian– Economic Science and Technologies
ISSN 1987– 6335
Publisher: Institute of Agrarian Economics, founded in 2006; international scientific– methodological and practical quarterly referenced journal, in the Georgian language, abstracts in Georgian and English. address: B.14, 37 I. Chavchavadze St., Tbilisi.
www.agroeco.org.ge

Collected Papers of V. Bagrationi Institute of Geography
ISBN 99940-61-19-4
Publisher: V. Bagrationi Institute of Geography; articles and abstracts in Georgian, Russian and English languages.
www.geography.ge

Proceedings of A. Janelidze Institute of Geology
ISBN 978-9941-406-51-5
Publisher: A. Janelidze Institute of Geology; articles in Russian and English languages, abstracts in Georgian, Russian and English languages

Energy
ISSN 1512– 0120
Scientific– technical journal; articles in the Georgian and Russian languages; abstracts in Georgian, English and Russian, address: 40 I. Abashidze St, 0179, Tbilisi.
www.directory.ge/client/Energy

Economics and Business
ISSN 987– 5789
Tbilisi Iv. Javakhishvili State University, Faculty of Business and Economy; international referenced and reviewed scientific– practical journal, published since January 2008; bimonthly; address: 1, University St., Tbilisi.

Theses of International Scientific Conference *Modern Technologies and Materials*
ISSN 1512-309-X
Publisher: Ministry of Education and Science of Georgia, Georgian National Scientific Foundation, A. Tsereteli State University, theses in Georgian and Russian languages, Kutaisi, 2008

Bulletin of the Georgian National Academy of Sciences
ISSN 0132– 1447
Publisher: Georgian National Academy of Sciences; articles (mathematical and physical sciences, agricultural sciences, medical sciences, humanitarian sciences) in English; annotations in English and Georgian; quarterly publication; address: 52, Rustaveli Ave., Tbilisi.
http: www.science.org.ge

Proceedings of the Georgian National Academy of Sciences – Chemical Series
ISSN 0132– 6074
Publisher: Georgian National Academy of Sciences; articles and abstracts in Russian, Georgian, and English, quarterly; address: 5 Jikia St., Tbilisi.

Georgian Oil and Gas
ISSN 1512-0457
Publisher: Faculty of Mining and Geology of Georgian Technical University, Georgian Scientific-Technical Association of Oil and Gas, articles in Georgian, Russian, English languages, abstracts in Georgian, Russian, English.
http: www.georgianoilandgas.com.ge

Bulletin of the Centre of Strategic Development of Georgia
ISSN 1512-0813
Publisher: Centre of Strategic Development of Georgia, articles in Georgian language; address: 5a, Delisi I Lane, Tbilisi.
www.csrdg.ge

Georgian Chemical Journal
ISSN 1512– 0686
Publisher: Georgian Chemical Society; published since 2001; articles in the Georgian, Russian, English languages; address: 3, Chavchavadze Ave., Tbilisi.
www.georgiachemj.ge

Transport and Machine Building
ISSN 1512– 3537
Publisher: Technical University of Georgia; Faculty of Transport and Machine-building; scientific–technical journal; quarterly; articles in Georgian and Russian; abstracts in Georgian, Russian and English.

Works - Appendix to the Newsletter of the Academy of Education Sciences of Georgia
ISSN №1512-102X
Publisher: Georgian Academy of Education Sciences and Georgian Technical University (engineering and technical sciences, economic sciences, methods of teaching foreign languages, humanitarian sciences, journalism, social sciences), articles in Georgian, Russian, English languages, abstracts in Georgian, Russian, English languages, address: 1 Zandukeli St., Tbilisi.
www.newsletters.gtu.ge

Transactions of Georgian Institute of Hydrometeorology
ISSN 1512 – 0902
Publisher: Georgian Institute of Hydrometeorology, address: 150a, David Agmashenebeli Ave., Tbilisi, 0112

Main Oil and Gas Pipelines and Underground Gas Storages, (Projecting, Constructing and Exploitation), G. Varshalomidze, I. Goguadze, 2009
ISBN 978-9941-14-294-9
Publisher: Georgian Technical University, in Georgian language, abstracts in Georgian, Russian, English languages, 652 p. http: www.gtu.ge/publishinghouse/

Bulletin of the Abastumani Astrophysical Observatory, volume #78, 2008
ISBN 0375-6644
Publisher: Ilia Chavchavadze State University Abastumani Astrophysical Observatory. Articles and abstracts in Georgian, Russian and English languages.
Address: Abastumani, Khanobili Mount

Revaz Ghigladze Modern Study of Solar System Planets and Satellites, 2007
ISBN 99928-77
Publisher: Tbilisi Iv. Javakhishvili State University, in Russian language. Abstracts in Georgian and English languages

SUBJECT ENTRIES

A. SOCIAL SCIENCES

A1. State and Law. Jurisprudence
A2. Sociology. Demography
A3. Economy
A4. Education
A5. Informatics/Computer Science
A6. Other Social Sciences

B. NATURAL AND EXACT SCIENCES

B1. Mathematics. Mechanics. Physics. Cybernetics
B2. Chemistry. Biology
B3. Geology. Geodesy
B4. Geography. Cartography. Astronomy
B5. Other Natural and Exact Sciences

C. TECHNICAL AND APPLIED SCIENCES. SECTORS OF ECONOMY

C1. Power Industry
C2. Electrical Engineering. Electronics. Radio Engineering. Communications
C3. Automation & Telemetry. Computer Engineering
C4. Mining. Metallurgy. Chemical Industry
C5. Mechanical Engineering. Instrument-making
C6. Light Industry
C7. Food Industry
C8. Construction. Architecture
C9. Agriculture and Forestry. Fishery
C10. Water Industry. Melioration
C11. Foreign and Domestic Trade. Tourism
C12. Transport
C13. Medicine. Healthcare

D. INTERSECTORAL ISSUES

D1. Organization and Management
D2. Environmental Protection. Ecology
D3. Statistics
D4. Other Intersectoral Issues

A. SOCIAL SCIENCES

A1. State and Law. Jurisprudence

UDC 328:342.5
4.A1.1. Forms of state government in Georgia. /J.Khetsuriani/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – p.175-180. – Eng. (res.: Geo., Eng.)
In the history of Georgia, almost all forms of state government and their varieties have been used. Until the first annexation of Georgia by Russia (1801), in the course of many centuries, Georgia had been a monarchical State represented as an absolute monarchy. In the 12th century, under Queen Tamar, there was an attempt to establish a parliamentary monarchy. After the restoration of Georgian state independence in 1991, in the past 17 years, all types of republican government - parliamentary, presidential and semi-presidential systems – alternated in Georgia. Recently, an idea of the expedience of establishing a parliamentary monarchy has emerged. The article analyses the pro and contra arguments. It is observed in this article that the choice between a republic and a monarchy should be made by the people through a referendum.

A2. Sociology. Demography

UDC 364:159.992.2
4.A2.1. Social system and person's value orientation. /S. Lominadze/.Proceedings - Appendix to the Bulletin of the Georgian National Academy of Sciences – 2008. - #11. – pp.219-221. – Rus. (res.: Geo., Eng.)
The article deals with basic value orientations of individuals. Study of value orientations of the youth is noted to be very important for teachers. The dialectic of interaction between society and an individual is exposed. The author holds that free-thinking plays the main role in the development of society. It is emphasized that the values common to mankind are able to unite the nation and their serves as a guarantor of life, truth and freedom.

A3. Economy

UDC 336
4.A3.1. Financial globalization. /E. Mekvabishvili/. Economics and Business. – 2008. – #2. – pp.32-38. – Geo. (res.: Rus.)
The major characteristics of financial globalization are as follows: 1) the creation and accumulation of enormous valuables in financial spheres; and 2) a gigantic growth of loan capital, direct foreign investments, portfolio investments, and currency market. A world-scale overview of each category is provided. The financial globalization has a certain positive effect on the economic development of sovereign states. Although, together with positive sides, it has some negative aspects as well, the most important being the economic instability that, rather frequently, creates a danger of transition to financial crises.

UDC 336.746
4.A3.2. Some features of monetary policy in Georgia. /N. Khaduri/. Economics and Business. – 2008. – # 2. – pp. 50-58. – Geo (res.: Eng.)
Following the "Rose Revolution", the facts of both official and unofficial expropriation of property, non-formal taxation of business, etc. were frequent in Georgia. The dynamics of the money mass circulating in Georgia is of interest. In 2005, when coupon was replaced by the national currency – Lari (GEL), only GEL 95 million was circulating in the country. By December 2007, the figure exceeded GEL 1.3 billion, which was expected to result in a drop of the rate of exchange. However, the opposite happened. The event might have an anti-inflationary impact but it adversely affects the deficient balance of payment as it is. At the same time, arresting inflation is still a problem in Georgia. According to predicted governmental data, inflation will reach 9 percent in 2009, gradually slowing down to 8, 5, 8 and 7 percent in the years to come, which, in itself, is a rather high rate. The excess of imports over exports makes 23 percent. Against such background, of importance is to assign a high degree of independence to the National Bank of Georgia (NBG) - the principal implementer of the monetary policy in Georgia. The article gives diagrams showing the quantity of money in circulation, the GEO-USD-Euro rate of exchange, as well as the foreign trade figures and inflation index.

UDC 336.71:06.012.7
4.A3.3. On the improvement of bank liquidity management. /M. Gogokhia/. Economics and Business. – 2008. – #2. – pp.136-141. – Geo. (res. Eng.)
Practice has worked out a series of methods for bank liquidity risk management, which are based on the management of assets, liabilities, or both of them. The article deals with advantages and disadvantages of these methods, as well as with other liquidity management techniques: the reserve position management method, bank securitization and immunization, coefficient method, the funds flow management mechanism. The liquidity management of a commercial bank is also carried out by the central bank, which establishes uniform standards of liquidity, binding reserve requirements, carries out refinancing.

UDC 336.3
4.A3.4. Contemporary trends in a microfinance market development. /T.Khomeriki/. Economics and Business. – 2008. – #2. – pp.145-156. – Geo. (res. Eng.)
Characteristics and regulatory norms of a microfinance organization, statistical data concerning the functioning of registered microfinance organizations are given. The 2002 legislation concerning credit unions - non-bank depositary institution has not lost its importance. Credit unions operate with the legal status of a cooperative and can play a significant role in the small business development, especially in rural areas. An opinion in favor of the development of local economy according to the cluster principle has also been voiced.

UDC 338
4.A3.5. State and economy. /T.Chkheidze, E.Chkhartishvili, L.Kakhadze/. Transport and Machinebuilding. – 2008. – #3(11). – pp.115-121. **-** Geo (res. Geo., Rus., Eng.)
The state intervention into economy under a market economy conditions is justifiable and even necessary only when the effects of free market forces are ineffective for society. In other words, the state intervention into economy is justified when the market fails to “work” in national interests or to ensure an optimal allocation of resources in order to sufficiently make the “public benefit”. As regards the necessity of activation of the state’s role in the economy regulation at the modern stage, it is dictated by the market activity slumps that have resulted in: a high level of unemployment; outflow of able-bodied population from and country and aggravation of the demographic situation; the low accumulation of local capital and its drain abroad.; lack of power resources. In order to cope with the aforementioned problems, the state shall elaborate and fulfil a priority economy sectors’ development program.

UDC 339.562/.564
4.A3.6. Export and import - components of aggregate expenditures. /N.Guramishvili/. Works - Appendix to the Newsletter of the Academy of Education Sciences of Georgia. – 2008. – #11. – pp. 40-41. – Rus. (res. Geo., Eng.)
The economy internationalization process causes, the forms of their demonstrations, as well as the advantage of participation of countries in the world economic relations and the problems cause thereby are considered.

UDC 338.124.4:339.747
4.A3.7. The world financial crisis and monetary policy of Georgia. /A. Lapachi/. Agrarian-economic Science and Technologies. – 2009. – #1. – pp. 31-35. – Geo. (res. Eng.)
A serious economic crisis in our country reveals itself in several parameters, one of which is a decrease in employment. Private structures resort to redundancy measures that result in a decrease in locally made products. This concerns both industry and the construction sector, which, like the major portion of economy segments, is almost idle. Thus the crisis situation has been clearly formed. The studies carried out are indicative of the imminent national currency devaluation. The process will last until the export production and the export-import balance, also investment flows are restored to the earlier extent. Will these events lead to a monetary crisis? We have all means to avoid such crisis. On the one hand, the currency reserves of the National Bank exceed USD one billion. On the other hand, by decision of 22 October 2008, Georgia is to get a monetary aid worth USD 4.5 billion from the European Union, U.S., Japan, and other donor countries. Given the expected foreign currency transfers from Georgian national employed abroad, as well as foreign investments, it might be said that the fears of the monetary crisis in Georgia are exaggerated.

UDC 332.2
4.A3.8. Methodological approaches to business evaluation and determination of financial solvency. /I.Palelashvili, S.Turmanidze, G.Dzagnidze/. Agrarian-Economic Science and Technologies. – 2009. – #1. – pp. 36-40. – Geo. (res. Eng.)

Among numerous indicators of solvency estimation of agribusiness enterprises priority should be given to the three basic indicators: liquidity ratio of long-term obligations, current liquidity ratio and intermediate liquidity ratio. The full solvency ratio of a profitable enterprise is calculated by a ratio of equity capital to total liabilities, whereas in a low-profitable or unprofitable enterprise - by a ratio of current assets to total liabilities. Therefore, an agribusiness enterprise may be evaluated in the following sequence: a. valuation of the enterprise property; b. calculation and analysis of profitability, solvency, financial stability, efficiency and economic growth in prospect.

UDC 658.14/.17
4.A3.9. Financial rating of enterprises. /G.Dzagnidze, I.Palelashvili, S.Turmanidze/. Agrarian-economic Science and Technologies. – 2009. – #1. – pp. 41-49. – Geo. (res. Eng.)
A stable financial position of enterprises can be reflected by a uniform system of economic indicators in which a balance sheet structure of an enterprise will be comprehensively displayed. However, a multitude of such indicators sometimes interferes with an objective financial rating of business activity. Therefore, it is expedient that only a part of these indicators be prioritized; in addition, introduced should be ratios such as: debt-to-equity ratio, debt-payment liability ratio, own funds ratio, and financial stability ratio. For a full-value financial rating of an agricultural enterprise, an integral financial position ratio should be employed which will give a clearer picture of complex assessment of efficiency of activity of an enterprise (firm).

UDC 332.2
4.A3.10. Assessment of profit in agribusiness enterprises. /S.Turmanidze, G.Dzagnidze, I.Palelashvili/. Agrarian-economic Science and Technologies. – 2009. – #1. – pp. 50-56. – Geo. (res. Eng.)
Two variants of calculation of profits are practiced: the Anglo-American and the French-German. The both variants have their shortcomings. Therefore, advantages of the methods of both variants should be summarized first to better characterize the agribusiness profits and to make it possible to increase them. All this can be achieved in two ways: by increasing production activity and better using own assets. Thus, the employment of the invested capital and sales indicators would be more expedient for assessing profits an agribusiness enterprise.

UDC 336.12
4.A3.11. Considerations on perfection of the budget system. /M.Mchedlishvili, A.Lapachi/. Agrarian-economic Science and Technologies. – 2009. – #1. – pp. 57-60. – Geo. (res.: Eng.)
In the process of budget formation, great importance is given to its structure ensuring a rational balance between expenditures and incomes. When forming the budget, expenditures should be prioritized over incomes. Rather important is to determine budget expenses and resources to such a level that could ensure implementation of the tasks set before the society. Economic development is one of the most important priorities for the country's government. Changes in the fiscal sphere are the most important part for the economic reform and the economic policy as a whole. In addition, the Georgian government plans for the next 5 years include strategic changes for perfecting the fiscal policy and improving the financial situation in Georgia. All these will provide for the macro-economical stability, the growth of expenditures in the priority directions and the strengthening of financial order.

A4. Education

UDC 37.014
4.A4.1. On the problem of training scientific personnel in the area of natural history. /R. Jobava, M. Lomouri, L. Geonjian/. Transactions of the Georgian Institute of Hydrometeorology. - 2008. - vol.115. - pp. 204-213. - Geo. (res.: Geo., Eng., Rus.)
Based on the necessity of increasing the level of professional education in physical geography, a study of the 2008 entrance examination results of the contingent admitted to the Faculty of Exact and Natural Sciences of Tbilisi State University has been conducted. The ways of raising the level of training have been designed.

A5. Informatics. Computer Science

UDC 167/168.001.76:002.5/.6
4.A5.1. Information support to the commercialization of research results. /N.Makhviladze, E.Pawlowic, T.Chubinishvili/. Theses of International Scientific Conference: Modern Technologies and Materials. – 2008. – pp. 207-208. – Geo.

Innovative activity represents a process of materialization of a scientific idea and of a research outcome into the production process, its product. In addition to research activity, this process encompasses such activities as marketing, promotion and advertising, protection of intellectual property, establishment of a business plan, techno-economic and information analysis, etc. Each of the above comprises to a great extent information activity. Correspondingly innovation needs a strong information support. During the last 30 years an informal innovative infrastructure has been actually established in economically developed countries, one of the priority components of which is the information and communication infrastructure. Regrettably, due to a whole number of objective and subjective conditions the development of innovative activity as well as the process of establishment of the related infrastructure, including the information one, has been impeded in Georgia. Irrespective of a significant progress in the introduction of information and communication technologies in the world, Georgian scientists and engineering personnel are in the majority of cases devoid of an opportunity to employ these technologies. In order to partially eliminate this shortcoming, Techinformi engages in the promotion of the innovative proposals of Georgian scientists and the research results that would be useful for commercialization by employing information technologies. In particular, relevant databases have been generated and are being disseminated through telecommunication networks, by laser CDs. Widely used are such international sci-tech services as ICSTI and ISTC, FAO AGRIC/CARIS. A three-year (2007-2009) information strategy development plan worked out by Techinformi that provides for the planning, management and coordination of these activities and ensures the appropriate participation of Georgian scientists in European Union's research and innovative framework programs has been included in the Activity Plan of the European Neighborhood Policy. According to this plan, Techinformi has started intensive use of the EU's scientific information services.

UDC 001.001.73:002.5/.6

4.A5.2. Information technologies in the science reforming process. /T.Chubinishvili, P.Tsotskolauri/. Theses of International Scientific Conference: Modern Technologies and Materials. – 2008. – pp. 219-220. – Geo.

The reforming of the research and innovations management process is an essential part of an economic reform. This process is being actively implemented in Georgia, beginning with the restructuring of research institutions and ending with the state support to research and innovative activities. Notwithstanding the said efforts, the research management process is still of unplanned nature. They fail to fully cope with the regulatory role in respect of the ongoing processes, nothing to say of stimulating measures. This can be explained by a number of reasons, among which the priority one consists in the lack of a proper analysis of the actual situation. A strong network of research organizations used to function in Georgia. These organizations created a large amount of scientific products in the form R&D works, dissertations, scientific papers or inventions. The existing system of recording/registration of such products made it possible for interested persons to retrieve and use the said material whenever needed. However, it should also be mentioned that there concurrently existed a very serious impediment, namely the lack of possibilities of dissemination of these material outside the country. Given this, five years ago Techinformi started activities for dissemination of scientific products created by Georgian scientists through international databases. The communication channels were the databases of FAO, ISTIC and other international organizations. In view of perfecting management in the science transformation area, the dissemination of scientific products will not suffice. It is necessary that the assessment of the effectiveness of using such products would also become possible. This can be achieved by means of citation index establishing systems created by international organizations. Techinformi has already initiated activities in this direction; it is, however, necessary that the work for creating such an index would be started in Georgia as well. The identification of the scientific research efficiency and applicability index will make practicable the process of assessment of research activity of Georgian scientists and help financial bodies prioritize funding of the most economically feasible researches. All the above will make it possible to reorganize the system of funding of research and innovative activities as well. Employment of the indexing system will deepen scientific cooperation, enhance the attraction of investments in the research and innovations sphere, and facilitate the formation and expansion of production-research-higher education institution links. All this will, in turn, contribute to an increase of a share of funding from the economic activity in the system of financing of research in addition to the state allocations.The working out of the activities aimed at the development of the sphere of research and innovations should be based on the indexes shoeing the actual research activity progress in the country. In addition, the research and innovations restructuring activities should be provided with a legislative base that has been amended and supplemented in line the up-to-date requirements.

B. NATURAL AND EXACT SCIENCES

B1. Mathematics. Mechanics. Physics. Cybernetics

UDC 624.21.095.323:539.22

4.B1.1. On perturbation of an orthotropic half plane caused by movement of a concentrated force on the boundary. /T.Iamanidze, M.Losaberidze/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – # 3. – pp. 43-47. – Eng. (res. Geo., Eng.)

The paper deals with a problem of perturbation of an orthotropic half plane caused by movement of a concentrated force on the boundary. Stresses and wave range transmission in the anisotropic body are shown to have greater values than in isotropic materials.

UDC 539.125/.126

4.B1.2. Comparative analysis of average characteristics of π–mesons and protons produced in non-central and semi-central CTa-collisions at 4.2 AGeV/c. /L.Akhobadze, V.Garsevanishvili, Y.Tevzadze/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 51-57. – Eng., Geo. (res. Eng.)

A comparative analysis of the average characteristics of π– -mesons and protons produced in non-central and semi-central CTa-collisions at the momentum of 4.2 AGeV/c is made. The angular dependence of the temperature of nuclear matter T is studied. One centre- and two-centre production mechanisms are considered. The results obtained are compared with the Dubna version of the cascading model (DCM) and with the results of other works.

UDC 681.5.015.75:303.447.22

4.B1.3. Model correlators in VHM region. /J.Manjavidze, N.Shubitidze/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol.2. - #3. – pp.58-61. – Eng., Geo. (res. Eng.)

Correlation characteristics of high energy very high multiplicity interactions are investigated.

