

3rd International Conference on Environment and Sustainable Development of Territories: Ecological Challenges of the 21st Century

IOP Conference Series: Earth and Environmental Science
Volume 107

Kazan, Russia
27 – 29 September 2017

ISBN: 978-1-5108-5773-5
ISSN: 1755-1307

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2017) by the Institute of Physics
All rights reserved. The material featured in this book is subject to
IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of contents

Volume 107

3rd International Conference Environment and Sustainable Development of Territories: Ecological Challenges of the 21st Century

27–29 September 2017, Kazan, Russian Federation

Accepted papers received: 18 December 2017

Published online: 31 January 2018

Preface

[3rd International Conference Environment and Sustainable Development of Territories: Ecological Challenges of the 21st Century](#)

[Peer review statement](#)

Papers

1. Geocology and Exodynamic processes

[Hydroecological characteristic of coal-mining regions with crucial anthropogenic load \(in the case study of the Yaiva river basin\)](#)

O A Berezina, N G Maksimovich and S V Pyankov.....1

[Consequences of the river valley bottom transformation after extreme flood \(on the example of the Niida River, Japan\)](#)

D Botavin, V Golosov, A Konoplev and Y Wakiyama.....8

[The Approach to Study the Kama Reservoir Basin Deformation in the Zone of a Variable Backwater](#)

S A Dvinskikh, A B Kitaev and A A Shaydulina.....14

[Engaging expert communities in development of content of Russia's regional geoportals \(case study: "River basins in European Russia" geoportal\)](#)

P Ermolaeva.....21

[Small catchments DEM creation using Unmanned Aerial Vehicles](#)

A M Gafurov.....26

[Study of medieval fortified settlements destruction under natural and anthropogenic factors using remote sensing data](#)

I I Gainullin, P V Khomyakov and B M Usmanov.....31

[Evaluation of heavy metal pollution in bogs of Tomsk region on change in biogeochemical activity of ericaceous shrubs](#)

L P Gaskova.....38

[Trend of Soil Erosion Processes within the Southern Half of the Russian Plain for the Last Decades](#)

V N Golosov, O P Yermolaev, G R Safina, K A Maltsev, A V Gusarov and I I Rysin.....43

[Capability of applying morphometric parameters of relief in river basins for geomorphological zoning of a territory](#)

M A Ivanov and O P Yermolaev.....50

[Changes of cropland area in the river basins of the European part of Russia for the period 1985-2015 years, as a factor of soil erosion dynamics](#)

M A Ivanov.....57

[The elevation and its distribution in geomorphological regions of the European Russia](#)

S V Kharchenko, O P Ermolaev and S S Mukharamova.....65

[The genetic structure of the chloride ion runoff on the example of karst and non-karst geosystems of Arkhangelsk oblast](#)

D N Khayrullina and A A Kurzhanova.....72

[The main relief-forming factors of asymmetry of river valleys within the central part of East European Plain](#)

A A Kourjanova and E V Petrova.....77

[Erosion Losses of Soils on Arable Land in the European part of Russia](#)

K A Maltsev and O P Yermolaev.....82

[Soil evaluation for land use optimizing](#)

O A Marinina.....88

[Trends of the gully erosion development in the territory of the Republic of Tatarstan](#)

R A Medvedeva.....94

[Modern Approaches to Mathematical Modeling of River Runoff in the Territory of the European Part of Russia](#)

S S Mukharamova, O P Yermolaev and E A Vedeneeva.....99

[Constructing development and integrated coastal zone management in the conditions of the landslide slopes of Cheboksary water reservoir \(Volga River\)](#)

I V Nikonorova.....104

[Investigation of the dynamics of ephemeral gully erosion on arable land of the forest-steppe and steppe zone of the East of the Russian Plain from remote sensing data](#)

E V Platoncheva.....112

[Exploring the performance of the SEDD model to predict sediment yield in eucalyptus plantations. Long-term results from an experimental catchment in Southern Italy](#)

P Porto, V Cogliandro and G Callegari.....117

[Gullies and dry-valley systems of Kazan as a territorial reserve for the development of the city](#)

G R Safina, V A Fedorova and R A Medvedeva.....123

[Preliminary estimating the contemporary sedimentation trend in dry valley bottoms of first-order catchments of different landscape zones of the Russian Plain using the ¹³⁷Cs as a chronomarker](#)

A Sharifullin, A Gusarov, A Gafurov and B Essuman-Quainoo.....127

[GIS-technologies application for calculation of potential soil loss of Marha River basin \(Republic of Saha\)](#)

Y Shynbergenov, K Maltsev and N Sihanova.....133

[Spectroscopic methods for determining of zonal soils erosion \(Chuvash Republic, Russia\)](#)

V V Sirotkin, S V Vasyukov, B M Usmanov and G F Gainutdinova.....139

2. Climate Change, Macrocirculation Processes and the Ecology of Atmosphere

[Peculiarities of the thermal regime of the Russian plain depending on tidal oscillation Earth rotation speed](#)

L M Akimov.....144

[On the forecast of runoff based on the harmonic analysis of time series of precipitation in the catchment area](#)

A V Cherednichenko, A V Cherednichenko and V S Cherednichenko.....149

[Variability of the snow cover and its characteristics on the territory of the Republic of Bashkortostan](#)

R G Galimova.....159

[Water runoff vs modern climatic warming in mountainous cryolithic zone in North-East Russia](#)

V E Glotov and L P Glotova.....166

[The changes in the composition of Cladocera community in bottom sediments of Lake Maloye Shirozero \(Zaonezhsky Peninsula\) as a consequence of shifts of environmental and climatic conditions](#)

A G Ibragimova, L A Frolova, D A Subetto, N A Belkina and M S Potakhin.....174

[Multiparameter models in the management of the development of territories, taking into account the influence of hydrometeorological factors](#)

E P Istomin, N N Popov, A G Sokolov and A A Fokicheva.....182

[Inter-annual variability of variations of ground and integrated atmospheric water vapor content in Europe](#)

O G Khutorova, V E Khutorov, V V Kalinnikov and G M Teptin.....188

[The temperature characteristics of biological active period of the peat soils of Bakchar swamp](#)

M V Kiselev, E A Dyukarev and N N Voropay.....194

[Formaldehyde content in atmospheric air of Saratov](#)

N V Korotkova and N V Semenova.....199

[Interannual variability of anticyclone activity and temperature extremes in the Black sea region](#)

O Yu Kovalenko and E N Voskresenskaya.....205

[Latent fluctuation periods and long-term forecasting of the level of Markakol lake](#)

A S Madibekov, A V Babkin, A Musakulkyzy and A V Cherednichenko.....211

[Transmissivity of the atmosphere above the Russian territory: observed climatic changes](#)

A N Makhotkin, E L Makhotkina and I N Plakhina.....218

[Variability of the circulation processes in the Lower Volga Region on the background of global climate trends](#)

S V Morozova, E A Polyanskaya, G F Ivanova, N G Levitskaya, K E Denisov and N P Molchanova.....225

[Hydrobiological investigations of Kytalyk Wildlife Reserve polygonal ponds \(North-Eastern Yakutia\)](#)

G Nigamatzyanova, L Frolova and L Pestryakova.....232

[Relationship between glacier melting and atmospheric circulation in the southeast Siberia](#)

O P Osipova and E Y Osipov.....238

[Climatic changes in the troposphere, stratosphere and lower mesosphere in 1979-2016](#)

Y P Perevedentsev, K M Shantalinskiy and V V Guryanov.....244

[Model-based calculations of surface mass balance of mountain glaciers for the purpose of water consumption planning: focus on Djankuat Glacier \(Central Caucasus\)](#)

O O Rybak and E A Rybak.....252

[Long-term changes in the hydroclimatic characteristics in the Baikal region](#)

N N Voropay and N V Kichigina.....258

[Interannual climate anomalies in the Atlantic-European region associated with La-Nina types](#)

E N Voskresenskaya, O V Marchukova, V N Maslova and A S Lubkov.....264

[Changes of extreme precipitation in Southern Russia](#)

E V Vyshkvarkova and E N Voskresenskaya.....271

[Impact of climate changes on population vital activities in Russia in the early 21st century](#)

A N Zolotokrylin, V V Vinogradova, T B Titkova, E A Cherenkova, D D Bokuchava, I A Sokolov, A V Vinogradov and E D Babina.....277

3. Global Pollution, Environmental Impact Management, Ecological Risks and Sustainable Development

[An integrated risk assessment of the environmental hazards influence on Kazakhstan section \(from Khorgas and Dostyk dry ports to Aktau seaport\) of the international transport corridor](#)

F Zh Akiyanova, Z K Arykbayeva, A M Atalikhova, B A Dauilbayev, N B Zinabdin, A B Kubeyev and K A Tkach.....283

[Ecological-geomorphological assessment of the suburban area of Astana](#)

F Zh Akiyanova, N B Zinabdin, A Zh Kenzhebayeva, F G Adilbekova, A T Ilyassova and E M Karakulov.....288

[Specifics of the methodological approach to the study of nanoparticle impact on human health in the production of non-metallic nanomaterials for construction purposes](#)