UDC 621.3.011.212/.222

4.B1.4. The mechanism of occurrence of a negative differential conductivity in pure p-Ge at helium temperatures. /Z.Kachlishvili, L.Kukutaria/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 62-64. – Eng., Geo. (res. Eng.)

The current-voltage characteristic of pure p-Ge in a pre-breakdown region of a shallow-level impurity breakdown has been estimated using the Monte-Carlo simulation in the isotropic-parabolic and crimped dispersion law model approximations. It is shown that under conditions of crimped band dispersion a negative differential conductivity region is observed on the current-voltage characteristics, which is due to the light hole weighting phenomenon.

UDC 510.532

4.B1.5. Construction and investigation of hierarchical models for thermoelastic prismatic shells. /G.Avalishvili, M.Avalishvili, D.Gordeziani/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol.2. – # 3. – pp. 35-42. – Eng., Geo. (res. Eng.)

In the present paper an initial boundary value problem for thermoelastic prismatic shells is considered. Three-dimensional dynamical problem for prismatic shell with surface forces given along the upper and the lower faces of the shell is reduced to hierarchy of two-dimensional problems. The obtained problems are investigated in suitable function spaces, the convergence of the sequence of vector-functions of three space variables, restored from the solutions of two-dimensional problems to the solution of the original three-dimensional problem, is proved and the rate of approximation is estimated.

UDC 519.863/.873

4.B1.6. Optimization of a delay variable structure system with mixed intermediate condition. /T.Tadumadze, A.Arsenashvili/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol.2. - #3. – pp. 22-26. – Eng., Geo. (res. Eng.)

In this paper an optimal control problem for a two-stage variable structure control system is investigated, whose law of movement is described by an ordinary differential equation at the first stage and by a delay differential equation at the second stage. These two stages of the system are connected by a mixed intermediate condition. The necessary conditions of optimality are obtained: for optimal control in the form of maximum principle and for the optimal structure changing moment in the form of equality, containing the effect of the mixed intermediate condition. The general results for linear time-optimal control problem are concretized.

UDC 517.518.25
4.B1.7. Maximal and potential operators in variable exponent Morrey spaces defined on non-doubling quasimetric measure spaces./V.Kokilashvili, A.Meskhi/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 18-21. – Eng., Geo. (res. Eng.)
The boundedness of modified maximal operator and potentials in variable Morrey spaces defined on quasimetric measure spaces, where the doubling condition is not needed, is established.

B2. Chemistry. Biology

UDC 57.089
4.B2.1. Biotechnology in Georgia for various applications. /L.Mosulishvili, N.Tsibakhashvili, E. Kirkesali, L.Tsertsvadze, M.Frontasyeva, S.Pavlov/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 88-94. – Eng., Geo. (res. Eng.)
The results of collaborative work carried out in the field of biotechnology at the Frank Laboratory of Neutron Physics (FLNP) of the Joint Institute for Nuclear Research (JINR) (Dubna, Russia) jointly with scientists from Georgia are presented. Using instrumental neutron activation analysis (NAA), significant results were obtained in the following directions – medical biotechnology, environmental biotechnology and industrial biotechnology. In the biomedical experiments a blue-green alga *Spirulina platensis* biomass has been used as a matrix for the development of pharmaceutical substances containing such vitally important trace elements as selenium, chromium and iodine. The feasibility of target-oriented introduction of these elements into *Spirulina platensis* biocomplexes retaining its protein composition and natural beneficial properties has been proved. The adsorption of such toxic metal as mercury by *Spirulina platensis* biomass in dynamics of growth has been studied also. NAA has been successfully applied to investigate the biotechnology of toxic Cr(VI) transformation into less toxic Cr(III) complexes by Cr(VI)-reducer bacteria isolated from polluted basalts in Georgia. This method was used to track accumulation of chromium in the bacterial cells. To monitor and identify Cr(III) complexes in these bacteria, electron spin resonance (ESR) spectrometry was employed. For the first time, the elemental composition of Cr(VI)-reducer bacteria has been studied, using epithermal NAA. The natural organic mass of vegetal origin – peat – was applied as a source of microorganisms to study the bacterial leaching of some metals from lean ores, rocks and industrial wastes.

UDC 566
4.B2.2. The history of veretebrate fauna in Eastern Georgia. /A.Vekua, D.Lordkipanidze/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 149-154. – Eng., Geo. (res. Eng.)
At the end of the Middle Miocene the Caucasus represented a land forepart, the geographic position of which induced the development of peculiar flora and fauna in Eastern Georgia. On the territory of Eastern Georgia several reference fossil vertebrate sites are discovered, among them Udabno (Maeotian), Dzedzvtakhevi (Maeotian), Iaghludja (Sarmatian-Maeotian), Kvabebi (Akchagilian) and others are worth mentioning. In the Pliocene an interesting association of vertebrate fauna was developed, the early Homo becoming the most remarkable representative.

UDC 549.67
4.B2.3. Biological activity of the natural zeolite – clinoptilolite-containing tuff. /T.Andronikashvili, T.Urushadze, L.Eprikashvili, M.Gamisonia, E.Nakaidze/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 99-106. – Eng., Geo. (res. Eng).
This paper discusses the questions of biological influence of natural zeolites – clinoptilolite-containing tuffs and peaty-zeolitic and organo-zeolitic fertilizers prepared on their basis on the qualitative and quantitative composition of soil microorganisms. It is shown that their influence causes the reproduction of useful microflora, in particular azotobacter. Azotobacter contributes to fixing air nitrogen by transferring it into the so-called “biological” one. The latter is cheaper than technical fertilizer that is applied into the soil as mineral one. Furthermore, far from contaminating the soil, it largely supplements its nitric stock of the soil reserve. It is established that under the influence of organo-zeolitic fertilizers, the quantity of useful soil microflora increases, being of pulsatory character due to the reproduction and necrosis of microorganisms. It must be noted that under the influence of zeolites and especially organo-zeolitic fertilizers the intensive vitality of bacteria continues in winter period**.**

UDC 616.74-009.125
4.B2.4. The role of mitochondrial lectin in the activity of creatine kinase system. /N.Koshoridze, Z.Kuchukashvili, T.Vardiashvili/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. -# 3. – pp. 113-115. – Eng., Geo. (res. Eng.)

Influence of glucose specific lectin separated from the mitochondrial membranes of bovine brain on creatine kinase activity has been studied. It has been observed that inhibition of enzyme activity starts with the lectin action. The inhibition process starts under conditions of a certain concentration of the components of enzymatic reaction, which presumably facilitates regulation of the reaction.

UDC 541.571.8

4.B2.5. Coordination compounds of some d-elements with 1-[2-(benzylcarbamoil)-ethyl]-2-isonicotinoilhydrazone (nialamid-L). /M.Tsintsadze, N.Gegeshidze, N.Zhorzholiani, I.Beshkenadze, T.Tsintsadze, I.Gvelesiani, L.Skhirtladze/. Georgian Chemical Journal. – 2008. -vol. 8. – #3. – pp. 215-216. – Rus. (res.: Geo., Eng.)

The coordination compounds of some transitive elements have been synthesized with 1-[2(benzlcarb-amoil)-ethyl]-2-isonicotinoilhydrazone (nialamid-L), some physical-chemical characteristics and absorption IR spectra have been investigated. The structure of the investigated complexes has also been given.

UDC 541.571.8

4.B2.6. Coordination compounds of some d-elements' thiocyanates with 1-[2-(benzylcarbamoil)-ethyl]-2-isonicotinoilhydrazone nialamid-L). /M.Tsintsadze, N.Gegeshidze, N.Zhorzholiani, I.Beshkenadze, T.Tsintsadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 217-218. – Rus. (res. Geo., Eng.)

Coordination compounds of some transitive elements thiocyanates have been synthesized with 1-[2-(benzylcarbamoil)-etil]-2-isonicotinoilhydrazone (nialamid-L), some physical-chemical characteristics and IR spectra of absorption have been investigated. The structure of the investigated complexes is also given.

UDC 539.9

4.B2.7. Electronic structure and complex-forming ability of paradimethylaminobenzaldehyde nicotinoilhydrazone. /M.Tsintsadze, N.Kilasonia, T.Tsintsadze, I.Gvelesiani, Ts.Dolidze, M.Chanturia, N.Tatiashvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3 – pp. 219-221. – Geo. (res. Rus., Eng.)

Interatomic distances, valence angles, effective charges and electron density on atomic orbitals have been calculated by quantum chemical semi-empirical method AM1 for the molecule of paradimethylamino-benzaldehyde nicotinoilhydrazone. Potential donor atoms: nitrogen of heterocycle and hydrazine and oxygen of carbonyl group have been determined.

UDC 615.038

4.B2.8. Full x-ray structural study of bio-coordinative admixture of Bismuth with medical preparation of Cardiamine. /T.Tsivtsivadze, N.Chigogidze, R.Skhiladze, R.Kldiashvili, G.Sulakvelidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 222-228. – Geo. (res. Rus., Eng.)

The structure of a bio-complex admixture of Bismuth with the heart preparation of Cardiamine ($BiCl_3$ (Cor) (C_2H_5OH) (where Cor - Cardiamine, N,N – diethylnicotineamide, $C_{10}H_{14}N_{2O}$; C_2H_5OH - ethanol) has been identified by means of an x-ray– structural method. The biocomplex crystals have been determined to belong to rhombic syngony (Feodorov's group D_2^4 =$P2_12_12_1$) with elementary cell parameters: a=8,064(1), b=8,141(1), c=21,211(3)Å, d=2.58g/sm^3, V=1390.7Å^3, number of formulary units Z=4. In the studied structure cardiamine displays the function of monodentate ligand and co-ordinates with complex forming Bismuth atom by means of an oxygen atom of carbonyl amide group. This de-facto result makes corrections into infra-red spectral interpretation, according to which cardiamine coordinates with central atoms only by means of a pyridine nucleus heterocyclic nitric atom or rarely by means of carbonyl amide group oxy-gen and heterocyclic nitric atoms in the form of bidentate-bridge ligand. Display of either function of cardiamine with complex former towards dentations seems to depend on composition of admixture, M:Cor stereochemical proportion and nature of metals. The work presents crystallographic parameters of biocomplex admixtures, atom co-ordinates, their iso- and anisotropic temperature factors, interatom distance and valence angle magnitudes, complex bond types, some stereo- chemical peculiarities of the structure in co-ordinative polyhedron forms, etc. Findings can serve as a stimulus for purposeful synthesis and study of biocoordinative admixtures, for determination of the influence of structural and geometric characteristics on physical, chemical and biological properties, for conducting quantum and chemical calculations, etc.

UDC 542.951.1

4.B2.9. Some structural peculiarity of bio-complexes of arsenic, stibium and bismuth amides of pyridine carboxylic acids. /T.Tsivtsivadze, N.Chigogidze, R.Skhiladze, R.Kldiashvili, G.Sulakvelidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 229-235. – Geo. (res. Rus., Eng.)

Some structural and stereochemical peculiarities of arsenic, antimony and bismuth bio-complex compounds (pycolynamide - PkA, nicotinamide - NkA, and isonicotinamide - InkA) have been studied by IR spectroscopy. It was established that pyridine planar ring of pycolynamide and amide groups have almost the same geometry as corresponding groups of nicotinamide and isonicotinamide molecules. Pycolyn-amide molecules of As, Sb and Bi in bio-complex compounds are bidentical. Nitrogen atom of amino-groups and heterocycles causes bidentical nature of PkA in As(III) and Bi (III) bio-complexes, but in Sb (III) complex -nitrogen atom of NH_2-group and oxygen of carbonyl group. In all cases five-member ring is formed. In bio-complex admixtures of Arsenic, Stibium and Bismuth halides nicotineamide serves as a monodental ligand – coordination is performed only by means of a heterocycle nitric atom. In bio-complexes NkA molecules are in the form of dimere. In isonicotine containing As, Sb and Bi biocomplexes organic ligands are as a bidental bridges, but the difference is that in As (III) and Bi (III) biocomplexes INkA coordinated by the N of heterocycle and O of carbonyl group, but in Bi (III) biocomplexes – by the N of heterocycle and amino group. Coordination number of all PKA, NkA and INkA containing biocoordinated compounds are 6 and 7. Bio-complexes have octahedral shape.

UDC 547.571

4.B2.10. Synthesis and research of physical and chemical properties of benzaldehyde benzoilhydrazon and of complex compounds of some metals' tiocianates synthesized on its basis. /M.Tsintsadze, T.Giorgadze, G.Tsintsadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 236-238. – Geo. (res. Rus., Eng.)

Coordination compounds $M(SCN)_2 \cdot L_n \cdot m(H_2O)$ where M = Co (II), Ni (II), Cd; L = BGBA; n=1, 2; m = 0, 2; have been synthesized and studied by UR spectroscopic and radiographic methods. The ways of coordination of hydrazon and SCN– groups have been established and assumptions of a structure of the synthesized complexes are stated.

UDC 542.943

4.B2.11. Oxidation of stibium oxide (IV) with potassium bromate (V) in alkaline medium. /M.Rusia, M.Kopaleishvili, N.Sagaradze, M.Kikalishvili, R.Gigauri/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 239-241. – Rus. (res. Geo., Eng.)

A possibility of oxidation of stibium oxide (IV) with potassium bromate (V) in an alkaline medium for obtaining corresponding antimonite through the hydrochemical reaction has been studied. The potassium bromate is widely used for quantitative determination of stibium in different objects. Interaction of stibium oxide (IV) with the above-mentioned oxidizer for obtaining commercial products has not been investigated until now.

UDC 661.8

4.B2.12. Synthesis of some II-group metals' bis (salicyl-pyrocatechol) borates. /L.Turiashvili, B.Jioshvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 242-243. – Rus. (res. Geo., Eng.)

Bis (salicyl-pyrocatechol) borates of Mg, Ca, Ba and Zn have been synthesized. Elementary composition has been determined. IR spectra and thermoanalytical curves have been investigated. On this basis the structures of synthesized compounds are proposed.

UDC 539.9

4.B2.13. The electronic structure of (disallicyl) borat anion. /B.Jioshvili, L.Turiashvili, A.Kalatozishvili, Z.Pachulia/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 244-246. – Geo. (res. Rus., Eng.)

Within the scope of quantum-chemical half-empirical method AM1 the borate anyone of bis (disallicyl) borate cupper (II), interatomic distances, valence angles, the population of electrons on atomic orbitals (electronic density) and effective charges on the atoms of this anion have been calculated.

UDC 577.152.193

4.B2.14. Some peroxide compounds of P. Melikishvili and their coordinative formulas. /M.Tsintsadze, G.Tsintsadze, T.Tsivtsivadze, T.Edilashvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 247-248. – Geo. (res. Rus., Eng.)

Coordinative formulas of the compounds synthesized by Prof. P.G. Melikishvili are given in this article.

UDC 556.55:543.3

4.B2.15. A comparative characterization of chemical properties of water of some West Georgian Lakes. /N.Kiknadze, M.Kiknadze, T.Bauzhadze, T.Mzhavanadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 249-252. – Geo. (res. Rus., Eng.)

Three relict lakes of West Georgia have been chemically observed: Paleastomi (Kolkheti Lowland), Ardagani and Nuri lakes (Ajarian shore). The results of the observation are compared to the former data. On the basis of their generalization, it is established that physical and chemical parameters of the water of these three lakes are not within the permissible standards. This is caused mainly by the negative

influence of the factors of anthropogenic origin. Based on the strategic importance of the observed lakes, their regulat cleaning and a systematic monitoring of their hydro-chemical parameters are necessary.

UDC 541.64

4.B2.16. Dyed oligomers and polymers on the basis of polyvinyl alcohol and α,ω-bis (trimethylsiloxy) nethylhydridesiloxane. /M.Karchkhadze, O.Mukbaniani, R.Tkeshelashvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 253-255. – Geo. (res. Rus., Eng.)

Dyed polymers have been obtained through both the „direct" and chemical dying method. In partciluar, by etherification of polyvinil alcohol and dehydrocondensation reactions of α,ω-bis(trimethylsiloxy)methylhydridesiloxane with some azo- and diazo-groups-containing stains oligomers and polymers with chromophoric groups in the side chain have been synthesized..

UDC 678.049.12:678.044

4.B2.17. Mono- and bis-vinylacetylenic carbinols of a ferricene series – new special-purpose effective catalysts. Study IX. /E.Gigineishvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 256-257. – Rus. (res. Geo., Eng.)

Some transformations of ferrocene-conteining bis-vinilacetilene carbinol FK-3Γ-reduction reaction with the complex $LiAlH_4/AlCl_3$ and reaction of catalytic hydrogenation on $Pd/CaCO_3$ have been studied. Corresponding products have been obtained.

UDC 678.049.12:678.044

4.B2.18. Mono- and bis-vinylacetylenic carbinols of a ferricene series – new special-purpose effective catalysts. Study X. /E.Gigineishvili, N.Lekishvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 258-260. – Rus. (res. Geo., Eng.)

The catalytic and plasticizer properties of ferrocene-containing monovinilacetylene carbinol FK-3Γ were investigated. The results were compared with standard catalyst of burning of mixture solid rocket fuels – diphenylferrocene (DEF). It has been established that FK-3Γ, by its catalytic efficiency, predominates the standard catalyst (DEF) by 40-50% and is recommended for its substitution and inclusion in the production of MSRF.

UDC 547.313

4.B2.19. The role of cyclic redox surface reaction in activation of C_1-C_3 alkanes. /F.Babayeva, S.Abasov, M.Rustamov/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 266-269. – Rus. (res. Geo., Eng.)

The conversion of methane into benzene over M and M-ReO_x/Al_2O_3 (where M = Ni, Co, Pt) at 650°C and GHSV = 1500 $hour^{-1}$ and the conversion of C_6H_6-C_3H_8 mixtures into propene, cumen and other aromatic hydrocarbons at 180-350°C and GHSV = 500 $hour^{-1}$ over $MReO_x$+H– form of zeolites Y, M or ZSM-5 have been studied. It has been established that the course of reactions is dependent on a cyclic reduction of metallic sites M-O-ReO_x by hydrocarbons or hydrocarbon and H^+ with the follow-up oxidation of the reduced $MReO_x$ sites by the formed H_2O molecules.

UDC 678.044:661.185.224

4.B2.20. Study of phenol interaction process with 1-methylcyclohexene in the presence of phosphorus-containing catalyst on a regressional mathematical model. /R.Azimova, L.Zeynalova, R.Jafarov, A.Azizov, Ch.Rasulov/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 270-274. – Rus. (res. Geo., Eng.)

A regressional model of the process of interaction of phenol with 1-methyl-cyclohexene in the form of a polynome on the basis of minimal experimental data with the usage of the method of multifactor programming of experiment has been developed.

UDC 541.113

4.B2.21. Degree of accuracy of $C_{p,298}$ and $\Delta G^0_{f,T}$ values computed by the Academician N.Landia's method. /A.Sarukhanishvili, E.Matsaberidze, M.Gugeshidze, M.Kapanadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 275-277. – Rus. (res. Geo., Eng.)

The results of comparison of standard values of heat capacity of a number of compounds calculated by means of a computerized method of the Academician N. Landia are given and presented in the IVTANTERMO database. The difference between these values is found not to exceed 15%, which allows calculating $\Delta G^0_{f,T}$ within not more than one-percent accuracy.

UDC 547.551.2:539.163.3
4.B2.22. An algebraic-chemical investigation of the "structure-properties" correlations for N-alkylanilines. /M.Gverdtsiteli, N.Basharuli, M.Gverdtsiteli/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 278. – Eng. (res. Geo., Rus.)
The "structure-properties" correlations have been constructed and studied for N-alkylanilines within the scope of quasi-ANB-matrices method. The calculations show the correlations to be satisfactory.

UDC 661.83:546.311
4.B2.23. Theoretical investigation of aluminohydrides of alkali metals within the scope of pseudo-ANB-matrices method. /M.Gverdtsiteli, N.Basharuli, M.Gverdtsiteli, G.Chachava/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – p. 279. – Rus. (res. Geo., Eng.)
Two correlation equations have been constructed and investigated for aluminohydrides of alkali metals within the scope of pseudo-ANB-matrices method. The calculations show the correlations to be satisfactory.

UDC 615.038
4.B2.24. On using Circassian wallnut leaves for manufacture of medical preparations. /K.Goletiani, P.Yavich, G.Tsagareishvili, L.Churadze, N Gagua/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 280-284. – Rus. (res. Geo., Eng.)
According to literary data, the Circassian walnut leaves containing tannins, flavonoids, vitamins, different acids, among them unsaturated fat, quinones, alkaloids etc. in the form of infusions, decoctions, extracts, ointments and powders are widely used in popular medicine for treating a wide range of diseases. In the traditional medicine, the leaves are used for treating gastrointestinal tract, cutaneous diseases, avitaminosis, and helminthosis. They are also used in cosmetics and for other purposes. There are data concerning the use of walnut leaves in treating oncological diseases and radiation damages. On the basis of the available data, a cream, containing a thick extract of the Circassian walnut leaf, a new (bentonite clay) base of the preparation "Thicha-Ascanae", lanolin and oil, has been prepared. The physico-chemical characteristics of the cream are given. The cream is found to fully meeting the existing requirements The microbiologic characteristic of the cream have been studied to found that that the cream's storage is not liable to the formation of microbial, bacterial and fungous flora, which is indicative of its high activity. The cream is recommended for treating cutaneous diseases related to streptococcus, staphylococci and fungous damages and for cosmetic purposes.

UDC 58.07
4.B2.25. Standardization of hawthorn berries and flowers. /P.Yavich, L.Churadze, N.Gagua, K.Magradze, T.Rukhadze, M.Kakhetelidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 285-287. – Rus. (res. Geo., Eng.)
The content of biologically active compounds in berries and flowers of the hawthorn plant growing in the outskirts of Tbilisi has been studied. According to the obtained data, a number of tests corresponding to the pharmacopoeia are recommended to be increased.

UDC 612.392.74
4.B2.26. Application of dietary fibers for production of wheat bread with improved properties. /M.Shengelia, N.Dolidze, R.Iashvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 288-290. – Rus. (res. Geo., Eng.)
The properties of dietary fibers for normalization of the gastrointestinal tract action have been established. The efficiency of using wheat bran for treating and preventing gastrointestinal diseases has been detected.

UDC 612.392.74
4.B2.27. Improvement of bread quality by using medical-prophylactic non-traditional food raw material. /M.Shengelia, T.Menabde, R.Iashvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 291-292. – Geo. (res. Rus., Eng.)
Today, there is a real opportunity for making a new variety of wheat flour through a special milling method consisting of grinding the whole grain and baking a new variety of bread with high nutritional qualities.

UDC 669.053.4.
4.B2.28. A combined hydrometallurgical treatment of an oxidized concentrate of Madneuli pyrite and Chiatura manganese. /L.Bagaturia, V.Gaprindashvili, N.Barnov, M.Gvelesiani, T.Lezhava/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 293-294. – Geo. (res. Rus., Eng.)
For extracting main components (Mn, Fe) from pyrite and manganese concentrates, a mechanical-chemical activation process is recommended at the first stage of hydrometallurgical treatment of their blend. In the process of mechanical-chemical activation, an increase in the specific surface area of the

tested blend and the breaking of the lattice take place, leading to the activity of substances in the process of subsequent treatment. The proposed process excludes the use of high temperatures and concentrated acids and guarantees the possibility of extraction from the initial raw stock of the main components in the form of manganese and iron sulphates at high rates (Mn – 90%, Fe – 80%).

UDC 665.66

4.B2.29. Study of used oil products' pyrolysis. /G.Khitiri, L.Topuridze, T.Gabunia, Z.Amiridze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 295-296. – Rus. (res. Geo., Eng.)

The product obtained as a result of pyrolysis of used oil products has been investigated. It is shown that the pyrolyzate contains valuable aromatic compounds. In addition, gasoline and kerosene fractions can be used as useful components for industrial-technical purposes, while the residue over 350°C can be recommended as a component for fuel oil.

UDC 628.315

4.B2.30. Wallpaper manufacturing water purification. /G.Jincharadze, N.Bokuchava, D.Jincharadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 297-300. – Rus. (res. Geo., Eng.)

A scheme of wall-paper manufacturing water purification using the processes of coagulation, flocculation and sorption has been developed. The full water purification and decolorization takes place by adding reagents of aluminium sulphate, lime milk, coal ashes from thermal power stations and polyacrylamide in definite quantities. The water purification quality makes possible to re-use it.

UDC 625.712.35:574

4.B2.31. Ecological and economic efficiency of highway tunnels *ad exemplum* Roki highway tunnel. /N.Beglarashvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 301-302. – Geo. (res. Rus., Eng.)

Ecological efficiency has been determined given a significant share (70%) of greenhouse gases (GHGs) emitted by motor transport. The Natakhtari-Ardoni highway section has been estimated for the amount of main greenhouse gas (CO_2, N_2O) emissions from both the Roki highway tunnel and the Dariali cross section. The ecological efficiency of the Roki highway tunnel is assessed as a result of reduction of GHG emissions. The economic efficiency of the tunnel construction is estimated in relative units.

UDC 625.712.35:574

4.B2.32. Greenhouse gas emission reduction potential in using Rikoti tunnel and its economic efficiency measure. /N.Beglarashvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 303-304. – Geo. (res. Rus., Eng.)

The quantitative data on greenhouse gas emissions from motor vehicles on Rikoti (Georgia) highway section have been presented when using both the tunnel and adjacent cross. The ecological efficiency of the highway tunnel is assessed as a result of reduction in GHG emissions. The economic effectiveness of the tunnel construction is estimated in relative units.

UDC 551.438.5(262.5)

4.B2.33. The effect of anthropogenic factors on the physico-chemical parameters of the Black Sea water in the Ajarian coastal strip. /N.Kiknadze, M.Kiknadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 305-308. – Geo. (res. Rus., Eng.)

The present chemical and ecological state of the Black Sea water in the Ajarian coastal strip, namely in Kvariati, Adlia, Batumi University and Batumi Port water areas has been studied. For this purpose, some physical and chemical parameters of the Black Sea water (temperature, pH, salt, instant oxygen contents, biochemical usage of the oxygen) have been seasonally determined. These parameters are found to be within permissible standards in the Kvariati water area. Any anthropogenic factor effect causes pollution of the Black Sea water. From this point the most polluted is the Batumi Port water area. For rational and successful use of the Black Sea genetic pool, regular chemical and ecological monitoring is to be carried out in order to control the water quality.

UDC 547:541.134.5

4.B2.34. Oxidation-reduction reactions in organic chemistry. /M.Gverdtsiteli, G.Otinashvili, M.Gverdtsiteli, M.Karchkhadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #3. – pp. 309. – Geo. (res. Rus., Eng.)

Examples of an electronic balance method application for organic reactions are considered.

UDC 547.576

4.B2.35. Coordination compounds of Cu (Ii) with acetylhydrazone of salicylic aldehyde. /R.Machkhoshvili, O.Shamilishvili, N.Didmanidze. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 319-322. – Rus. (res. Geo., Eng.)

The complexes $Cu(AGSA)_2X_2 \cdot nH_2O$, where AGSA = $H_3CCONHNC(H)C_6H_4OH$, X = Cl, Br, NO_3, ½SO_4. n = 2 or 3, have been obtained by interaction of copper (II) chloride bromide, sulphate, nitrate with salicylac aldehyde of acetylhydrazone. Some of the properties and IR absorption spectra of the complexes are studied.

UDC 542.91

4.B2.36. Synthesis, Structure and Properties of Biocoordinative Admixture of Arsenic, Stibium and Bismuth Halides with Cordiamine. /T.Tsivtsivadze, N.Chigogidze, R.Skhiladze, R.Kldiashvili, G.Sulakvelidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 323-330. – Geo. (res. Rus., Eng.)

The methodology has been worked out, purposeful synthesis conducted and 9 new bio-coordinative admixtures of arsenic, stibium and bismuth with the heart preparation of Cordiamine obtained with total structure: $MX_3(Cor) \cdot (C_2H_5OH)_n$, where M = As(III), Sb(III), Bi(III); Cor = cordiamine (N,N-diethylnicotineamide, $C_{10}H_{14}N_{2O}$); C_2H_5OH - ethanol; n = 1, 2. Optimum conditions for the synthesis have been determined. The structure of the synthesized bio-complex and the question of stereochemistry have been studied by means of x-ray structural analysis and infra-red spectral absorption. The obtained structural data can serve as a stimulus for purposeful research of mixed bio-coordinative admixture and for determination of the influence of structural and geometric characteristics on their physical, chemical and biological properties. These results are of utmost importance for revealing subtle peculiarities of interaction between the complex-forming atoms and ligands (acydo and organic) when they contain different competitive donor atoms. The studied data of mixed bio-complexes, their inter-atom distances and other geometric parameters are necessary for conducting different quantum-chemical calculations. Conditions for thermal stability of synthesized bio-coordinative admixtures under different temperature regimes have been determined by means of a thermographic research.

UDC 616-002.5

4.B2.37. New antitubercular bio-complexes with Larusane. /T.Tsivtsivadze, N.Chigogidze, R.Skhiladze, R.Kldiashvili, G.Sulakvelidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 331-338. – Geo. (res. Rus., Eng.)

By means of a devised methodology nine new antitubercular bio-complex admixtures of arsenic, stibium and bismuth with antitubercular medical preparation of Larusane (furfural acetone isonicotinoil-hydrazone monohydrate, $C_{14}H_{13}N_3O_2 \cdot H_2O$ = Lar) have been synthesised in non-aqueous solutions with the total formula: $MX_3(Lar)_2(C_2H_5OH)$, where M = As(III), Sb(III), Bi(III); X = F^-, Cl^-, Br^-, I^-; Lar – Larusane, C_2H_5OH – ethanol. Optimal conditions for synthesis, some questions concerning thermal stability of bio-complex admixtures and other basic physical, chemical and physico-pharmacological characteristics have been determined. According to the preclinical studies, the synthesized bio-complex admixtures have displayed strong bioactivity towards tubercular mycobacterium.

UDC 541.12.017.3

4.B2.38. Dehydration of three-component azeotropic mixture with clinoptilolite. /L.Turiashvili, A.Kalatozishvili, T.Tsiramua, B.Jioshvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 339-340. – Geo. (res. Rus., Eng.)

An opportunity of clinoptilolite's use in the etherification reaction between boric acid and methanol has been studied in order to dehydrate the azeotropic mixture of methanol+methylborate+water.

UDC 542.91

4.B2.39. Synthesis of some bis-indole compounds on the basis of azelaic, sebacic acids and 7-methyltriptamine. /J.Lagidze, L.Talakvadze, T.Revazishvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 341-343. – Geo. (res. Rus., Eng.)

On the basis of dichloroanhydrides of azelaic and sebacic acids and 7-methyltryptamine the corresponding bis-indoles: bis-N,N'-[2-(7-methyl-1H-indol-3-yl)ethyl]amide of the azelaic acid and bis-N,N'-[2-(7-me-thyl-1H-indol-3-yl)ethyl]amide of sebacic acid have been obtained. By cyclization of the latter under Bishler-Napiralsky reaction bis-β-carbolines (1,7-bis-(8-methyl-3,4-dihydro-9H-β-carboline-1-yl)-heptan and 1,8-bis-(8-methyl-3,4-dihydro-9H-β-carboline-1-yl)octane) have been synthesized. The structure of these compounds has been established on the basis of elementary analysis and spectroscopic investigations. As it is known, such bis-indoles and β-carbolin derivatives are widely used in medicine as effective antiblastomatic preparations. At the same time, they are used as high antidepresant and hypotensic means. Biological investigation of the synthesised compounds has shown that they easily overcome the hematoencepalic barrier and accumulate in high concentrations in the brain tumour cells of experimental animals. Studu of their biological activity is under way.

UDC 547.785.5

4.B2.40. Obtaining of new potentially bioactive derivatives based on 1h-bBenzo(E)thiophene(3,2-E)benzimidazol. /T.Khoshtaria, N.Gakhokidze, M.Maisuradze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 344-345. – Geo. (res. Rus., Eng.)

By merging two heterocyclic systems – dibenzthiophene and benzimidazol, which are separately characterized by a rather wide range of biological activity (tuberculostatic, antimalarial, psychotropic etc), a new heterocyclic condensed tetracycli system 1H-benzo(e)thiopheme(3,2-e)benzimidazol and its 2-methyl-, 2-chlormethyl-, 2-phenyl-, 2-o-chlorphenyl- derivatives were obtained and methods of their preparation were elaborated; also some of their spectral characteristics were studied.

UDC 543.226

4.B2.41. Thermo-analytical research of alkylphenolate-type polyfunctional boron-containing additives. /T.Akchurina, A.Mamedova, E.Nagiyeva, Sh.Amidova/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 346-348. – Rus. (res. Geo., Eng.)

Intermediate and final products of synthesis of multifunctional additives which are calcium salts of condensation products of alkylphenol with formaldehyde and ammonia or monoethanolamine treated by boric acid have been studied by methods of thermal analysis in comparison with analogous additives not containing atom boron. It is shown that a boron-containing additive of the product of phase condensation of alkylphenol with formaldehyde and monoethanolamine has increased thermostability, 360°C, and the best thermo-oxidative efficiency to oil as well.

UDC 54-161

4.B2.42. Amorphous matrix nanocomposites in the system PbO-MnO-B_2O_3. /A.Sarukhanishvili, T.Cheishvili, M.Kapanadze, M.Mshvildadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 349-353. – Rus. (res. Geo., Eng.)

Glasses produced on the basis of PbO-MnO-B_2O_3 system are considered as nanocomposites, for they are characterized by signs of amorphous matrix nanocomposite materials. It is supposed that amorphous (glassy) materials obtained in this system consist of several kinds of structural units, which can be considered as nanodimensional inclusions. The effect of correlation and sizes of inclusions on the character of dilatometric curve of materials and volume electrical resistance is shown.

UDC 546.221.1:666.266.6

4.B2.43. Tests of glass coatings on hydrosulphuric corrosion. /I.Berdzenishvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 354-355. – Rus. (res. Geo., Eng.)

The basic factors causing corrosion and the character of local failures of pipelines, which are worsened by vital functions of sulphate-reducing bacteria are discussed. It is shown that pipeline service life does not exceed 1-1.5 years though, according to standards, it must be 7.6 years. The expediency of using pipes with protective silicate enamel coatings is justified. Experimental tests of coatings on hydrosulphuric corrosion have shown positive results.

UDC 541.64

4.B2.44. Organophilization of clinoptilolite optimization process for preparation of polymer extenders. /O.Lomtadze, N.Karkashadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 356-360. – Rus. (res. Geo., Eng.)

Quantitative distribution on the size of particles in the powders of organophilic clinoptilolite prepared by a method of mechanical adsorption has been investigated. Dependence of the size of a specific surface of powders and speed of their saturation by water or toluene on the change of the organophilization degree of a surface of these powders is shown. According to the findings, the optimum amount of surfactant – octa-decylamine - was selected (1% of a taken clinoptilolite) which under conditions of the given degree of dispersion provides the preparation of a powder with the maximal dispersibility and affinity to polymers. Investigation of physical and mechanical properties of the compounded coverings containing clinoptilolite, organophilized in a various degree, has shown suitability of the prepared clinoptilolite as active extender for polymers.

UDC 543.21

4.B2.45. Thermo-gravimetric investigation of crystalline boron. /T.Machaladze, M.Shavlakadze, M.Samkharadze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 361-364. – Geo. (res. Rus., Eng.)

Investigation of crystalline boron of α- and β-modifications was carried out by thermogravimetric method. Heating on the air of α-romboedrical boron powders to 600°C is accompanied with the dehydration process of orthoboric acid. Intensity of the process is determined by the content of boric anhydride of glassy modification in starting powders. The temperature of the oxidation process starting and the

oxidation coefficient of crystalline boron powders when heated to 1000°C have been determined. The oxidation coefficient of β-rombo-edrical boron is ~25%, while α-romboedrical boron is ~35%.

UDC 661.3

4.B2.46. The use of a mathematical planning method of an experiment in the process of joint extraction of hallco-pyrite and manganese concentrates. /L.Bagaturia, V.Gaprindashvili, N.Barnov, M.Gvelesiani, T.Lezhava/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 365-366. – Geo. (res. Rus., Eng.)

The optimal conditions of sulphur acid extraction process of former activated mixtures of hallco-pyrite and manganese concentrates have been found: extraction duration - 2 h; the process temperature - 90ºC, liquid : solid ratio - 10:1, sulphur acid concentration is 10%, grinding time - 1h. Degree of copper extraction is – 93.7%, manganese – 99.8%. The obtained solutions containing Cu - 13; Fe^{2+} - 10; Fe^{3+} - 4,2; Mn^{2+} - 80; H_2SO_4 – 33.5 g/l after purification from iron are valid for obtaining metallic copper and manganese compounds.

UDC 577.33

4.B2.47. Quantum–chemical investigation of a complex-forming ability of oxymethyl-amide of pyridine-3- and 4–carboxylic (nicotinic and izonicotinic acid). /G.Tsintsadze, T.Tsintsadze, D.Lochoshvili, I.Gvelesiani, L.Skhirtladze, M.Kereselidze, J.Kereselidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 367-369. – Rus. (res. Geo., Eng.)

By the quantum(chemical method AM1 the energetic, electronic and structural characteristics of oxymethyl-amide of pyridine(3(and 4(carboxylic acid have been calculated. A method for coordinating this molecule was determined on the basis of the calculated data.

UDC 546.121.13

4.B2.48. Theoretical investigation of magnesium halides within the scope of ANB-matrices method. /M.Gverdtsiteli, K.Kupatadze, M.Gverdtsiteli/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – p. 370. – Eng. (res. Geo., Rus.)

Four correlation equations have been constructed and investigated for magnesium halides, within the scope of the ANB- matrices method. Calculations show the correlations to be satisfactory.

UDC 661.839

4.B2.49. Mathematical-chemical investigation of the hydrides of VIA group elements within the scope of ANB-matrices method. /M.Gverdtsiteli, K.Kupatadze, M.Gverdtsiteli/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – p. 371. – Eng. (res. Geo., Rus.)

Correlation equations are constructed and investigated for the hydrides of VIA group elements within the scope of ANB-matrices method. Calculations show the correlations to be satisfactory.

UDC 519.233.5

4.B2.50. Mathematical-chemical investigation of glymes within the Scope of quasi-ANB-matrices method. /N.Ovsyannikova, M.Gverdtsiteli, N.Kuprashvili, M.Gverdtsiteli/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – p. 372. – Eng. (res. Geo., Rus.)

Within the scope of the quasi-ANB-matrices method correlation equations are constructed and investigated for glymes. Calculations show the correlations to be satisfactory.

UDC 665.583.44

4.B2.51. Study of anti-inflammatory action of a tooth-paste containing vegetative extracts. /B.Butskhrikidze, M.Bakhtadze, M.Gegeshidze, G.Gorgodze, G.Khvedelidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 373-375. – Rus. (res. Geo., Eng.)

The ability of the the tooth-paste containing an extract oil of tea leaves and extracts of blackberry leaves to limit exudates component of inflammation and inflammatory damage has been determined. In addition, it contributes to proliferation of woven and active healing of wounds. All these properties are indicative of good prospects for practical use of the tooth-paste.

UDC 663.95

4.B2.52. Influence of extraction methods on thei quantitative and qualitative composition of a tea lipid complex. /G.Gorgodze, M.Gegeshidze, M.Bakhtadze, G.Khvedelidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 376-378. – Geo. (res. Rus., Eng.)

Organic solvents have been selected and the use of trichloroethylene for extraction of a tea lipid complex has been considered expedient. The tea leaf granulation prior to extraction that increases the outcome of biologically active substances is recommended. The extraction length and temperature have been fixed,

as well as the weight proportion of the solvent and tea leaf which should be taken into account in an industrial experiment.

UDC 627.8.03

4.B2.53. Intensification of the regeneration of water-purifying ionite filters by an ultrasound device. /N.Kalabegashvili, D.Ioseliani/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 379-380. – Rus. (res. Geo., Eng.)

The process of intensification of the regeneration of water-purifying ionite filters by an ultrasound device has been studied. The ion-exchange capacity of cationites as a result of irradiation by an ultrasound device is found to increase by 12%, while the ion-exchange capacity of anionites - by 9%. Moreover, as a result of ultrasound irradiation, the anionized water almost does not contain SiO_3^{2-} ions.

UDC 661.183.123.3

4.B2.54. Elaboration of an optimal scheme of hot regeneration of anionite filters. /N.Kalabegashvili, D.Ioseliani, G.Balarjishvili/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 381-382. – Geo. (res. Rus., Eng.)

An optimal scheme of hot regeneration of anionite filters of the Tbilisi State Regional Power Station has been elaborated. Implementation of this scheme will ensure the release of anionite filters from polymerized silicic acid accumulated during years, the resultant increase of the ion-exchange capacity and service life of anionites, and high quality of water purification at thermal and nuclear power stations.

UDC 66.081

4.B2.55. Sorption power and possibility of use of waste coal of Tkibuli Coal-Preparation Plant /M.Tsverava, T.Palavandishvili, E.Shengelia, L.Gvasalia/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 385-386. – Geo. (res. Rus., Eng.)

The sorption power of waste coal of Tkibuli Coal-Preparation Plant towards water colour and organic matters has been studied and tested as filtering material by the water-treatment shop of Rustavi JSC "Azoti".

UDC 66.081

4.B2.56. Investigation of sorption power of waste coal of Tkibuli Coal-Preparation Plant towards heavy metals. /T.Palavandishvili, M.Tsverava, L.Gvasalia/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 387-389. – Geo. (res. Rus., Eng.)

The dependence of water purification from heavy metals on the concentration correlation and solution pH has been studied on the waste coal of Tkibuli Coal-Preparation Plant as a natural sorbent. The mathematical model of purifying the polluted water from heavy metals has been designed.

UDC 576.321:669.018.674

4.B2.57. On the mechanism of membranotropic action of heavy metal ions on plant cells. /J.Oniani, R.Gakhokidze, T.Oniani, E.Gakhokidze, L.Tabatadze, T.Mchedluri, V.Yurin/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 390-393. – Eng. (res. Geo., Rus.)

The regularities of interaction between heavy metal ions and plasmalemma are described on the basis of measurements of bioelectrical reactions of the cell and cyclosis velocity. It is shown that Pb^{2+}, Zn^{2+}, Cd^{2+}, Ni^{2+} ions in concentrations of 10^{-6}-10^{-3}M have a direct membranotropic effect. Copper in concentration above 10^{-5} M exerts an indirect membranotropic effect in both short- (10-15 min) and long-term (more than 20 min) experiments. In this respect, a scheme for the chemical agents' classification is suggested according to the elements of membranotropic effect mechanism and with consideration of the shifts in the ion permeability of membrane.

UDC 576.321

4.B2.58. Evaluation of membranotropic effects of water samples according to electroplasmographic analysis data. /J.Oniani, R.Gakhokidze, T.Oniani, M.Gakhokidze, L.Tabatadze, T.Mchedluri, V.Yurin/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 394-395. – Eng. (res. Geo., Rus.)

In a framework of the model, which describes potential-dependency of the velocity of cellular cyclosis in the characeae algae, the evaluation of the action character of the tested water samples was performed. The tested water samples were found to pronouncedly differ from each other according to their action on the cyclosis. The detected regularities make possible to test biological quality of the water medium.

UDC 632.95

4.B2.59. Persistent organic pollutant (POP) pesticides – environmental challenge. /A.Chankseliani, I.Legashvili, N.Gongadze, N.Kutsiava/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 396-398. – Eng. (res. Geo., Rus.)

Extrapolating from the laboratory analyses, it is estimated that about 66% of total volume of obsolete pesticides contain POPs, bringing the volume of POP pesticides in the regional stores to 235 t.

UDC 665.7.035.6

4.B2.60. Rheological bases of reprocessing technology of shell-shaped used articles made from polyolefins. /M.Gachechiladze, I.Bochoidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 402-404. – Geo. (res. Eng., Rus.)

The rheological basis of reprocessing technology of shell-shaped and used articles made from polyolefins have been considered. Experimental flow curves have been built with the help of reometer for the used contaminated and washed samples. An attempt has beem made to explain the fact of shear stress reduction at high deformation speeds for the contaminated samples. Processing methods of used articles, their variety and the temperature regimes are given conditionally.

B3. Geology. Geodesy

UDC 552.143

4.B3.1. Event deposits in chaotically built formations. /F.Maisadze/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. -#3. – pp. 79-87. – Eng. (res. Geo, Eng.)

Proceeding from the analysis of the composition, structure and the forming mechanism of the Upper Eocene chaotically built formations of a part of the Alpine folded area (the Swiss and French Alps, the Dinarides, the Southern Slope of the Greater Caucasus), event deposits have been established; they are observed in the form of olistostromes and wild flysch. It is ascertained that the major factors of their formation were oft-recurring catastrophic events related to the thrusting accompanying the Pyrenean phase of folding, at the terminal of Late Eocene. With due regard for the degree of force and scope of display of these catastrophic events, it can be inferred that the olistostromes and wild flysch are event deposits of a higher order than the analogous ones of the rhythmically built formations (tempestites, turbidites).

UDC 502.55

4.B3.2. Influence of foehn phenomena on the processes of atmospheric air pollution. /G.Gunia, Z.Tskvitinidze, B.Kholmatjanov, Z.Fatkhullaeva/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. -# 3. – pp. 65-69. – Eng., Geo. (res. Eng.)

The paper presents the results of investigations of the influence of foehn phenomena on the level of pollution of atmospheric air of Kolkheti lowland (South-Western part of the Caucasus) and Akhangaran valley (Western Tien Shan). The calculations of the distribution fields of NOx concentration in the region of Akhangaran valley are presented. It is shown that foehn events have a significant impact on the level of atmospheric air pollution in conditions of mountainous countries.

UDC 550.382.2

4.B3.3. Some Results of electrometric survey of the territory of magnetic sands of the Ureki seaside resort. /G.Berishvili, A.Tarkhnishvili, J.Lominadze, N.Mebaghishvili, G.Tabaghua, K.Kartvelishvili/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. -#3. – pp. 70-73. – Eng., Geo. (res. Eng.)

The curative properties of Ureki seaside resort are widely known, although this region is not practically distinguished for climatic and geological peculiarities from other areas of the Black Sea coastal area, by being affected by space geophysical fields and other clearly notable factors. In addition, the beach line is definitely uniform in terms of the coastal sands and their content of magnetite. According to geomorphologic research, the geological structure of this region must have been formed with the participation of river sedimentation represented in the paleobed of the River Supsa, this being evidenced by electrometric data. The said dislocation of the sediments represented on Ureki territory, electrically, the so-called “peninsular” model, by its hydro geological peculiarities is an exception to the littoral strip of the region. Further research is advisable to be carried out as a complex one – with participation of physicists, geophysicists, medical men, and specialists from other related branches, whereas for the purpose of identifying new prospective areas, detailed field work should continue in the Poti-Batumi littoral.

UDC 551.24(479.22)

4.B3.4. Kinematics and morphogenesis of intermontane molasse depression block structures of the Caucasus (Georgia). /L.Basheleishvili, M.Qumelashvili, S.Stambolishvili/. Institute of Geology, Collection of Papers. – 2008. – pp. 61-68. – Rus. (res. Rus., Geo., Eng.)

Modern structure of the South Caucasian molasse depressions is on the main conditioned both by meridional and latitudinal fault systems; they encompass different depth of the Earth’s crust. The mentioned faults often turned out to be borderline structures of the blocks of the Earth’s crust crystalline

basement; they as a whole make a mosaic-block pattern. Configuration of the blocks is determined by the mentioned faults. The analysis of lithofacies and thicknesses of sedimentary cover sometimes establishes their autonomous and inverse nature of development as well as differentiated kinematics. The research data enables to make the following conclusions: the Caucasian molasse depression (within the territory of Georgia) is divided into eastern and western subsiding zones by the Dzirula (crystalline basement) salient; they are also divided by faults into separate restricted blocks. Westwards and eastwards of the central uplift zone, along the faults is outlined a gradual "stepwise" submergence and tilting of blocks of the crystalline substrate. In the modern literature the analogous structures are known as the so called "tilt" blocks and kinematically they are related to tensile strains. Thus, in contemporary structure of the pre-Alpine crystalline basement of the South Caucasian molassic depression (along the latitudinal profile) is marked the existence of tension structure mainly in condition of stepped-inclined blocks, which subsequently turn into the so-called listric faults. The appearance of this one is bound up, on the one hand, with uplift of the mantle masses in some parts of the region and on the other hand, with advance of the Arabian plate to the north and connected with them lateral squeezing out of masses both to the west and to the east especially at the late-orogenic (collision) stage of development.

UDC 552.5(479.22)
4.B3.5. Clastic dikes in Khrami crystalline massif. /O.Dudauri, G.Vashakidze, M.Togonidze/**.** A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp.226-231. – Rus. (res. Rus., Geo., Eng.)
The paper deals with the description and origin of clastic dikes discovered in the Khrami crystalline massif. They are superficial Neptunic clastic dikes formed on land.

UDX551.263.037(479.22)
4.B3.6. Pliocene volcanic centre on the southern slope of the Greater Caucasus within the limits of Upper Racha. /M.Togonidze, O.Dudauri/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – p. 232-237. – Rus. (res. Rus., Geo., Eng.)
On the crest of the Main Range of the Greater Caucasus, between the Laboda and Geze summits, we have revealed and investigated a dacitic volcanic center represented with a stock-like subvolcanic body – an incurrent volcanic vent (neck) and with a volcanic breccia filling a parasitic vent of the volcano. The effusive activity was accompanied by forming of two systems of dacitic dykes - sublatitudinal and submeridional. At that, the last ones intersect the first system of dykes. On the Southern Slope of the Greater Caucasus dacitic bodies are known on the Karobi ridge and near the glacier of Kirtisho and a hypabyssal granite porphyric intrusion in the upper reaches of the Tskhenistskali (Tsurungal). K-Ar age of these bodies is proved to be Pliocene - 4-4.5Ma. The age of Zopkhito dacites by petrographic and petrochemical similarity to Karobi dacites can also be considered as Pliocene. The set of indicated hypabyssal and volcanic formation is a volcanic-plutonic association.

UDC 551.263.037(479.22)
4.B3.7. Some aspects of the formation of the Javakheti Plateau (Southern Georgia). /G.Vashakidze, R.Akhvlediani, O.Dudauri, M.Togonidze, V.Lebedev/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 238-248. – Rus. (res. Rus., Geo., Eng.)
The study of the petrochemical data for the young volcanics of the Javakheti Plateau has allowed, first of all, due to the mineral thermo-barometry to define concrete P-T conditions of forming of the studied rocks. Statistical treatment of the petrochemical characteristics of the rocks that were formed at various stages and phases of the region's Neogene-Quaternary magmatism has enabled to be traced, to a certain extent, a pattern of successive change of the formation mode of the young volcanics for the Javakheti Plateau as a whole.

UDC 552.3(479.22)
4.B3.8. New data on the age of magmatic rocks of the Kutaisi District (Western Georgia). /V.Lebedev, G.Vashakidze, A.Chugaev, O.Dudauri, M.Togonidze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 268-273. – Rus. (res. Rus., Geo., Eng.)
We have obtained new K-Ar dating for the magmatic rocks of the Kutaisi district of the Western Georgia. It is shown that the igneous rocks of this region were formed during the three pulses of the Mesozoic magmatism - Bajocian, Kimmeridgian-Tithonian and Turonian-Santonian. The teschenitic and qartz-dioritic intrusions that were referred earlier to the Neogene, are plutonic analogues of the Upper Cretaceous suite Mtavari and as for the basalt bodies fixed in the Bathonian sediments - they are of the Tithonian - Kimmeridgian age. The isotope-geochronological data testify to the absence of the display of Neogene - Quaternary volcanism within the limits of the Kutaisi district; in this connection we think it incorrect to include this region into the bounds of the Central Georgian neovolcanic area.

UDC 550.8.528(479.22)
4.B3.9. Mapping according to potassium ratio in Eocene volcanogenic rocks of Achara-Trialeti. /G.Nasidze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 279-282. – Rus. (res. Rus., Geo., Eng.)
Statistical processing of data on K-Na ratio in volcanogenic rocks of the region has established four distribution curves of K_2O/ K_2O+ Na_2O, respectively amounting to 21, 35, 50 and 64%. As a result, mapping of the volcanogenic rocks of the region has been carried out.

UDC 549.673.1(479.22)
4.B3.10. Molecular structure of jet. /R.Akhvlediani, I.Akhvlediani/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 291-299. – Rus. (res. Rus., Geo., Eng.)
IR spectrometry, nuclear magnetic resonance and x-ray diffraction methods have been used in the preliminary study of the composition and structural state of organic constituent of jets from Tkibuli coal basin (Georgia). Aromatic, aliphatic and alicyclic groups, also tracks of their transformation during metamorphism process were detected. The resin part of jet has been analysed.

UDC 552.521(479.22)
4.B3.11. Mode of occurrence and texture of jet in different sedimentary basins. /I.Akhvlediani, Z.Kilasonia/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 359-369. – Rus. (res. Rus., Geo., Eng.)
Mode of occurrence and texture of jet body is discussed. General relationship and typomorphic features for different sedimentary basins are shown. They may serve in future as as a basis for paleogeographic and paleofloristic reconstructions, also as a cause of "Jet Atlas" creation**.**

UDC 550.93
4.B3.12. The crystallogeny and age of zircon from the gabbroids of the Korsun-Novomirgorod pluton (Ukrainian shield). /T.Dovbush, L.Stepaniuk, E.Shestopalova/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 274-278. – Rus. (res. Rus., Geo., Eng.)
By the methods of optical and electronic microscopy, the anatomy of crystals and structure of the inclusions in zircons from anorthosites of two large massifs of the Korsun-Novomirgorodsky pluton have been studied. In the middle of zircon crystals, in a form of inclusions are revealed pyroxenes, feldspars, ilmenite, apatite and quartz that allows to assume the late magmatic crystallization of zircon and to interpret the digital values of the age received for zircons using the uranium-lead isotope dating, as the age of anorthosites. According to uranium-lead isotope dating of zircons it is established, that the anorthosites of the Novomirgorodsky massif are dated as 1750,2±0,9 million years, and that of the Smiljansky massif as 1752,8±6,5 million years. Based on isotope composition of strontium in apatite ($^{87}Sr/^{86}Sr$=0.7069) and presence of relict cores in zircon crystals there is drawn a conclusion about the lower crustal source of these anorthosites.

UDC 551.248.1(479.22)
4.B3.13. Some issues of neotectonics of the Javakheti volcanic highland (Central South Georgia). /N.Sadradze, N.Tsereteli, O.Varazanashvili, A.Gventsadze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 79-90. – Rus. (res. Rus., Geo., Eng.)
There is specified the age of intensively folded acid volcanites spread within the limits of Eastern periphery of Javakheti highland (to the west of the village Kamarlo). They are the analogues of the Upper Miocene-Lower Pliocene Goderdzi suite. Folding of these lavas is indicative of the tectonic activity of the region at the Late Neogene stage of its development. Especially, “Kamarlo” lavas are intensively folded in contact with Middle Eocene rocks. The folds are of fault-propagation type. The contact is tectonic and it verifies to the activity of the Dmanisi fault. The version that folding of these lavas is flow-induced has been rejected. Seismological and seismotectonic investigations show that the Javakheti and Dmanisi faults belong to the sub-vertical right -lateral strike-slip faults. Investigations of distribution of depth by magnitude (M≥4) have shown that earthquake depths mostly change from 8 to 15 km. The orientations of maximum horizontal stress are North-South that reflects the orientation of acting regional compression.

UDC 552.5(479.22)
4.B3.14. Comparative lithology of the Early Cretaceous sedimentary formations of Georgia. /E.Varsimashvili/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 338-347. – Rus. (res. Rus., Geo., Eng.)
A detailed study of the comparative lithology of the Early Cretaceous sedimentary formations of Georgia enables to ascertain flysch sedimentation in the Eastern basin of the Marginal Sea of the Greater Caucasus and the involved processes of lithogenesis. Here are distinguished Berriasian-Early Hauterivian relatively deep-sea, Late Hauterivian-Aptian shallow sea and Albian relatively deep marine environments of sedimentation, the lithological character of the Lower Cretaceous epicontinental-marine

sediments of Georgia and their matter content specifies that originated in various marine environments – from the bar-wave-cut zone of the mobile shoal to the external shelf inclusive.

UDC 552.5(479.22)

4.B3.15. On the lithology of Upper Cretaceous flysch formation of the Aragvi river-gorge. /G.Chikhradze, N.Gagnidze, N.Sadradze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 348-352. – Rus. (res. Rus., Geo., Eng.)

The Upper Cretaceous carbonate flysch formations are spread in the Aragvi river-gorge of Shovi-Pasanauri subzone of Mestia-Tianeti zone of the Southern Slope of the Greater Caucasus, where they are transversed by Georgian Military road. These sedimentary rocks occupy stratigraphic level from the Upper Turonian including Maastrichtian and form continuous section, represented by limestones, marls, carbonate pelitolithes – argillites and small amount of turbidites. Detailed study of carbonate formations showed that methods of their field study needs more precise definition. Almost all the section of the Senonian is represented by basin carbonate sediments, and turbidites make up 5% of the section. While studying such type of carbonate formations for the first time its necessary to describe the basin formations, their regular alternation (ABAB) with establishment of genetic types of limestones and other pelitic carbonate rocks, and then turbidites should be stated; gradational intervals of A. Bouma should be signified in turbidites. Such kind of approach gives the accurate presentation about the mechanism of turbidite formation and containing them basin formations and also about the general image of carbonate sediments accumulation environments.

UDC 552.5(479.22)

4.B3.16. Quantitative content of aluminum in the Bathonian crust of weathering of West Georgia. /L.Chomakhidze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 353-358. – Rus. (res. Rus., Geo., Eng.)

The author has investigated the Bathonian crust of weathering (CW) developed on the Bajocian volcano-genic series, which is the source rock for the crust of weathering. Here have been studied: the clay matter (<0,00 mm), a product of superficial weathering processes; it is a mechanical compound of fine-dispersed minerals of chlorite, hydromica, montmorillonite, metahalloysite, halloysite, kaolinite, gibbsite and mixed-layered hydromica-montmorillonite formation; the rocks of the crust of weathering consist of effusive rocks and their volcanoclastolites; they are modified to different extent. The extent of rock change that increases up the section has been expressed in a change of quantitative content of the clay matter and in a degree of groundmass structure integrity; parent rocks represented by effusive rocks (basaltic andesites, basalts, picrobasalts) and their volcanoclastolites. When the first ones prevail it indicates that they had already suffered hydrothermal changes, propylitization in particular. On the basis of carried out researches have been determined chemical and mineralogical composition of clay matter and also quantitative percentage of mineral content by the method of nominal value, the weight percentage of aluminum oxide (Al_2O_3) and quantitative content of aluminum in oxide Al_2O_3. Presence of free alumina in a form of gibbsite $Al(OH)_3$ makes possible to consider the studied region as a perspective ore-bearing area.

UDC551.2.05(479.22)

4.B3.17. Injective dislocations in the axial zone of the horst-anticlinorium of the East Caucasian Main Range. /T.Giorgobiani, D.Zakaraia/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 44-60. – Rus. (res. Rus., Geo., Eng.)

Following the detailed geological-structural researches carried out in the axial zone of the horst-anticlinorium of the Main Range of East Caucasus, in the sandstone strata of the Upper Paleozoic Stori suite, for the first time have been defined numerous manifestations of amagmatic injective dislocations of fissure type. They appear by means of injection and penetration of plastic matter into more viscous and friable, pre-fragmented rocks. At the same time has been treated a significant and at present disputable problem implying the dating of the Stori suite rocks. Proceeding from the detailed study of qualitatively new actual material and its correlation with the data on other Paleozoic units of the region, the authors propose these formations to be of Upper Carboniferous age. In the paper according to sketches and photos are briefly described morphologically completely differing injective structures. It is shown that the injective dislocations had been formed under the acute uniform stress arising in the process of the protrusive upward movement to the surface of the basement block that is built up of the Stori suite formations. In this time due to intensive horizontal lateral compression in the interstitial voids of sandstones took place injection of clay matter from the surrounding Lower Liassic clay shales. There has been inferred that the injective structures, undoubtedly being of tectonic origin, are typical collision formations that had appeared during the late orogenic stage of the Alpine cycle of development of the Greater Caucasus.

UDC [551.243:553.3](479.22)

4.B3.18. Geological-structural peculiarities of the Bolnisi ore district (South-East Georgia). /T.Giorgobiani, G.Nadareishvili, D.Zakaraia, D.Gogoladze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 91-105. – Rus. (res. Rus., Geo., Eng.)

In the paper is characterized in detail the Upper Cretaceous thick (exceeding 4 km) ore-bearing volcanogenic-sedimentary series of the Bolnisi ore district that is located within the limits of South-East Georgia. In particular, the authors give a new interpretation of peculiarities of its geological structure and tectonic pattern, as well as lithofacies, lithopetrographic and matter content of separate suites of this series. In the work are considered numerous acid and basic cross-cutting bodies that spatially link with the Upper Cretaceous volcanogenic-sedimentary series. In the lower part of the Mashavera suite, for the first time has been distinguished the Angrevani suite; there is introduced its detailed characteristics. In the paper, is represented a geological map of South-East Georgia and a generalized stratigraphic column to it; they have been produced by the authors according to the existing data. On the map, two geological-structural profiles are drawn; they intersect the studied region from south to north, pointing out to its comparatively simple, north dipping structure. Along the first profile, based on the carried out investigations, there has been featured a discordance of geophysical data with the presumable mode of occurrence of the pre-Jurassic crystalline basement; instead of, in general monoclinal plane bedding at an angle of 10-25°, has been mapped a gently sloping synclinal structure.

UDC 565.33(262.5)

4.B3.19. Recent ostracodes of the central sector of the Black Sea Georgia. /L.Popkhadze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 177-180. – Rus. (res. Rus., Geo., Eng.)

At the present stage of research is actual the ecology and vital activity of the eastern part of the Black Sea (Georgia). With that end in view were studied ostracodes found in modern deposits of the central sector of the Black Sea. Qualitative and quantitative distribution of each group of ostracodes will give full idea on the ecological condition of the basin. In recent sediments of the above mentioned sector of the Black Sea of Georgia, at different depth - environs of Poti (41º33, 42º15), (41º30, 42º10), village Ureki up to Qobuleti (41º40, 42º00), (41º40, 41º50), Batumi (41º40, 41º44), (41º40, 41º38) are found shells of ostracode species of various genera: *Paradoxostoma, Leptocythere, Callistocythere, Hemicytherura, Semicytherura, Paracytheridea, Loxoconcha, Carinocythereis, Xestoleberis.* Together with ostracodes are found foraminifers and mollusks. Ostracodes are mainly of the Mediterranean and Atlantic origin. According to ecological data of the studied ostracodes it is possible to establish, that they adapt to the salinity above 11‰ and feel well in fine- and medium-grained sandstones, argillaceous sandstones, clays deposited at a depth of 20-30m.

UDC [565.33:551.782.12](479.22)

4.B3.20. Ostracodes from the Karangatian sediments of Guria (West Georgia). /L.Popkhadze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 181-183. – Rus. (res. Rus., Geo., Eng.)

The Karangatian sediments of Georgia are spread in Abkhazia, on the Kolkheti plane (ascertained in bore holes), in Guria and they are dated only by mollusk fauna. At the recent stage of researches alongside with mollusk fauna study of microfauna, especially ostracodes is significant. In the paper are established ostracodes fixed in the Karangatian sediments of Guria. Along the Makharadze-Supsa road to the East of Bitumen factory, on the mountain of Tsvermagala in sands and arenaceous sandstones ostracodes of Karangatian age are fixed. These ostracodes are from the following genera: *Aglaiocypris, Ilyocypris, Candona, Eucypthere, Cyprideis, Leptocythere, Callistocythere, Carinocythereis, Aurila, Heterocythereis*, *Laxoconcha, Semicytherura, Xestoleberis, Cytherois.* The majority of ostracodes inhabiting the Karangatian basin are of the Mediterranean and Atlantic origin. The above sediments by ostracodes belong to the upper part of the Karangatian they are represented by the ostracodes characteristic of the shallow basins – sandstones, sands and lumachelle presumably deposited in the 25-30m deep basin that is justified by ecological data concerning the analogous contemporary Mediterranean and Black Sea fauna.

UDC 551.781

4.B3.21. Some considerations Concerning the Paleogene system stages. /N.Mrevlishvili/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 137-156. – Rus. (res. Rus., Geo., Eng.)

In the paper has been rated the validity of each Paleogene stage with the attraction of the data on the most informative stratigraphic sections of the Paleogene Mediterranean deposits and those of their adjacent regions. It is valuated with due regard for the principle that the general stratigraphic scale of the Phanerozoic systems is a conditional scheme of a sequence of sections and stages and that the main terms for its indispensable stability is to keep a rule of priority at the decision of nomenclature problems.

When the degree of cognition and popularity for each stage and the data on the stratotypes of their boundaries is analazed, the following sequence is prposed: in the Paleocene – Danian, Montian and Landenian; in the Eocene - Ypresian, Lutetian, Auversian and Priabonian; in the Oligocene – Lattdorfian, Rupelian and Aquitanian.

UDC [55+550.4+553.983]:551.762.1(479.22)
4.B3.22. Geological-geochemical characteristics of Lower Jurassic shaly sediments of Trans-Alazani Kakheti (by the example of the Stori River-gorge). /A.Akimidze, K.Akimidze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 249-254. – Rus. (res. Rus., Geo., Eng.)
The paper presents, in the light of the modern conception, the geological-geochemical characteristics of the Lower Jurassic sequences in the gorge of the Stori River (Trans-Alazani Kakheti) and considers the problem of gold prospects of the Stori suite.

UDC 549.283
4.B3.23. Comparatie analysis of archaeological gold ware and native gold ore manifestations in South-Eastern Georgia. /V.Geleishvili, N.Poporadze/. A.Janelidze Institute of Geology, Collection of Papers. – 2008. – pp. 300-306. – Rus. (res. Rus., Geo., Eng.)
A detailed micro x-ray spectral analysis of gold ware of different epochs and functionality found in various burials on the territory of ore manifestation in Bolnisi clearly shows the similarity of their chemical composition with that of native gold mined on the mentioned territory. Thus, it may be assumed that Georgian metal-workers made gold ware using native gold from South-Eastern Georgia as well.

UDC 622.244
4.B3.24. „Coil-tubing" drilling rig. /G.Varshalomidze, T.Barabadze, I.Goguadze, V.Khitarishvili/. Georgian Oil and Gas. – 2009. – #23. – pp. 88-101.- Geo. (res. Geo., Rus., Eng.)
Application of a coil-tubing drilling rig decreases time spent on downhole and uplift operations compared with an ordinary drilling rig and increases length of time just for drilling, increases mechanical drilling speed, expands flow of oil from the productive strata, and considerably increases technical-economic indices of drilling.

UDC 622.244
4.B3.25. Slurries with ceramic microspheres filled with gas. /T.Barabadze, V.Khitarishvili, N.Jikia, N.Machavariani, T.Sarjveladze/. Georgian Oil and Gas. – 2009. – #23. – pp. 102-109. Geo. (res. Geo., Rus., Eng.)
To prevent fluid loss and increase the quality of well casing under anomalous low formation pressures, the slurries, the composition of which includes ceramic microspheres filled with gas, have been developed. Theoretical and practical estimations and calculations of the required materials have been carried out; the costs of preparation of the present amount of the slurry are given.

UDC 622.24
4.B3.26. Investigation of face parameters of a telemetric system through hydraulic channel while Drilling. /G.Varhalomidze, I.Goguadze/. Georgian Oil and Gas. – 2009. – #23. – pp. 123-132. – Geo. (res. Geo., Rus., Eng.)
The article deals with the drilling process model, according to which information may be obtained by means of a telemetric system. The investigation concerns the drilling parameter volume identification through hydraulic channels by means of amplitude phase frequency parameters. Their decipher enables to control the drilling process from the surface. The results of the investigation enable to determine the data for projecting measuring and controlling devices.

UDC 622:24
4.B3.27. New well drilling technology. /I.Goguadze, T.Sarjveladze/. Georgian Oil and Gas. – 2009. - #23. – pp. 133-147. – Geo. (res. Geo., Rus., Eng.)
A new technology for opening the productive stratum by means of a hydro-acoustic device of the drilling rig consisting of tow modules is given in the work..

B4. Geography. Cartography. Astronomy

UDC 551.509.2
4.B4.1. Actual problems of collection and processing of regime– climatologic data. /Z.Tskvitinidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 19-26. – Geo. (res. Geo., Eng., Rus.)

Conditions of the regime– climatologic data processing are being analyzed for stations and posts of the Meteorological Observation Network of Georgia. Problems concerning representation and management of the regime– climatologic data base are considered.

UDC 551.583 – 911.2

4.B4.2. The Hydro-climatic resources of the Caucasus natural landscapes. /M.Elizbarashvili/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 46-50. – Geo. (res. Geo., Eng. Rus).

The basic functions of the Caucasus natural landscapes have been revealed on the basis of the estimation of potential hydro-climatic resources and the corresponding map has been worked out.

UDC 551

4.B4.3. On the causes of climate aridization and desertification of the Iori Upland./Z.Djanelidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 51-56. – Geo. (res. Geo., Eng. Rus).

On the basis of paleogeographical, geobotanical and archeological records it became obvious that anthropogenic modification of the natural landscapes of forest, forest-steppe and steppe of the Iori Upland began as early as the Bronze age (5000-6000 years ago). Since then, the major part of the Iori Upland has been cultivated by man, whose economic activity was a principal reason for substitution of the natural landscapes of forest, forest-steppe and steppe by secondary steppes and thorny valleys, climate aridization and partial desertification of the area.

UDC 551.582

4.B4.4. Expected changes of air temperature in Tbilisi City. /K.Tavartkiladze, A.Amiranashvili/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 57-65. – Rus. (res. Geo., Eng., Rus.)

The estimation of the expected changes of air temperature in Tbilisi up to 2055 year using two methods is carried out.

UDC 551.58.583

4.B4.5. Change of the thermal field of Georgia against the background of global warming. /D.Mumladze, N.Lomidze/. ransactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 66-75. – Geo. (res. Geo., Eng. Rus).

Due to the coplexity of Georgia's relief and other climatic factors, changes of air temperature during the period (1906-1995) are different in the western and eastern parts of Georgia. If in the eastern part of Georgia change of the thermal field is in line with modern changes of climate (known as global warming and is estimated by 0.74^0 C for 100 years), in western Georgia, the thermal regime remained a steady equilibrium, which is proved by the temperature data according to 90 meteorological stations of Georgia.

UDC 551.58.583

4.B4.6. Revealed and predicted climate change in Georgia and its impact on economy and natural ecosystems. /M.Shvangiradze, B.Beritashvili, N.Kutaladze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 76-80. – Rus. (res. Geo., Eng., Rus.)

The change of main climatic elements between the periods of 1955-1970 and 1990-2005 is discussed for 3 regions of Georgia (the Black Sea coastal zone, Kvemo Svaneti and Dedoplistskaro region) selected as priority regions during the preparation of Georgia's SNC to the UNFCCC. Predicted values of temperature and precipitation change up to 2100 for both parts of Georgia are presented on the basis of up-to-day climatic models. Adverse effects of climate change for the past half-a-century in the selected regions are discussed with their impact on economy and natural ecosystems.

UDC 551.510.42

4.B4.7. Local anthropogenic geatures of climate change for Georgia's mountain regions. /Z.Tskvitinidze, G.Gunia/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115, – pp. 81-89. – Geo. (res. Geo., Eng. Rus).

Practical aspects on protection of the environment and control over anthropogenic influence on the climate change for Georgia's mountain regions are considered. Special attention is given to an estimation of the current state, also to the identification of tendencies of a possible change in the qualitative and quantitative characteristics of atmosphere.

UDC 551.501

4.B4.8. Empirical radar models of different convective clouds of warm season of East Georgia. /T.Salukvadze, E.Khelaia/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 141-149. – Rus. (res. Geo., Eng., Rus.)

The data of several years of radar observations by convective clouds in Kakheti region of Georgia are analyzed. With usage of appropriate data of aerological and synoptic observations, the empirical radar models of single-cell, multi-cell, and super-cell clouds are composed.

UDC 551.510

4.B4.9. Analysis of the Georgian mountainous regions' meteorological observation results for the last 15 years. /N.Gogishvili, Z.Tskvitinidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 150-158. – Geo. (res. Geo., Eng., Rus).

Observation data of selected 9 meteorological mountainous stations for last 15 years (1991-2005) was processed under a national grant-supported project. The data have been processed from paper to electronic format, critically analyzed and compiled as meteorological tables. The obtained results are indicative of an increase in temperature (warming) during the last years.

UDC 551.510

4.B4.10. Revealing atmospheric circulatiion features for Georgia's mountain regions. /I.Chogovadze, Z.Tskvitinidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 159-167. – Geo. (res. Geo., Eng., Rus).

Atmospheric circulation processes characteristic of Georgia's mountain regions being mainly developed in close connection with the large-scale circulation processes going in the Eurasian space are analyzed. 4 basic types out of these circulating processes are considered in detail.

UDC 551.510

4.B4.11. Agroclimatic peculiarities of mountainous regions. /J.Tskhakaia, Z.Tskvitinidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 168-176. – Geo. (res. Geo., Eng., Rus).

Based on the spatial distribution of agroclimatic resources of mountainous regions, the boundaries of vertical-optimal movement of staple agricultural crops have been determined. The decisive role of of daytime temperature is underlined. Regularities of the minimum temperature distribution by territories, according to terrain and altitudes are presented.

UDC 551.582

4.B4.12. Long-term variations of air effective temperature in Tbilisi. /A.Amiranashvili, L.Kartvelishvili/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 214-219. – Geo. (res. Geo., Eng., Rus)

A detailed statistical analysis of variations of air equivalent-effective temperature (combination of temperature, air relative humidity and wind speed) in Tbilisi for a period from 1957 to 2006 has been carried out.

UDC 531.114

4.B4.13. Linear transient dynamics of perturbations in non-geostrophic flows with a constant vertical shear. /J.Lominadze, G.Chagelishvili, V.Avsarkisov/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 335-348. – Geo. (res. Geo., Eng., Rus.)

Linear dynamics of perturbations in unbounded non-geostrophic zonal inviscid flows with a constant vertical shear of velocity, when a fluid is incompressible and density is stably stratified along the vertical and meridional directions is investigated. Specific features of the dynamics are closely related to the abnormality of the linear operators governing perturbation evolution in shear flows. The roles of Coriolis parameter f (earth rotation) and shear rate A in the perturbation dynamics (instability) are analyzed. These two factors lead to a new transiently unstable type of perturbation dynamics for $\mathrm{Ri} < 1$ (i.e., when the condition for the so-called symmetric instability is met). In particular, in the linear theory, shear and rotation causes the vortex mode to evolve with time. Pure vortex (aperiodic) perturbations are able to gain the basic flow energy, undergo transient amplification, and then generate waves.

UDC 52-337

4.B4.14. Resistive-viscous suppression of magnetorotational instability in an astrophysical plasma. /J.Lominadze, E.Pashitski, A.Mikhailovski, O.Kharshiladze, A.Churikov, V.Avsarkisov/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. -#3. – pp. 48-50. – Eng., Geo.(res. Eng.)

Resistive-viscous suppression of magnetorotational instability in astrophysical plasma is studied. A criterion of such suppression is derived.

UDC 523.4
4.B4.15. Analysis of polarimetric observations of the Galilean satellites of Jupiter. /R.Chigladze/. Bulletin of the Abastumani Astrophysical Observatory. – 2008. – vol. 78. – pp. 205-208. – Rus. (res. Geo., Eng.)
The polarization properties of the light reflected from different sides of the Galilean satellites of Jupiter are analyzed on the basis of observational material.

UDC 523.4
4.B4.16. Electropolarimetric observations of Jupiter's satellite Ganymede. /R.Chigladze/. Bulletin of the Abastumani Astrophysical Observatory. – 2008. – vol. 78. – pp. 209-214. – Rus. (res. Geo., Eng.)
The polarization properties of Ganymede are studied based on electropolarimetric observations.

UDC.523.4
4.B4.17. A polarimetric study of Io. /R.Chigladze/. Bulletin of the Abastumani Astrophysical Observatory. – 2008. – vol. 78. – pp. 215-217. – Rus. (res. Geo., Eng.)
The polarization properties of the light reflected from Io's surface are studied. These are similar to the polarization properties of a mixture of sulphur and sodium chloride particles smaller than 0.25 mm in diameter.

UDC 523.4
4.B4.18. Results of polarization observations of Mars at favorable opposition of 2003. /R.Chigladze/. Bulletin of the Abastumani Astrophysical Observatory. – 2008. – vol. 78. – pp. 218-221. – Rus. (res. Geo., Eng.)
The polarization properties of the surface of Mars have been studied on the basis of observational data.

UDC.523.4
4.B4.19. Recent studies of planets and satellites of the solar system. /R.Chigladze/. TSU Proceedings (Monograph). – 2008. – p. 186. – Rus. (res.: Geo., Eng.)
The polarization properties of the light reflected from different sides of the Galilean satellites of Jupiter are analyzed on the basis of observational material. The work discusses polarized properties of the light reflected from the surfaces of Jupiter's Galilean satellites in nearly opposition (in less studying of time of scientist-researchers). It is shown that when the phase angle $\alpha=0^0$, the size of the polarization degree is $P\neq0$. Earlier they supposed that when $\alpha=0^0$, $P=0$. The work gives one acceptable version to explain this fact. The given hypothesis well explains different hemispheres of Jupiter's Galilean satellite surfaces. The polarization properties of the surface of Mars have been studied on the basis of observational data.

B5. Other Natural and Exact Sciences

UDC 54.057
4.B5.1. Development of innovative SHS technology coupled with thermal explosion for production of single-phase nanocrystalline materials of Ti-Al system. /G.Varshalomidze, Z.Aslamazashvili, G.Zakharov, A.Berner, G.Oniashvili/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 75-77. – Eng., Geo. (res. Eng.)
Self-Propagated High-Temperature Synthesis (SHS), coupled with thermal explosion, is suggested for environmentally safe, energy-efficient production of nanostructured, single-phase intermetallics. Two new technologies, based on combustion and explosion, are developed for fabrication of compacted, pore-free, single-phase components. To solve this problem, a device for conduction of SHS in the mode of explosion is designed and constructed. The developed technology allows production of single-phase, nanostructured intermetallics.

UDC 546.464.3:547.918
4.B5.2. Antidromic identification of output units of basal nucleus of the amygdaloid complex projected to hippocampus: study combined with intracellular staining. /G.Todua/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 116-119. – Eng., Geo. (res. Eng.)
Extra and intracellular recordings were made from antidromically identified neurons of basal nucleus [BN] of the amygdaloid complex, due to ammonic subfields stimulation. For identification of antidromic responses traditional criteria were used. Most effective was CA1 subfield stimulation. 12 units were recorded intracellularly. Among them 9 units were stained with biocytin and analyzed morphologically. The somata of identified neurons were pyramidal or polygonal in shape and the mean size was 22.5 x 17.2 □m. It is proposed that connections between amygdaloid complex and hippocampus may be important in the limbic memory and learning system.

UDC 159.929

4.B5.3. Influence of chronic psychogenic stress repeated in genetically linked generations of rats on typological peculiarities of offspring behavior; emotionality, locomotion, stress-rReactivity. /F.Kalandarishvili, T.Orjonikidze, I.Pantsulaia, T.Mtskeradze, Z.Khanaeva/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. -#3. – pp. 121-127. – Eng., Geo. (res. Eng.)

In 370 adult offspring of five consecutive generations of initial 8 pairs of offspring rat-parents crossbred in the state of a strong psychogenic stress (information neurosis) in the open field the indices of emotionality (defecation and motor activity level) have been studied in their initial status, i.e. before any experimental procedures as well as after a moderate stress (elaboration of two-way active avoidance). It has been established that pronounced information pathology of rat-parents induces considerable changes in offspring behavior expressed in: an enhanced emotionality with pronounced anxiety, followed by an increased locomotion and excretory function; an increased excitability and its low threshold, high stress-reactivity and large stress response unequal to an action exposure. The above-said changes progressively increase from the second to consecutive generations of continuous lines of the offspring. The first generation of direct offspring of stressed rat-parents does not show any significant changes in behavior. The results obtained are discussed from the standpoint of existing views about the character of interrelations of emotionality signs in the open field as well as in the aspect of possible ways of formation of stress-induced affective disorders and ways of their effect on the hereditary apparatus.

UDC 615.212

4.B5.4. Tolerance induced by non-opioid analgesic microinjections into the central nucleus of amygdala of rats. /N.Tsiklauri, I.Nozadze, G.Gurtskaia, E.Abzianidze, M.Tsagareli/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. -#3. – pp. 129-133. – Eng., Geo. (res. Eng.)

Recent investigations have shown that in some brain areas, particularly in the midbrain periaqueductal gray matter (PAG) and rostral ventro-medial medulla (RVM), the microinjection of non-opioid analgesics, metamizol, and lysine-acetylsalicylate causes antinociception with some effects of tolerance. Our preliminary findings also have shown the same effects of tolerance in intraperitoneal injections of non-steroidal anti-inflammatory drugs (NSAIDs). The present study was designed to examine whether microinjection of analgine, ketorolac and xefocam into the central nucleus of amygdala (Ce) leads to the development of tolerance in rats, and to ascertain whether this nucleus is the pain-modulating pathway through PAG. Our investigation revealed that microinjection of NSAIDs into the Ce both unilaterally (the left side) and bilaterally produced antinociception as indicated by a latency increase in tail flick reflex (TF) compared to controls with saline, on the first experimental day for analgine ($p<0.001$), ketorolac ($p<0.001$), and xefocam ($p<0.001$) respectively. However, when these drugs microinjection subsequent testing also took place on the following days the antinociceptive effects progressively diminished so that on the fifth experimental day the TF latency was similar to that in the rats that received repeated injections of only saline. These results show that alongside with PAG and RVM the Ce is an important site of endogenous antinociceptive system, which triggers the descending pain control mechanism and thus inhibits nociceptive transmission. On the other hand, our data confirm the results of other authors that NSAIDs are in close relation with endogenous opioids and the tolerance to these non-opioid drugs probably depends on opioid tolerance.

C. TECHNICAL AND APPLIED SCIENCES. SECTORS OF ECONOMY

C1. Power Industry

UDC 621.311.1

4.C1.1. Reconstruction of power units of Tbilisi Heat Power Plant (HPP) on the basis of combined-cycle technologies. /A. Khetaguri, G. Chitashvili/. Energy. – 2008. – #4(48). – pp. 3-14. – Geo. (res. Geo., Eng., Rus.)

The schemes of existing combined-cycle plants and their technical-economic characteristics are considered. The necessity of reconstruction of power units of the base power plant of high capacity in Georgia (Tbilisi HPP) by using combined-cycle technologies is grounded. Several alternatives of reconstruction in combined-cycle plants of power units #3 and #4, according to the semi dependent scheme of discharge type (with an ordinary boiler), combined scheme and binary type (with boiler-utilizer) are studied. According to the estimation, it is determined that the most effective will be establishing of binary combined-cycle plants by using modern gas turbine plants. In this case a capacity of each power unit will increase up to 425 megawatt, coefficient of efficiency – up to 54%. This alternative of reconstruction is the best, though it will need large investments. The cheapest alternative of reconstruction of the above-mentioned units in combined-cycle plants will be a semi-dependent scheme. In this case, the capacity of each power unit will increase up to 228 megawatt, coefficient of efficiency – up to 37%. According to the power efficiency, combined-cycled plants of discharge and combined type

take intermediate position, their coefficient of efficiency will be the same (40%), though the capacity of combined-cycle plants of combined scheme (228 megawatt) will be 6% more than the combined-cycle plants of discharge scheme. The final decision on which type of combined-cycle plants, the existing power units of Tbilisi HPP must be reconstructed should be made on the basis of a detailed technical-economic study subject to attracting possible investments. In any case, the reconstruction of Tbilisi HPP power units on the basis of combined-cycle technologies has no alternative. It will be profitable from the economic and ecological point of view, as well as from the point of view of increasing power efficiency and capacity of the station.

UDC 621.311.4

4.C1.2. Modernized high-voltage substations in the system of JSC TELASI. /M.Kobalia, T.Kandelaki, B.Tsopurashvili/. Energy. – 2008. – #4(48). – pp. 15-19. – Geo. (res. Geo., Eng., Rus.)

A structural scheme of Tbilisi 35/110 kV network, by means of which high-voltage substations of JSC TELASI are supplied with RF current, is considered. A typical simplified linear scheme of the substation is shown, which by parallel lines supplies the existing power transformers. It is shown even with the main aggregates under repair the power transformers may still be supplied with power. Equipping of a modernized closed complete distributing aggregate and its designation are shown. Morally and physically obsolete communication equipment has been replaced by highly reliable up-to-date vacuum circuit breakers. A schematic drawing of functioning of JSC TELASI as a company receiving and distributing power is given. The company plans to modernize its several substations and to minimize thus unforeseen emergency conditions.

UDC 621.311.42

4.C1.3. Choice of necessary power for power transformers and traction substations. /D.Laoshvili, G.Kokhreidze, N.Goginashvili, A.Sikharilidze/. Energy. -2008. – #4(48). – pp. 24-28. - Geo. (res. Geo., Eng., Rus.)

Methods of choosing necessary nominal power for power transformers and traction substations taking into account heat the correlation of energy spent on burning and traction for different periods of year are developed. The limits of normal power are determined. An annual schedule of loading by length is taken into consideration. An impact of the consumer-power ratio on the power of electrical installation and means of its increasing are examined. The reactive power value Q_c is obtained. It is created by a C capacity battery. Its value is $Q_c = 2\pi fCU^2 10^{-3}$, where f is frequency of current, Hz; C is total power of a capacitor of the battery, mkF; U is linear voltage on binders of the battery, kilovolt. This formula indicates that the capacitor battery, connected from the side of high voltage, generates a higher reactive (inductive) voltage of the electrical installation. In case of switching low-voltage capacitors, the reactive voltage of the power receivers as well as of transformers will be compensated.

UDC 621.22

4.C1.4. Some problems of development of modern hydropower. /A.Akhvlediani, A.Gogoladze,T. Akhvlediani/. Energy. – 2008. – #4(48). – pp. 51-57. – Geo. (res. Geo., Eng., Rus.)

Last decades have witness qualitative changes in the world hydropower conditioned by the economic, political and technological reasons. According to UNESCO, about 2 milliard people in the world are deprived of electricity, water supply and sewerage. Unlike other kinds of generation, the large hydropower is capable of solving several problems of raising the standard of living set by the United Nations, in particular the electrification and water supply problems. Up to this day, at the national regulation level of many countries, local nature protection limitations prevail over global priorities. Under such conditions, many new large hydroprojects comprising environmental risk factors fail to be implemented (especially in developed countries). A change of the status of global ecological requirements (in particular, the follow-up ratification of the Kyoto Protocol by the countries) would facilitate implementation of large hydropower projects.

UDC 621.22

4.C1.5. Water discharge process outflow characteristics of a bottom spillway of Zhinvali hydropower plant (HPP). /G.Gigiberia/. Energy. – 2008. – #4(48). – pp. 58-69. – Geo. (res. Geo., Eng., Rus.)

Water discharge from water storage reservoir of Zhinvali HPP is carried out by surface and bottom (subsurface) spillways. In accordance with the project study and research results carried out at Moscow Water Conservation Institute (including experiments on hydraulic model) ordered by TBILHYDROPROJECT, water discharge shall be carried out under the whole range of charges, including at its maximum value of 1425 m^3/s. According to the re-examination results, caused by several changes in the design statements, some project conditions have been found groundless. In fact, under conditions of high costs, free-flow was found to take place only in the area beyond the gates, in the inclined part of the diversion tunnel. As for the end part of the tunnel, a pressure flow is noted their already at the level of

costs of 400 m^3/sec (or 260 m^3/sec given aeration). Only under maximum discharge costs, the flow will be in the pressure regime along the whole channel. A method of estimation of real discharge capacity is suggested. Particularly, until a free-flow beyond the gates is preserved, five (5) formulas stated in this article should be used, and in the case of a higher pressure, the discharge capacity can be calculated from the expression received by equating the formulas (5) and (8). The above-mentioned division of the estimated methods on two bays is conditioned by a difference between the existing pressures. The real maximum discharge shall be taken as 900 m^3/sec rather than the project-determined1425 m^3/sec. To ensure the maximally costly discharge, the most cost-effective measure would be to increase the outflow characteristics of the surface spillway by reconstruction of its structures.

UDC 627.43

4.C1.6. Several issues regarding research of arch dams under operation. /A.Tchrelashvili/. Energy. – 2008. – #4(48). – pp. 76-79. – Geo. (res. Geo., Eng., Rus.)

The article deals with handling of an important problem occurred in the body of Enguri arch dam under operation as a result of the known anomalous phenomenon. When the reasons of its occurrence are not known, the searching of ways and means of solving the above-mentioned problem is essentially complicated. An original approach by using a method of imposition of fictitious, orthotropic systems is suggested. As additional sought quantities values (other than those presented in the method of imposition of fictitious, orthotropic systems) modules of deformation of the base of Enguri arch dam presented in the form of double mathematical lines have been introduced. For the purpose of determining unknown coefficients in desire quantities, additional equations are introduced that reflect the results obtained by carrying out full-scale observations in the base of Enguri arch dam.

UDC 621.1

4.C1.7. Issues concerning modeling of optimization problems of developing of fuel-energy complex. /M.Razmadze, O.Vezirishvili/. Energy. – 2008. – #4(48). – pp. 80-83. – Geo. (res. Geo., Eng., Rus.)

Issues concerning modeling of optimization problems of a fuel-energy complex are considered. The development of a fuel-energy complex shall become the decisive factor in determination of the energy policy of Georgia. Methods of conducting a financial and economic analysis for increasing energy efficiency are presented. Mathematical models for optimization of developing of a fuel-energy complex both for the whole as well as separate (unit) structures, which ensure solution of the development optimization problems at different stages of planning on the basis of available information have been worked out. Formulas that can compute a balanced interconnection of energy consumption and power and fuel supply to power industries and industrial regions and which are so important for developing a normal national economy are given.

UDC 621.31

4.C1.8. Situation in the electric-power industry of Georgia. /M.Loria/. Energy. – 2008. – #4(48). – pp. 109-112. – Geo. (res. Geo., Eng., Rus.)

A situation existing in the Georgian electric power sector is analyzed. In spite of the fact that Georgia is rich in its hydro resources, only 15% of them are used at present. In many foreign countries, most of hydro-resources have been used. Georgia lacks any other energy resources (oil, gas) and an emphasis must be made on the maximum development of available hydro-resources. The total capacity and output of hydropower stations of Georgia are presented. It is pointed out that recently the generation of electric power in the country has increased, which denotes a growth of operating efficiency of hydro-power stations. Also a tendency of growth of economy as a whole is seen. Three distribution companies – JSC TELASI Energy Company KAKHETI and JSC ENERGY-PRO GEORGIA – operating on the domestic market are described. Observations regarding growth of the operating efficiency of the above- mentioned companies have been voiced.

UDC 621.31

4.C1.9. Transit of power from Azerbaijan and Georgia to Turkey. /A.Artilakva/. Energy. – 2008. – #4(48). – pp. 113-115. – Geo. (res. Geo., Eng., Rus.)

In the near future, a problem of transmission of power from Azerbaijan and Georgia to Turkey will be raised. For this purpose, it will be necessary to enhance a power supply network of Georgia by creating Akhaltsikhe center, where “Zestafoni-Akhaltsikhe” and “Akhaltsikhe-Gardabani” high-voltage lines will pass. By 2013-2015, electric-power generation in Georgia is to increase. 500 kV “Mukhrani” line will be reconstructed to combine power systems of Georgia and Azerbaijan. All this will enable to transfer to Turkey considerable power from the Akhaltsikhe center. Modeling of the grids of Georgia, Azerbaijan and Turkey was carried out by means of a program complex PSS/E. Models of the grids of Georgia and Azerbaijan are presented by a complete network. The Turkish side is presented by an equivalent scheme.

The most difficult moment for the system can be short circuits on the “Imereti” high0voltage line. If a short circuit lasts for 0.3, the system stability will be disturbed.

UDC 621.1.018.82

4.C1.10. Bench testing of a traverse dynamometer design by dynamometrical cut technique. /E.Zavrian/. Energy. – 2008. – #4(48). – pp. 116-118. – Geo. (Geo., Rus., Eng.)

Under specific conditions of static operation of concrete underground structures, an indirect method for a correct one. The latter fails to completely and accurately take into consideration some factors, connected with the operation of concrete and ferroconcrete structures. To determine the operating stresses in a tunnel lining, a ‘dynamometric cut” method of bench testing of some objects has been introduced at the Yerevan Laboratory of Tunnels. Method of bench test of a traverse-type dynamometer is given. Tests are carried out on two types of patterns in eight concrete specimens sized 75x75x12 cm. The ready patterns of the device are mounted in vertical position under the press, with about 20 t-loading. The holes are drilled in the plates. As a results of drilling, loading on the dynamometer increases. The maximum value of loading measured by the dynamometers was obtained under completing H-type cut and the stress value made 0.74 on the average. The obtained results confirmed reliability of measurement by means of a dynamometrical cut

UDC 625.93.001
622.693.24

4.C1.11. Main Oil and Gas Pipelines and Underground Gas Storages (Projecting, Constructing and Exploitation). /G. Varshalomidze, I. Goguadze/. – 2009. – 651 p. – Geo., (res.: Geo., Rus., Eng.)

The authors of this monograph have collected and given factual material, which contains complete information about all works related to the service of main oil and gas pipelines and underground gas storages. The connection of contemporary state of exploitation of equipment in the current geological, hydrogeological and ecological conditions with energy security both in Georgia and in the world is described. The object of special attention is a contemporary state of energy complexes in Georgia and the monitoring of their exploitation. The prospects of construction of new underground gas storage in the East and West Georgia, projecting new installations and creation of ecologically clean conditions for construction of energetic complexes in Georgia are considered

C2. Electrical Engineering. Electronics. Radio Engineering. Communications

UDC 621.377.622.322.3

4.C2.1. Transformers with amorphous-magnetic core. /Sh. Natchkebia, N.Gvaramadze/. Energy. - 2008. – #4(48). – pp.103-108. – Geo. (Geo., Rus., Eng.)

For reducing transformer losses preference is given to power transformers in which amorphous materials are used. Such transformers have considerably smaller dimensions and weight against power transformers mounted on stations and substations of Georgian grid. The transformers made from amorphous materials are predominantly used in developed countries. Based on the above, replacement of the relevant equipment operating in the Georgian grid by modern transformers, made from amorphous materials becomes advisable. Prospects of using amorphous magnetic materials for manufacture of electric transformers are considered. Basically, a design of amorphous magnetic cores for transformers is covered. These are: magnetic properties, dimensions, capacity, standard curves, size of transmission capacity, magnetic losses, vibration frequency, etc. Features of cores made from nano- crystalline materials are studied.

C3. Automation & Telemetry. Computer Engineering

UDC 656.21

4.C3.1. Influence of faults of railway automatic and telecontrol devices on railway operating characteristics. /M.Gotsadze, N.Khuchua/. Transport and Machine Building. – 2008. – #3(11). – pp. 76-80. – Geo. (Geo., Rus., Eng.)

Influence of faults of railway automatic and telecontrol devices on railway exploitation indexes is researched (fault of automatic section blocking equipment and fault of electric power interlocking devices on intermediate stations) are studied; relationship of a double-track line capacity loses to automatic interlocking signal equipment faults is viewed; shipment expenditures caused by faults of interval control equipment are calculated are calculated; it is shown that eradication of track circuits’ faults importantly increases operating characteristics of the railway.

C4. Mining. Metallurgy. Chemical Industry

UDC 553.43

4.C4.1. Prospects of ecologically justified processing of Madneuli copper concentrate in Georgia. /M.Berezhiani, A.Berejiani/. Proceedings of the Georgian National Academy of Sciences, Chemical series. – 2008. – vol. 34. – #2. – pp. 193-196. – Geo. (res. Eng., Rus.)

A scheme of virtually wasteless industrial complex development for copper concentrate processing is considered, where a technological and ecological barriers for separate plants turn into mutually beneficial links, in particular: sulfurous anhydride recovery from non-ferrous metallurgy effluent gas by effective ammoniac process lets to produce sulfurous anhydride as a marketable product that is used for nitrogen-15 stable isotope production. Finally, ammonium sulfate fertilizer is produced; the objectives of recycling waste acids and nitrous gases are fulfilled; and the capability for copper vitriol production is provided.

UDC 542.973

4.C4.2. Co-Mn catalysts on aluminum-calcium carrier for carbon conversion of methane. /V.Mosidze, V.Bakhtadze, R.Janjgava, M.Pajishvili, N.Kharabadze/. Proceedings of the Georgian National Academy of Sciences, Chemical series. – 2008. – vol. 34. – #2. – pp. 210-213. – Rus. (res. Geo., Eng.)

It has been shown that at volume rate of methane – 4000 h^{-1}, at ratio CH_4:CO_2=1 ÷ 1,5 and in the temperature range of 750-900^{0}C, at carbon conversion of methane on Co-Mn catalysts on aluminum-calcium carrier, the converted gas of the following composition is produced, in vol. %: H_2 – 43,0- 44,0; CO – 44,5-45,0; CH_4 – 0,0; CO_2 – 11,0-12,0. The 50-hour experiment duration does not show a carbon trace on the catalyst surface.

UDC 621.643.053

4.C4.3. Ways of raising resource of truck pipelines. /I.Berdzenishvili/. Proceedings of the Georgian National Academy of Sciences, Chemical series. – 2008. – vol. 34. - #2. – pp. 214-217. – Rus. (res. Geo., Eng.)

The efficiency of enamel protection of pipelines is shown. On the basis of manganese containing carbonate ore new highly effective protective enamel coatings for pipelines are synthesized. The technology of induction enameling of pipes is estimated.

UDC 615.477.1

4.C4.4. Polymer composition of orthopedic sole material. /M.Shalamberidze, Z.Kopadze, N.Lomtadze/. Proceedings of the Georgian National Academy of Sciences, Chemical series. – 2008. – vol. 34. - #2. – pp. 218-220. – Rus. (res. Geo., Eng.)

Physical and mechanical properties of butadiene-styrene polymer compositions on the basis of latent hardener (ЛО-3) and sulfur vulcanization agent have been studied. It is proved that the use of the latent hardener (ЛО-3) in butadiene-styrene rubber gives more flexible and soft sole material than in the case of sulfur vulcanizers of corresponding rubbers.

UDC 669.3

4.C4.5. Role of carbonic materials used during direct reduction of iron ore to metallic iron. /N.Loladze, M.Tserodze, T.Pkhaladze, R.Tabidze/. Proceedings of the Georgian National Academy of Sciences, Chemical series. – 2008. – vol. 34. – #2. – pp. 225-228. – Rus. (res. Geo., Eng.)

The work is dedicated to the issues of direct reduction of iron ore to metallic iron using a solid carbonic reducing agent. The data on the possibility of applying the electro-contact method of heating the initial reaction charge are presented. Experimental data on the substantial influence of the structure and nature of the solid carbonic reducing agent on the efficiency of the reduction process are obtained. Optimal concentrations of various carbonic materials in the initial reaction charge in case of the application of electro-contact method of heating is identified.

C5. Mechanical Engineering. Instrument-making

UDC 539.32

4.C5.1. Ultrasound instrument for determining a module of elasticity of concrete directly in a structure. /P.Tchitchagua, T.Jojua, T.Turmanidze, G.Putkaradze/. Energy. – 2008. – #4(48). – pp. 99-102. – Geo. (res. Geo., Eng., Rus.)

To determine a stressed-strained state of buildings and structures, it is necessary to know a module of elasticity of concrete as the initial data. In most cases, its size is determined by testing of standard samples under laboratory conditions. Numerous tests indicate that such identification of the size of the module of elasticity of concrete is considerably different from the module of elasticity of concrete of a full-scale construction. A module of elasticity of mass concrete is advisable to be determined directly in the

body of a construction, in its different zones. For this purpose, a method of ultrasound method and a corresponding device, designed by the authors, are proposed. A profile of the device and a method of measuring as well as its features are described. Recommendations for constructing the calibration curve are quite novel. Dimensions of the device are determined considering the dimensions of the course aggregates of concrete. Experimental researches carried out for testing the device have corroborated its high-performance.

UDC 691.261.1
4.C5.2. Free-running bentonitic suspensions for making mold blends. /N. Ismailov/. Transport and Machine-building. – 2008. – #3(11). – pp. 13-18. – Rus. (res. Geo., Eng.)
Based on an analysis of requirement to blends under present conditions, effective ways of controlling technological characteristics of bentonitic suspensions and mold blends are established. The application of a polyphenolic carbonaceous reagent on the basis of activated bentonite makes it possible to produce a concentrated free-running suspension, also to increase the 'wet' strength and is rather effective during the 'activation' without adding soda.

UDC 531.133.32
4.C5.3. Push-pull inverter and its geometrics. /J.Uplisashvili, Z.Uplisashvili, I.Ugrekhelidze, A. Tabatadze/. Transport and Machinebuilding. – 2008. – #3(11). – pp. 19-23. – Rus. (res. Geo., Eng.)
A push-pull inverter produced as a result of realization in a moving mechanical system of inversion is presented. The basic principles of inversion are applied: transformation of a circumference into a straight line, making possible to transform the rotary motion into the rectilinear one. The inverter's special feature is its ability to make two travels of the driving unit during one revolution.

UDC 662.764.37
4.C5.4. Polyethylene liners' fabrication method. /M.Shvangiradze, V.Menteshashvili, D.Shvangiradze/. Transport and Machinebuilding. – 2008. – #3(11). – pp. 24-29. – Rus. (res. Geo., Eng.)
A method of fabrication of polymeric containers is given. The container consists of a polyethylene liner and a layer armored with epoxy tar-saturated fiber. Such containers are twice lighter than steel containers. In addition, their level of safety is considerably higher. In the case of destruction the polymeric container is torn and releases the gas contained in it. As for metal containers, their destruction is accompanied by an explosion and origination of a great number of small-size fragments that is hazardous to human health.

UDC 621.7(088.8)
4.C5.5. Interface temperature measurement during skip cutting of a preheated blank. /K.Inasaridze/. Transport and Machine-building. – 2008. – #3(11). – pp. 30-39. – Rus. (res. Geo., Eng.)
As a result of review of major recent advances in cutting, preconditions for devising a formula for computing skip and periodic cutting of preheated metals and alloys have been established. Using the main principles of the cutting process tribology, it has been established that the actual contact surface of the active section of a cutter represents a definite small part of the nominal contact. The contact thermal resistance and the transitory process length significantly increase on this section. Devising and specification of the calculation formula of the cutting temperature for the processes is our immediate task.

UDC 681.617.43
4.C5.6. On the quality of processing on a grinder with pneumomechanical tracer. /T.Mchedlishvili, V.Kiria, I.Elerdashvili, I.Zedelashvili/. Transport and Machinebuilding. – 2008. – #3(11). – pp. 60-68. – Rus. (res. Geo., Eng.)
Results of a dynamic research in connection with the design of initial and approximated non-linear models are presented. Both complete and truncated linearized mathematical models are obtained for analysis of forced vibration. The present work deals with analytic dependences obtained on the basis of using the dependent model that are necessary for assessing the quality level of the machined surface. Specific design formulas referring to an efficient application of the work results in handling the problems of engineering optimization synthesis of the engineering and process parameters of the system under study are presented.

UDC 621.923:658.5
4.C5.7. On the technical and economic multi-objective optimization of design decisions. /T.Mchedlishvili, G.Tkeshelashvili, T.Mchedlishvili, B.Navrozashvili/. Transport and Machinebuilding. – 2008. – #3(11). – pp. 96-106. – Rus. (res. Geo., Eng.)
Problems of multi-objective optimization related to the design of a homer system of modern machines are considered. The known principal methodological approaches according to the given transitional processes are used as a basis of the theory to be developed; methods of giving the desirable processes

being functionally connected with one or two generalized parameters are proposed for realizing mathematical procedures of the multi-objective synthesis, owing to which the problem of multi-objective, multi-parameter synthesis is reduced to one- or two-parameter problems. Together with technical characteristics also considered are the comparative economic indicators, with the analysis of their basic regularities. The functional sequence of implementation of the design-analytical procedures of the methods constituting the multi-objective synthesis of both the linearized and non-linear homer systems, which is presented as a functional structural scheme, is established

UDC 681.617.43

4.C5.8. Analysis of the machined surface quality of composite-profile pieces machined on a profile grinder. /Kh.Amkoladze, I.Elerdashvili, V.Kiria, I.Narimanashvili/. Transport and Machine-building. – 2008. – #3(11). – pp. 122-126. – Rus. (res. Geo., Eng.)

Dependences necessary for transfer to profiling errors are presented. Specific studies referring to the efficient use of the work results in handling the engineering optimization synthesis problems of both the engineering and technological parameters are conducted.

UDC 629.11.012.84

4.C5.9. Research and development of an overhead cable logging machine with two-way traverse skidding /Z.Balamtsarashvili, G.Kokaia, R.Tkemaladze, G. Asanidze/. Transport and Machine-building. – 2008. – #3(11). – pp. 148-154. – Geo. (res. Rus., Eng.)

In logging under mountain conditions, the most laborious and hazardous phase is the log skidding to the forest depot. It has been established that in wood-cutting areas with down gradient up 20 degrees skidding may be carried out by tractors. However, given hazards of operation of tractors on slopes, we propose that overhead cable logging machines be used instead. The article deals with an overhead cable logging machine with two-way traverse skidding designed at the Georgian Technical University. A technological scheme of the machine operation with two supplementary carriages for high-lead logging is given. Such scheme makes it possible to simultaneously work with two wood-cutting belts, also allows each carriage operate independently, which significantly increase productivity.

UDC 681.617.43:621.7.044.5

4.C5.10. Analysis of forced vibrations of a pneumomechanical tracer. /T.Mchedlishvili, V.Kiria, Kh.Amkoladze, N.Baidarashvili/. Transport and Machine-building. – 2008. – #3(11). – pp. 157-162. – Rus. (res. Geo., Eng.)

For subsequent analysis of forced vibrations, the transfer function numerator of the system under study, constructed on the basis of the obtained approximation model and the expression of input action on the system, has been analyzed. Mathematical expressions defining forced vibrations are constructed on the basis of the known theory of successive approximations of frequency solutions for non-stationary nonlinear systems. Analytical dependences defining frequency solutions of both first and second approximation used for analyzing forced vibrations connected with future profiling errors are obtained.

UDC 534.6

4.C5.11. The ways of improving electron-acoustic measuring devices. /E.Ter-Samvelova/. Works - Appendix to the Newsletter of Academy of Education Sciences of Georgia – 2008. – #11. – pp. 25-26. – Rus. (res. Geo., Eng.)

Examples and peculiarities of up-to-date electron-acoustic measuring devices are considered; the ways of essential application widening, their functions and metrological possibilities are presented.

C6. Light Industry

UDC 675.081.2

4.C6.1. Operation research of felt during fine-stapled cotton carding. /N.Chkhaidze/. Transport and Machinebuilding. – 2008. – #3(11). – pp. 90-95. – Geo. (res. Rus., Eng.)

Research of the pulp combing process between flats and the drum of a carder is presented. The graphs of fiber-length distribution in the lap, web and tow, when working with the flats having general and narrow working width flats, were compiled. The graphs show that that when combing the cotton on the carder, definite sorting out of the fibre by length occurs: a part of long fibers increases in the lap, a part of short fibers - in the tow, the effect being intensified when working with narrow flats. Theoretical and trial graphs of changing the average length of the fiber in the tow, as the flats move to the carding workplaces, were compiled.

UDC 677.051.17
4.C6.2. Research of carding process on a carder. /N.Chkhaidze, G.Kuprashvili/. Proceedings of the Georgian National Academy of Sciences, Chemical series. – 2008. – vol. 34. – #2. – pp. 232-239. – Geo. (res. Rus., Eng.)
Results of theoretic and experimental research of trash detachment from the pulp fed to a carder and of conversion into the flat tow are presented. The trash detachment takes place along the whole working area of carding – the trash amount in the tow increasing from the back to forward knives. Equations for the trash amount in the tow for each workplace of the carding arc, complying with the experimental results have been generated. The most intensive trash detachment takes place in the mid-workplaces, where the separation of the pulp is almost complete.

C7. Food Industry

UDC 338.439
4.C7.1. Food safety - scientific bases, modern principles and general provisions of legal regulation. /K.Laferashvili/. Bulletin of the Center of Strategic Research and Development of Georgia. - 2008. – #110, 111, – pp. 3-90, 2-107. – Geo.
Science-based, practical and legal aspects of modern food safety regulation and existing problems are specified and existing problems are presented.

UDC 338.439
4.C7.2. Food adulteration in Georgia. /E.Sarjveladze, D.Tsulaia/. Bulletin of the Centre of Strategic Research and Development of Georgia. – 2008. – #110, – pp. 91-107. – Geo.
The state of the Georgian food market from the standpoint of adulteration is described. It is mentioned that almost all kinds of adulterated analogues of both local and foreign-made products are met there. Different kinds of adulteration (assortment, qualitative, quantitive, cost, information, technological, complex) are studied. The food adulteration results and proposals and considerations concerning elimination of the cases of adukIteration in Georgia are described.

UDC 666.2/.3
4.C7.3. Lead content in some types of wine. /Ts.Turkadze, A.Chubinidze, I.Bochoidze, B.Butskhrikidze/. Georgian Chemical Journal. – 2008. – vol. 8. – #4. – pp. 399-401. – Geo. (res. Eng., Rus.)
The article deals with the ecological and chemical factors of lead content in some types of wine given the local ecology and consumption of grape and products made thereof; it presents the results of analysis of the content of lead in the wine made from vineyards located near the highway (50-100 m) and comparatively far away (500 m).

UDC 663.952.1.
4.C7.4. Experimental study of green brick-tea drying process. /G.Gugulashvili/. Transport and Machine-building. – 2008. – #3(11). – pp. 127-132. – Geo. (res. Geo., Rus., Eng.)
The green brick-tea drying process under current conditions is associated with considerable power consumption and requires a large production area. For the design and manufacture of a new modern green brick-tea drier, kinetics of the green brick-tea drying process has been studied by using a specially designed experimental device which makes it possible to control air temperature, humidity and consumption. According to the experimental results, the brick-tea drying process curves were constructed for different temperatures of the working agent and the drying process time curves were produced. A definite optimum value has been found to correspond to every temperature of the working agent. The so-called “drop-down” temperature condition has been proposed for the green brick-tea drying process.

UDC 338.439
4.C7.5. Food safety problems in Georgia and basic ways of solving them. /M.Ujarashvili/. Works - Appendix to the Newsletter of the Academy of Education Science of Georgia. – 2008. – #11. – pp. 66-69. – Rus. (res. Geo., Eng.)
Achievement of the admissible food safety lefel is considered in the article as an issue of national rather than global importance which, according to the author, holds the main point in the sustainable and safe development strategy of individual states. A factor analysis has identified food safety problems in Georgia and the main ways of their solution: improvement of the functioning efficiency of the agricultural and food industrial complex, the rational government regulation of the food market, the expansion and optimal use of foreign economic relations.

UDC 632.952:612.396.22

4.C7.6. Residues of benzimidazole fungicide in products of alcoholic fermentation. /M.Japaridze, Z.Kuratashvili, I.Abdushelishvili, B.Tsereteli/. Proceedings of the Georgian National Academy of Sciences, Chemical series. – 2008. – vol. 34. – #2. – pp. 206-209. – Rus. (res. Geo., Eng.)

The process of benzimidazole fungicide transformation under alcoholic fermentation has been studied. Carbendazim and 2-aminobenzimidazole were identified in fermentation products. Regularities of the allocation of fungicide residues in the sediment and wine are detected and the rate of fungicide oxidation due to the CO_2 formation is also identified. It is pointed out that the main part of radioactive fungicide is localized in the sediment. In protein compounds of the sediment, radioactive amino acids were not found; therefore, radioactivity of the sediment is conditioned by the interaction between fungicide and the products of its transformation with compounds of the sediment.

C8. Construction. Architecture

UDC 551.58

4.C8.1. Consideration of climatic parameters in construction. /L.Kartvelishvili, Z.Tskvitinidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 132-141. – Geo. (res. Geo., Eng., Rus.)

Different complex climatic parameters and their distribution patterns in time and space are discussed. The obtained data are necessarily to be taken into account when designing construction projects.

UDC 699.844

4.C8.2. Sound proofing of conference rooms and directors' offices. /M.Javakhishvili, M.Tchanturia, I.Garibashvili, R.Zhgenti/. Energy. – 2008. – #4(48). – pp. 84-87. – Geo. (res. Geo., Eng., Rus.)

When discussions and negotiations are held "behind closed doors" sound proofing must comply with existing standards. First of all, it concerns conference rooms and directors' offices. In this case, the most effective measure is to arrange the so-called 'lobby'. Different sound-proof materials (plates, pastes, etc.) and deafening facilities are discussed.

UDC 691.175.3

4.C8.3. Processing, marking, cutting and fixing of glass-fiber-gypsum plates. /V.Javakhishvili, M.Chanturia, I.Garibashvili, R.Zhgenti/. Energy. – 2008. – #4(48). – pp. 88-91. – Geo. (res. Geo., Eng., Rus.)

Glass-fiber-gypsum plates are cut on the smooth and firm surface, following their marking, by means of a special cutter. The pre-cutting preparation process and the cutting process itself, as well as the post-cutting fixing/mounting of the cut plates are discussed.

UDC 691.32

4.C8.4. Research of the physico-mechanical and technical characteristics of concrete on the basis of a theoretical analysis. /V.Lomidze, T.Jojua, T.Turmanidze/. Energy. – 2008. – #4(48). – pp. 92-98. – Geo. (res. Geo., Eng., Rus.)

One of the plane problems of the elasticity theory is considered. Pursuant to the concept of the theory of finite elements, an object is presented in the form of totality of small elements. For each element dependencies of the elasticity theory are recorded. On the basis of it, the corresponding values are computed. Conditions of continuity and balance are satisfied by means of the solution of a uniform system of equation. For solving the assigned task, a method of separation is applied. Design diagrams, static and kinematic boundary conditions are presented. 2 cases are considered: first – there is an ideal constraint between the elements of separation, the second - where such a constraint is absent. By means of satisfaction of geometric and static conditions for the elements of separation, unknown coefficients are eliminated gradually until specific numerical values are obtained. A way of solution of the assigned task is shown by a specific example. For this, a concrete block located between two hard platforms, which are under load, is examined. The task is symmetrical. By using an expression for a stress function, the values of the stress and relocation of the elements of separation are obtained. The further process is the satisfaction of boundary conditions. After the last process, has been completed, the design coefficients $A^n_{1,\ldots,}A^n_4$ assume specific numerical values.

C9. Agriculture and Forestry. Fisheries

UDC 631.416.143

4.C9.1. Mathematical study of soil salinity variability. /A.Surmava, N.Tugushi, L.Shavliashvili, L.Intskirveli, S.Mdivani/. Tansactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 322-330. – Rus. (res. Geo., Eng., Rus.)

By numerical integration of the water and dissolved nitrite infiltration equations in the soil one of methods of salinity reduction in the top layer of the saline soil used in practice is numerically simulated. The numerical investigation shows that the simulated method, at the certain values of the coefficients of the infiltration and diffusion and at a triple irrigation for 90 days, can decrease the salinity in the upper 70cm-layer of soil. The dissolved from the upper layer salt is gradually washed away and into a deeper layer, leading an insignificant increase of the salinity of the ground below 70 cm.

UDC 636.085/.087

4.C9.2. Feasibility of application of coarse mulberry leaf gathered in late autumn as cattle fodder for, development of appropriate technologies and economic efficacy. /G.Nikoleishvili, B.Korokhashvili, B.Sakandelidze, S.Turmanidze, E.Choladze/. Agrarian-economic Science and Technologies. – 2009. – #1. – pp. 21-30. – Geo. (res. Eng.)

According to the results of studies implemented at the Educational-Research Institute of Sericulture, coarse mulberry leaf stored in autumn can be successfully used animal husbandry as feed. In all cases, one has to study biochemical characteristics of the leaf and determine its nourishing value. The feasibility and economic efficiency of utilizing the leaf prepared in spring from various plantations of the recommended mulberry varieties, as well as the leaf stored in autumn for winter, leaf flour and other types of fodder will be studied at Kutaisi Zonal Station of Sericulture.

UDC 631.51

4.C9.3. Recommendations for effective use of arable lands. /S.Kamarauli, L.Kamarauli/. Agrarian-economic Science and Technologies. – 2009. – #1. – pp. 61-67. – Geo. (res. Eng.)

Given the outdated agricultural equipment as well as shortage of farm machinery and labor force, the work recommends enlargement of the existing small land plots by setting up farm cooperatives according to rural settlements, implying the setting up of one or several cooperatives within a settlement.

UDC 631.1.017.3-058.232.6

4.C9.4. The operating leverage effeciciency in small farms. /L.Chiburdanidze/. Agrarian-economic Science and Technologies. – 2009. – #1. – pp. 68-75. – Geo. (res. Eng.)

The main principles for defining the operating leverage efficiency are considered to be: 100% marketability of production; 100% sales revenue; evaluation of the consumed materials and performed work at current market prices. Under conditions of a market economy, farmers should be financially stable. The financial stability for farmers is the difference between the sales revenue and the profitability level. If a farmer's sales revenue is less than the profitability level, his financial situation will worsen and a shortage of liquid assets will be created.

C10. Water Industry. Melioration

UDC 551

4.C10.1. Fresh water resources' potential and management in Georgia. /V.Geladze, G.Geladze, N.Bolashvili, N.Machavariani/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 41-45. – Geo. (res. Geo., Eng., Rus.)

Fresh water resources of Georgia, exportable fresh water amount by regions and periods, water intake technique and place determinable after a detailed analysis of the state of individual hydro-ecosystems and water balances are considered.

UDC 551

4.C10.2. Year's beginning impact on relationship and trend between the annual river runoff and drift. /G.Grigolia, D.Kereselidze, V.Trapaidze, G.Bregvadze, N.Tsintsadze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 228-233. – Geo. (res. Geo., Eng., Rus.)

Climatic changes and the relevant changes in the river drift and run-off are generally studied in annual intervals. Standard processing and publication of materials are accomplished according to calendar years (from 1/I). The work corroborates that at different beginnings of the year, the correlation coefficient of the relation and trend between the annual runoff and drifts changes, and recommends starting annual calculations in the water-management year (1/IV), when the uniformity of annual values is more preserved and the correlation between annual drifts and runoffs is the greatest.

UDC 556.55
4.C10.3. Connective boundary problem of dynamic interaction of a mudflow intruded in a water reservoir with water. /J.Kilasonia/. Energy. – 2008. – #4(48). – pp. 39-42. – Geo. (res. Geo., Eng., Rus.)
A connective boundary problem reflecting the dynamic interaction with water of large-scale underground waters intruded at a high speed in the water area and the resulting wave processes is considered. To formulate the problem, the author-modified systems of differential equations of the two-dimensional theory of "shallow" water for the mudflow and water respectively, which are interconnected by means of the time-and-space-variable inner boundary, also the general algorithm of calculation are given.

UDC 627.43/.8
4.C10.4. Prognosis of the effect of waves in the tail-water originated as a result of a break of Algeti and Sioni dams. /T.Gvelesiani, G.Palavandishvili, B.Maglaperidze, G.Berdzenashvili/. Energy. – 2008. – #4(48). – pp. 43-47. – Geo. (res. Geo., Eng., Rus.)
During 2007, two projects (within the program for rehabilitation of water-engineering systems of melioration designation in Georgia) concerning the prognosis of the waves effect in the tail-water were implemented.The tentative origin of the waves is associated with a partial or complete destruction of Algeti and Sioni dams. The article describes the projects, methods used to implement them, as well as the relevant graphic material.

C11. Foreign and Domestic Trade. Tourism

UDC 551.582
4.C11.1. Tourism climatic index in Tbilisi. /A.Amiranashvili, A.Matzarakis, L.Kartvelishvil/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 27-30. – Eng. (res. Geo., Eng., Rus.)
Tourism climatic potential assessment for Tbilisi (the capital of Georgia) is given in accordance with the frequently used in other countries the "tourism climatic index" (TCI).

UDC551.582
4.C11.2. Climatic, aeroionization and radiological characteristics of Tskaltubo health resort and tourist complex. /N.Saakashvili, M.Tabidze, I.Tarkhan-Mouravi, et al./. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 31-40. – Rus. (res. Geo., Eng., Rus.)
The study results of the climatic, aeroionization and radiological characteristics of Tskaltubo town as well as of Tetri Mgvime, Sataplia and Tskaltubo caves are presented.

C12. Transport

UDC 621.43.019.2:629113/.115
4.C12.1. Efficiency of conversion of automobiles to autogas. /O.Gelashvili, I.Tsertsvadze, T.Niauri/. Transport and Machine-building. – 2008. – #3(11). – pp. 5-12. – Rus. (res. Geo., Eng.)
The efficiency of using liquefied gas to fuel cars and of converting cars to autogas is analyzed. The possibility of using cars equipped with gas cylinders as well as the expediency of their running on compressed and liquefied natural gas is discussed. Large-scale use of automobiles running on autogas has been found to significantly decrease consumption of costly petrol and diesel fuels. The autogas-fuelled cars exhibit performance and operational characteristics comparable with those of their petrol and diesel competitors, while generating lower running and maintenance costs.

UDC 621.43.019.2:629113/.115
4.C12.2. Influence of gasoline fumes' characteristics on automobile ecological compatibility. /J.Iosebidze, G.Abramishvili, T.Apakidze, A.Chkheidze, Kh.Mgebrishvili/. Transport and Machine-building. – 2008. – #3(11). – pp. 52-59. – Geo. (res. Rus., Eng.)
This article, based of literary sources and using a novel approach, analyzes the influence of gasoline fumes' characteristics (gasoline distillation, saturated steam pressure, volatility index) on the performance of an automobile engine (easiness and reliability of cold engine start-up in cold weather, duration of warming-up, completeness of burning of the air-fuel mixture, engine power, acceleration, wear of details of the cylinder-piston group, formation of the so-called "vapour locks" in the fuel system pumps and pipelines, increase of gasoline losses during storage, transportation and consumption, fuel saving, etc.); a conceptual dependence between these characteristics and environmental safety of automobiles has been established.

UDC 625

4.C12.3. All-round automated fire-prevention control systems of transport tunnels. /E.Moistsrapishvili, M.Moistsrapishvili, G.Enukidze, N.Arudashvili/. Transport and Machine-building. – 2008. – #3(11). – pp. 69-75. – Geo. (res. Geo., Rus., Eng.)

The paper briefly discusses high risks of fire and its quick spread in transport tunnels; the examples of great fires happened abroad are considered; all-round automated fire-prevention control systems, their subsystems and a functional scheme of the control system block are analysed. The function of the equipment and the principle of operation of the active fire-prevention automated control system block are described. It is noted that the data of the system block of active fire-prevention automated control are universal and can be used in other objects as well; at the same time, it is necessary that technical regulations of fire safety be developed. The article proves the possibility of using contemporary automated systems to form a successive block diagram of fire prevention measures and to develop the operation principles of the elements of the system with consideration of construction peculiarities, as well as to create a computer system of centralized control of the fire-prevention complex.

UDC 613.114.05

4.C12.4. Development of a logistic system for efficient automotive fuel consumption control under conditions of motor transport enterprises. /O.Gelashvili, B.Kitsmarishvili, T.Matsiashvili, T.Niauri/. Transport and Machine-building. – 2008. – #3(11). – pp. 83-89. – Rus. (res. Geo., Rus., Eng.)

The work deals with the questions of formation of the operational automotive fuel consumption and analyzes the methods of its rationing. Methods for determining the minimal automotive fuel consumption are developed and a new approach providing the fuel consumption reduction in operation is proposed. A three-stage qualitatively novel logistic system of automotive fuel control ensuring operational detection and elimination of the reasons of fuel over-expenditure and yielding a great economic effect under conditions of motor transport enterprises has been developed.

C13. Medicine. Healthcare

UDC 616.831

4.C13.1. Brain focal changes and hemodynamic parameters in relation to the state of collateral circulation. /F.Todua, D.Gachechiladze, M.Beraia/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 134-140. – Eng., Geo. (res. Eng.)

The paper aims at studying the state of collateral circulation in patients with unilateral high-grade stenosis and occlusion of the internal carotid artery (ICA). 41 patients with severe stenosis and 30 patients with occlusion of ICA underwent brain MRT, 3D TOF-MR-imaging, Doppler ultrasound of extra-intracranial vessels to investigate collateral flow via the circle of Willis and via the ophthalmic artery (OphA). Maps of the cerebral perfusion parameters were calculated. In 50 (70%) cases, the “symptomatic” cerebral ischemia was noted. In symptomatic patients, cortical MCA infarctions (13(26%)), and border-zone infarctions-10(20%) prevailed. In the cases of unilateral ICA, the occlusion compensatory dilatation of contralateral ICA and enhancement of the circulation volume by 60%, also the enhancement of circulation in the vertebral arteries by 18% was observed. In patients, where the anterior communicating artery was inactive, both deterioration of the flow intensity in the MCA (V mean-38cm/s, PI-0.69) as well as a higher incidence of brain infarction (13(85%)) were observed. In patients with the functioning anterior communicating artery 2 infarctions (Vmean-44cm/s, PI-0.77) were observed. Based on the above, it can be presumed that the anterior communicating artery the most important extracranial occlusive process compensation collateral. In patients, where the functioning of the communicating arteries of the circle of Willis is not observed, or where only the posterior communicating artery is functional, high infarction development risk (generally of the border zone) is revealed. Complex use of TCCD, 3D TOF-MR-angiography and PWI practically provides all necessary information about the functional status type of collateral circulation in the case of significant stenosis the carotid.

UDC 616-021.3

4.C13.2. Clinical manifestation and long-term prognosis of viral and idiopathic dilated cardiomyopathy. /N.Kipshidze, K.Nadaraia/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol. 2. – #3. – pp. 141-148. – Eng., Geo. (res. Eng.)

The aim of the present study was to evaluate and compare a long-term prognosis and clinical courses of viral and idiopathic (two of the most widespread and heavy) forms of dilated cardiomyopathy (DCM). In total, 144 patients (mean age 43.8±12 years, range 15-68 years, m122/f22) with DCM were enrolled in the study since 1991. Besides standard examinations, serologic tests for antibodies to cardiotropic viruses (ELISA method) were performed. The patients were divided into 2 groups (Gr.) according to the results of serologic tests and patients’ clinical and history data. In the case of lethal outcomes we used existing medical reports and/or interviewed family members to determine the cause of death. The Odds

and Hazard Ratio, Kaplan-Meyer methods were used for statistical analyses of the data obtained. In 77 (53.5%) out of 144 patients with DCM, together with acute respiratory infections in anamnesis we observed positive serologic reaction to cardiotropic viruses (Gr.1). 67 (46.5%) patients with idiopathic DCM entered Gr.2. During a 5-year observation period, 69 (47.9%) patients died, and 75 (52.1%) patients survived. The life-expectancy was 4.1±2.0 and 4.9±2.8 years for Gr.1 and Gr.2 respectively. The 3-year mortality rate made 33.8% and 26.5%, the 5-year mortality rate - 53.2% and 41.8% respectively. The most common causes of DCM mortality were progressive heart failure and sudden death (in gr.1 – 43.9% vs 31.7% and in gr.2 – 35.7% vs 46.4%, respectively.) We conclude that more than half of DCM cases are of viral etiology. Viral DCM is characterized by higher severity of clinical manifestation, more rapid development of progressive heart failure and higher mortality rates than idiopathic DCM.

D. INTERSECTORAL ISSUES

D1. Organization and Management

UDC 658.3
4.D1.1. Innovation management of personnel work. /N.Paichadze/. Economics and Business. – 2008. – #2. – pp. 78-86. – Geo. (res. Eng.)
Theoretical and practical problems of innovation management of personnel work are discussed. They imply any organization activities, organization decision-making, procedure or personnel management method that essentially differ from the practiced ones and are used in a given organization for the first time. Special attention should be paid to the organization of the innovation potential development, revealing and realization of novelties in terms of personnel work.

UDC 658
4.D1.2. Organizational structuring of contemporary business management. /E.Gulua/. Economics and Business. – 2008. – #2. – pp. 102-111. – Geo. (res. Eng.)
The article deals with modern aspects of management structuring in a business organization that imply the grouping of activity types and personnel for achieving the objective that had been set in advance. The selection of a structure depends on the specifics of individual business subjects/companies: type of activity, activity scale, existing situations. The industrial structure of a company is determined by its profile, diversification or specialization level, quantitative and qualitative composition of products. The organizational and management structures generally coincide: management structuring and implementation of specialized functions are carried out according to the organization divisions. The management structure is determined by different factors, such, for example, as the organizational and legal status of a company, its size, departmental belonging. Classical examples of the organization structures are: hierarchical, functional and mixed. On the other hand, each of them can be subdivided. Under conditions of changeable markets and demands, special attention shall be given to the ability of maneuvering – rapid changing of the strategy and tactics. Correspondingly, any organization must be easily restructured and reformed.

D2. Environmental Protection. Ecology

UDC 91 (479.22)+632.118.3
4.D2.1. Specificity of anthropogenic pollution of mountain biogeocenoses under conditions of global warming. /E.Salukvadze, M.Gogebashvili, N.Ivanishvili/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 90-96. – Rus. (res. Geo., Eng., Rus.)
The study aims at revealing the realization of anthropogenic pollution of mountain biogeocenoses under conditions of global warming. The process may be formed as follows: the pollution factor – low vegetation growth – phytocenosis with low adaptation potential – modification of hydrological parameters of biogeocenosis – development of adverse processes in the critical highland landscapes.

UDC 630:551.58
4.D2.2. Influence of global warming on changes in agroclimatic zones. /G.Meladze, M.Tutarashvili, M.Meladze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 97-104. – Geo. (res. Geo., Eng., Rus.)
As a result of analysis and processing of the meteorological observation data, a close correlation between the dates of the air temperature rise above 10°, the sum of active temperatures and altitude above sea level has been established. On the basis of the established correlations, the regression equations are made, according to which sums of active temperatures for agroclimatic zones are defined. 5 agroclimatic zones for distribution of various agricultural crops are allocated. According to the scenario, upon the

temperature rise of 1°, the area of distribution of citrus, grape, tea, cereals, winter wheat and other crops has gone up to 100-150 m. above sea level, as compared with their existing distribution areas, and upon the temperature increase by 2°, - up to 200-300 m. a.s.l.

UDC 551

4.D2.3. Joint statistical analysis of the river runoff and precipitation against the background of climatic change. /G.Grigolia, M.Alaverdashvili, V.Trapaidze, et al/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 105-111. – Geo. (res. Geo., Eng., Rus.)

Against the background of global warming of the climate, a joint evaluation of the river runoff and its principal determining factor - changes in precipitation by linear regression and trend (with the correlation coefficient between the random number and its ordinal number) is extremely urgent. The trend of average monthly and seasonal (III-V, VI-VII, IX-XI, XII-II) discharges of the Vere River and precipitations is estimated. The trend in mean of the annual individual monthly runoffs has been calculated with the aim of establishing the annual variability. The correlations between the runoffs in the specified periods and precipitations have been determined.

UDC 555.48.215.2

4.D2.4. A possibility of improving the calculation of water resources based on the application of the moisture circulation parameters against the background of climate change. /N.Begalishvili, T.Tsintsadze, V.Tsomaia, et al/. Transactions of the Georgian Institute of Hydrometeorology – 2008. – vol. 115. – pp. 112-121. – Geo. (res. Geo., Eng., Rus.)

The work deals with a possibility of calculation of the characteristics of water resources (precipitation, river runoffs and glacier accumulation-ablation) based on the moisture circulation parameters, under conditions of suspended hydrometeorological observations. The calculation of river water resources' parameters are given for warm, cold seasons and annual periods. For the non-associated and associated series, the results are positive, provision being within 80 to 98 percent.

UDC 551.465.5

4.D2.5. Modelling and forecast of the Black Sea circulation processes. /A.Kordzadze, D.Demetrashvili/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 122-131. – Rus. (res. Geo., Eng., Rus.)

Some results of modelling of the dynamic processes in the whole Black Sea and in the Georgian sector of the sea basin on the basis of the baroclinic prognostic models of the Black Sea general (spatial resolution 5 km) and regional circulations (spatial resolution 1 km) developed at M.Nodia Institute of Geophysics are considered.

UDC 551

4.D2.6. Transparency of atmosphere in the coastal area of Ajara. /R.Solomonidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol.115. – pp. 234-241. – Geo. (res. Geo., Eng., Rus.)

In 2007-2008, about 450 complex experiments have been carried to study transparency of the atmosphere in the coastal area of Ajara. The effects of temperature, humidity and wind on the atmospheric transparency were established. The influence of the sea on the transparency of atmosphere in the littoral area was studied.

UDC 550.42;54.064

4.D2.7. Dependence of concentrations of different chemical elements in the atmospheric precipitation of Kakheti region of Georgia on total mineralization. /G.Supatashvili, M.Salukvadze, L.Abesalashvili, T.Salukvadze, E.Khelaia/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. - pp. 242-245. – Rus . (res. Geo., Eng., Rus.)

Results of a research of the concentration of some chemical elements (B, P, Br, I, Cu, Pb) in the atmospheric precipitation of Kakheti region of Georgia are presented. The dependence of the concentration of these elements upon total mineralization is studied.

UDC 551.50.501.7

4.D2.8. Use of satellite information for early warning of hydrometeorological disasters in Georgia. /G.Kordzakhia, L.Shengelia, G.Tvauri, M.Tatishvili, I.Mkurnalidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 250-260. – Geo. (res. Geo., Eng., Rus.)

The use of satellite information for prevention or/and mitigation of disasters of hydrometeorological origin on the territory of Georgia is reviewed. Various characteristics of modern satellites are presented. The disasters that are typical for Georgia and for the prevention of which the satellite information is used are considered.

UDC 551.510.04

4.D2.9. On the meteorological aspects of macro-transfer of atmospheric pollutants in mountain regions. /G.Gunia, Z.Tskhvitinidze, B.Kholmatjanov, Z.Fatkhulaeva/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 261-271. – Rus. (res. Geo., Eng., Rus.)

Results of the investigation of influence of foehn events at a level of atmospheric pollution are observed by the examples of Kolkheti lowlands (the south-west part of Caucasus) and Akhtangar valley (the western Tien Shan). The calculations of distribution fields of NO_x concentration in the region of Akhangar valley are presented. The foehn events are shown to have an important impact on the level of atmospheric pollution under conditions of mountainous countries. Their consideration during regional investigations of atmospheric pollutants will significantly raise the accuracy of ecological assessment of the natural environment state. It is concluded that the said meteorological event should be ranked as regional "dangerous meteorological conditions" that enhance atmospheric pollution.

UDC 551.515.1.4

4.D.2.10. Short-range numerical prediction of extreme precipitation for Georgia. /N. Kutaladze, I. Megrelidze, G. Mikuchadze, I. Chogovadze, T. Davitashvili/. Transactions of the Georgian Institute of Hydrometeorology. -2008. - vol.115. - pp. 272-278. - Geo. (res. Geo., Eng., Rus.)

Run of local area model with boundary conditions from the global model (GFS), was implemented taking into account local Physical-Geographical and meso and micro scale parameters. These results were improved by 2-way nesting method into parent domain. In the example total surface precipitation forecast, received by mentioned method and it's observed fields are in close agreement.

UDC 551.594(063)

4.D2.11. Thunderstorm activity characteristics in Georgia. /A.Amiranashvili, O.Varazanashvili, A.Nodia, N.Tsereteli, I.Mkurnalidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 279-285. – Rus . (res. Geo., Eng., Rus.)

The distribution of mean periodicity of the number of days with thunderstorms per annum on the territory of Georgia has been mapped. The estimation of the density values of lightning discharges to the earth for each meteorological station and for 12 administrative regions of Georgia is carried out. The dependence of thunderstorm activity on the height of locality is studied.

UDC 502.573

4.D2.12. Assumed ecological consequences of the forest fire in the Borjomi-Kharagauli National Park in August 2008. /A.Amiranashvili, T.Bliadze, V.Chikhladze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 286-293. – Geo. (res. Geo., Eng., Rus.)

It is assumed that as a result of a forest fire in the Borjomi-Kharagauli National Park changes in the microclimatic and bioclimatic characteristics both on the territory of the fire and in the adjacent locality will occur. In order to assess the scope of negative impact of the damaged area, to mitigate the disastrous effects of this technogenic catastrophe and to take the necessary measures for this purpose, a detailed study of these characteristics is to be carried out.

UDC 551.59

4.D2.13. The spatial atructure of hazardous meteorological phenomena over Georgian territory. /O.Varazanashvili, E.Elizbarashvili/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 294-302. – Geo. (res. Geo., Eng., Rus.)

Such hazardous meteorological phenomena as draughts, frosts, stormy winds, blanket fog and icing are discussed. The special criteria elaborated considering the intensity of phenomena and consequent expected damages are based on the images of spatial fields of those phenomena in GIS.

UDC 550.42;54.064

4.D2.14. Dependence of total mineralization of atmospheric precipitation on the surface air temperature at constant value of relative humidity. /T.Salukvadze, M.Salukvadze, E.Khelaia/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 331-334. – Rus. (res. Geo., Eng., Rus.)

The temperature effect of the ground stratum of air on atmospheric precipitation mineralization at constant values of relative humidity is studied. Analysis of the statistically supported experimental material has found that the temperature-mineralization dependence graph for three ranges of relative humidity (30-55; 55-75 and 75-100 %%) has two maximums, which, together with decrease of the relative humidity, shift towards large temperature values.

UDC 546.296:616-006.6

4.D2.15. Radon distribution and lung cancer in individual regions of West Georgia. /A.Amiranashvili, T.Chelidze, K.Gvinianidze, G.Melikadze, M.Todadze, I.Trekov, D.Tsereteli/.

Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 349-353. – Eng. (res. Geo., Eng., Rus.)
According to data of more than 100 water samples taken in individual regions of West Georgia, they contain of radon is rather high. This research once again corroborates the correlation between the radon concentration and prevalence of lung cancer.

UDC 521.15
4.D2.16. Puter earthquake trigger factors. /M.Kachakhidze, G.Ramishvili, N.Kachackidze, R.Kiladze, V.Kukhianidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 354-358. – Eng . (res. Geo., Eng., Rus.)
Special distribution of planets or pairs of planets on the firmament is regarded as an earthquake trigger factor. Sectors, in which the number of earthquakes becomes maximal or minimal when planets or pairs of planets are found within them, have been identified.

UDC 550.540
4.D2.17. On the method of detecting quasi-periodic earthquake synchronising factors in the Caucasus. /O.Lursmanashvili, T.Paatashvili, L.Geondjian/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol.115. – pp. 359-368. – Rus. (res. Geo., Eng., Rus.)
A mechanism of earthquake synchronisation by external impact is proposed. The possibility to detect this external factor by examination of the shapes of histograms representing the distribution of earthquakes' occurring moments is shown. The tidal impact with the lunar-solar synodic month period on the Caucasus earthquakes is found.

UDC 550.340
4.D2.18. False periodicities in earthquakes spectra in the Caucasus induced by industrial explosions. /O.Lursmanashvili, T.Paatashvili, L.Geondjian/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 369-374. – Rus. (res. Geo., Eng., Rus.)
The study of possible diurnal periodicity of earthquakes on the base of the Catalogue of Caucasus Earthquakes, very distinctly reveals this phenomenon for events with $K < 9$, and the absence of diurnal period for stronger quakes. We reveal that the catalogue contains a set of industrial explosions, identified as natural events. The study of possible natural diurnal periodicity for the purpose of earthquake prediction needs very careful analysis of industrial activity to avoid erroneous conclusions and artifacts.

UDC 550.34
4.D2.19. Seismohydrodynamic observations on the territory of Georgia. /G.Melikadze, T.Jimsheladze, G.Kobzev, N.Kapanadze, N.Dovgal/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 375-380. – Geo. (res., Geo., Eng., Rus.)
A multitude of anomalies have been recorded during the current regime hydrodynamic observations on the territory of Georgia since 1985. An analysis carried out to identify their nature established that critical values of deformation stresses in the groundwater regime are known for a characteristic disturbance of background stress. The period of disturbance depends on the strength of earthquake. The largest gradient zone in the hydrogeodeformative field indicates future seismic focus.

UDC 551.491
4.D2.20. Variation of hydro-chemical regime of underground water during preparation of seismic events. /M.Todadze, N.Kapanadze, G.Melikadze, V.Ghlonti, T.Jimsheladze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 389-393. – Geo. (res., Geo., Eng., Rus.)
The data analysis results show the effect of seismicity on the hydro-chemical regime of the underground water. Based on the analyses carried out, major informative components for each area and for the region have been selected.

UDC 551.58.583
4.D2.21. Climatic extremes' calculation results for Georgia's mountainous regions. /N.Kutaladze, Z.Tskvitinidze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 394-401. – Geo. (res., Geo., Eng., Rus.)
Based on the data of 21 stations of the Georgian meteorological network, extremal climatic indices were calculated, multiannual trends of their dynamics revealed and their statistical stability established. Based on the above, climatic risks were assessed and mostly vulnerable areas determined.

UDC 523.58

4.D2.22. Investigation of concentration of solid aerosol particles in the surface air layer of Tbilisi. /N.Chiabrishvili/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 412-416. – Rus. (res.: Geo., Eng., Rus.)

Experimental data on research of the weight concentration of solid particles of aerosol (□m mg/cu m) in the surface air of Tbilisi are obtained. The distribution of the probability density of the weight concentration of solid aerosol particles is studied. The distribution graph and the values of the constants characterising this distribution are presented.

UDC 555.48.215.2

4.D2.23. A possibility of calculation and forecast of maximum water discharges of catastrophic floods based on the application of the moisture circulation parameters under condition of closed-up observation stations. /G.Gachechiladze, V.Tsomaia, L.Kitiashvili, S.Gorgijanidze, N.Begalishvili/. Transaction of the Georgian Institute of Hydrometeorology – 2008. – vol. 115. – pp. 417-426. – Rus. (res. Geo., Eng., Rus.)

The work deals with a method of calculation of moisture circulation parameters and a possibility of estimating and forecasting maximum water discharges and daily precipitation, with the maximum 1-percent security. The testing of the method on the Ajarian Black Sea coastal area rivers produced positive results – error less than 4 to 5 percent.

UDC 551.58:613.1

4.D2.24. Impact of effective air temperature and geomagnetic storms on the health of Tbilisi City population. /A.Amiranashvili, V.Amiranashvili, L.Kartvelishvili, Kh.Nodia, T.Khurodze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 434-437. – Rus. (res. Geo., Eng., Rus.)

The results of investigation of the impact of monthly average values of the air equivalent- effective temperature (combination of temperature, air relative humidity and wind velocity) and monthly duration of magnetic storms on the health of the Tbilisi City population are presented.

UDC 621.472

4.D2.25. Environmentally friendly power station. /V.Jamarjashvili, M.Arabidze/. Energy. – 2008. – #4(48). – pp. 29-38. – Geo. (res. Geo., Eng., Rus.)

A problem of conversion of high-pressure natural gas into electric power by using solar energy on the basis of multistage gas expansion is considered. The respective thermodynamic processes are presented. A plane solar collector is used as the solar energy converter. The most reasonable method for utilizing potential energy of high-pressure gas is the use of turbo-expanders. A solar electric power station (SES) is characterized of a high value of energy conversion factor η_{ef} = 0.73. It is pointed that in the case of using a steam-turbine, flat-collector cycle, the factor will be η_{ef} = 0.07-0.08 (under t = 100^0C). By power density, the SES will also exceed all the known systems of solar energy conversion into electric power. In addition, it is more effective than traditional power stations. High effectiveness of SES is conditioned by using the potential energy of high-pressure natural gas. Determination of performance characteristic of the SES is the subject of future research.

UDC 62:574

4.D2.26. The influence of anthropogenic factors on the formation of carcinogenic agents. /N.Ramazashvili, L.Chkheidze/. Transport and Machine-building. – 2008. – #3(11) – pp. 107-114. – Geo. (res. Geo., Rus., Eng.)

Results of an environmental monitoring conducted on the territory of Georgia are discussed. Special attention is paid to the compounds of aromatic carbohydrates, nitrogen oxides and metals in the human and animal food chain, as well as to the synthesis of carcinogenic agents that can lead to the formation of tumours, Measures to protect humans and animals from such effects are proposed

UDC 681.586.5

4.D2.27. Distributed fiber optic sensors to protect and monitor pipelines integrity. /G.Mgeladze/. Georgian Oil and Gas. – 2009. – #23. – pp. 76-87. – Geo. (res. Geo., Rus., Eng.)

Pipelines are essential components of the energy supply chain and the monitoring of their integrity has become a major task of the pipeline management and control. The presented article gives some information about the best way to protect pipelines using fiber-optical technologies. We have described the ability of distributed fiber-optic sensors to control and monitor pipelines integrity. The advantage is shown and the effectiveness of sensing system based on Brillouin and Raman scattering are used to protect pipeline leakage, verify pipeline operational parameters, and prevent failure of pipelines.

D3. Statistics

UDC 550.348/.349
4.D3.1. Statistical analysis of earthquake precursors. /H.Petrosyan/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 381-388. – Eng. (res. Geo., Eng., Rus.)
The results of a statistical analysis of precursors of about twenty earthquakes in the territory of Armenia are presented.

UDC 551.578.7
4.D3.2. Statistical characteristics of the number of hail days per annum in Georgia./A.Amiranashvili, O.Varazanashvili, A.Nodia, N.Tsereteli, T.Khurodze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 427-433. – Rus. (res. Geo., Eng., Rus.)
A map of the distribution of mean periodicity of the number of hail days per annum on the territory of Georgia is completed. The ranges of a change in the hail activity for 12 administrative regions of Georgia are determined. The dependence of hail activity on the height of locality is studied.

D4. Other Intersectoral Issues

UDC 551.58
4.D4.1. Investigation of some climate change peculiarities in Georgia by mathematical modelling. /T.Davitashvili, Z.Khvedelidze, A.Khantadze, K.Tavartkiladze, I.Samkharadze/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 7-18, – Eng. (res. Geo., Eng., Rus.)
Specific regional climate change peculiarities on the territory of Georgia are investigated by mathematical modelling, in particular, the cooling effect in the western Georgia and the climate warming in the Eastern Georgia. Specific peculiarities of the thermodynamic model describing the desertification process are discussed. For describing the desertification favouring processes, the behaviour of the earth surface temperature and precipitations are studied.

UDC 551
4.D4.2. Zoning of the Georgian territory on the drought intensity evaluation basis. /N.Begalishvili, T.Tsintsadze, M.Gzirishvili, N.Arutinian, R.Mahmudov/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 303-307. – Geo. (res. Geo., Eng., Rus.)
Results of atmospheric and soil drought development, also a complex evaluation of drought intensity on the territory of Georgia are discussed on the basis of the method developed at the Scientific-Research Institute of Agriculture of Russia. The data of observations conducted by 15 weather stations in 1961-1986 are applied. Schematic maps of climatic zoning of the territory of Georgia according to the evaluation of drought intensity for the 4 months of the warm period (May-August) are developed.

UDC 556.16.O6
4.D4.3. Characteristics of floods on the rivers of Georgia and ways of their prevention. /Ts.Basilashvili/. Transactions of the Georgian Institute of Hydrometeorology. – 2008. – vol. 115. – pp. 308-316. – Geo. (res. Geo., Eng., Rus.)
Statistical characteristics of the flood peaks for the most important rivers of Georgia being formed as a result of precipitation and snow melting in May and June are calculated. These represent initial and essential data for designing and projecting water economy facilities. A set of measures for avoiding and preventing probable environmental disasters are worked out

UDC 519.233.4
4.D4.4. A simplified solution of the transcendental equation of dispersion for studying standing waves on the water surface. /T.Gvelesiani, T.Kirimlishvili-Davitashvili/. Energy. – 2008. – #4 (48). – pp. 48-50. – Geo. (res. Geo., Eng., Rus.)
In different natural or artificial reservoirs, also in hydraulic trays (basins) standing waves may arise under the effect of repetitive fluctuations on these bodies. To study these waves, the transcendental equation of dispersion should be solved (i.e. the roots of this equation must be found). For this purpose, a method of selection, specifically, a computer graphic approach is to be applied. A new simplified technique of determining the above-mentioned roots on the basis of their direct estimation according to the presented formula is discussed in this work. In addition, accuracy of the obtained results is estimated by a relational error ô≤0, 7%. The figure shows the first three roots of the equation of dispersion for the case of standing waves.

UDC 625

4.D4.5. A principle of GIS-technology application in track facilities. /E.Moistsrapishvili, M.Moistsrapishvili, G. Enukidze, N. Arudashvili, I.Mchedlishvili/. Transport and Machine-building. – 2008. – #3(11). – pp. 40-43. – Geo. (res. Rus., Eng.)

The paper considers the necessity of introduction of geographic information systems (GIS) in the sphere of track facilities and the positive aspects of their application. It is noted that when designing the structural organisation of track facilities, together with the development of the control flowcharts, the problems of optimal location of sectoral enterprises and divisions should be solved. The following key problems making the basis for functioning of the GIS program upon design of the structural organisation of track facilities are formulated: creation of a sectoral GIS; creation of a geo-information base; electronic certification, re-engineering and informational support of the rail facilities; computer design (software) of structural organisation of the track facilities.

UDC 607.744.153

4.D4.6. Some considerations on the use of geometric transformation in computer engineering graphics. /A.Shavgulidze, Z.Kvinikadze, G.Shengelia/. Transport and Machinebuilding. – 2008. – #3(11). – pp. 44-51. -Geo. (res.: Rus., Eng.)

It is generally known that a computer program is a sequence of commands, every one of which informs the processor on what to do at the given moment. There are great many computer programs, but most of them are noted for neglecting the concept of an operation and for focusing on the final result. For example, the drawing of a tangent from the given point to the given straight line is accomplished by means of one pictogram, whereas the conceptual side of this operation requires the possession of much more information. Hence, in computer graphics, we often deal with the so-called “disemboweled operations”. The execution of an operation in this way is good only when the engineer is familiar with the full content of the operation is oriented on the result, saving time, and he comprehends adequately what he does by means of a computer. Where necessary, when the operation is to be executed sensibly, the methodology recommended in this work – supplement of the computer program using the intuitive algorithm – is quite expedient.

UDC 656.2/.4:681.5.017

4.D4.7. Mathematical description of control regime of track circuits in the existence of intertrack-rail bonds. /M.Gotsadze, N.Khuchua/. Transport and Machine-building. – 2008. – #3(11). – pp. 142-147. – Rus. (res.: Rus., Eng.)

Presented is a mathematical description of the control regime of track circuits in the existence of intertrack- rail bonds, where, in contrast to the known methods of track circuits’ study, specific resistance of mutual inductance between the respective rails of the adjacent tracks is foreseen. Finding of the common solution by the given system of differential equations obtained on the basis of the Kirchoff law is very difficult; therefore, several assumptions that do not affect the practical precision of the solution are made. Besides the grounding conductivity of rails, the design reflects ideal resistances of mutual inductance between the respective rails which enables to resolve the problem of calculating the control regime of track circuits more precisely.

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