A M Ayzenshtadt, M A Frolova, T A Makhova, V E Danilov, Piyush K Gupta and Rama S Verma.....295

[Occurrence of Hydrocarbon Degrading Genes in the Soils of the Republic of Tatarstan \(Russia\)](#)

L R Biktasheva, R P Shalyamova, U A Guseva and P Yu Galitskaya.....300

[Influence of Biopreparations on the Bacterial Community of Oily Waste](#)

L R Biktasheva, P Yu Galitskaya and S Yu Selivanovskaya.....307

[Transformation of environmental conditions in large former Soviet countries: regional analysis](#)

V R Bityukova and M S Borovikov.....314

[Influence of Vladivostok coastal waters pollution on a microflora of mussel *Crenomytilus grayanus*](#)

E A Bogatyrenko, T I Dunkai, L S Buzoleva and A V Kim.....321

[Biofilm formation as a method of survival of *Escherichia coli* and *Pantoea spp* in the marine environment](#)

L S Buzoleva, Y S Golozubova, A I Eskova, A V Kim and E A Bogatyrenko.....326

[Antibiotic resistance of microorganisms in agricultural soils in Russia](#)

N V Danilova, P Yu Galitskaya and S Yu Selivanovskaya.....331

[System methodology application to make water resources management plan for unstudied rivers](#)

S A Dvinskikh and O V Larchenko.....339

[Monitoring of Soil-Borne Pathogens in the Agricultural Soils of the Pestrechinsky District \(Tatarstan, Russia\)](#)

K.O. Dzhabarova, P.A. Kuryntseva, P.Y. Galitskaya and S.Y. Selivanovskaya.....346

[Monitoring Soil Bacteria with Community-Level Physiological Profiles Using Biolog™ ECO-Plates in the Republic of Tatarstan \(Russia\)](#)

G Sh Galieva, I M Gilmudinova, V P Fomin, S Yu Selivanovskaya and P Yu Galitskaya.....351

[Changes in enzyme activity and functional diversity in soil induced by Cd and glucose addition](#)

A R Gilmullina, P Yu Galitskaya and S Yu Selivanovskaya.....359

[Assessing the Potential of Using Biochar as a Soil Conditioner](#)

D M Glazunova, P A Kuryntseva, S Y Selivanovskaya and P Y Galitskaya.....364

[Eco-organic tourism as an element of the sustainable development of territories](#)

D V Ivanov and I I Ziganshin.....372

[Monitoring of oil hydrocarbons pollution in the Sea of Japan, based on detection of marker genes in microbial communities](#)

A V Kim, L S Buzoleva, E A Bogatyrenko, T I Zemskaya and E V Mamaeva.....377

[Atmospheric emission of \$^{137}\text{Cs}_{82}\$ from Beloyarsk nuclear power plant](#)

G A Kolotkov.....383

[Technogenic and natural radionuclides in the bottom sediments of the Sea of Azov: regularities of distribution and application to the study of pollutants accumulation chronology](#)

A N Kuznetsov, Yu A Fedorov and V M Yaroslavtsev.....388

[The Issue of transporting pollutants with atmospheric precipitation](#)

A Madibekov and L Kogutenko.....394

[Screening of the state of urban ecosystem with the use of bioindication method \(on the example of Kazan city\)](#)

E A Minakova, A P Shlychkov and A V Arinina.....401

[New strains of oil-degrading microorganisms for treating contaminated soils and wastes](#)

A Yu Muratova, L V Panchenko, D V Semina, S N Golubev and O V Turkovskaya.....408

[Soil diagnosis of an urban settlement with low levels of anthropogenic pollution \(Stepnoe, Saratov region\)](#)

C T Ngun, Ye V Pleshakova and M V Reshetnikov.....416

[Toxicity assessment of polluted sediments using swimming behavior alteration test with *Daphnia magna*](#)

O V Nikitin, E I Nasyrova, V R Nuriakhmetova, N Yu Stepanova, N V Danilova and V Z Latypova.....424

[Soil enzymes as biodiagnostics indicator of heavy metal pollution of urbanozem](#)

E I Novosyolova, O O Volkova and R R Turyanova.....429

[Variation in the carbon cycle of the Sevastopol Bay \(Black Sea\)](#)

N A Orekhova and S K Konovalov.....434

[Ligninolytic basidiomycetes as promising organisms for the mycoremediation of PAH-contaminated Environments](#)

N N Pozdnyakova, S A Balandina, E V Dubrovskaya, C N Golubev and O V Turkovskaya.....441

[Development of taxation system for oil production companies in Russia](#)

S V Salmina, I M Sboeva, J I Selivanovskaya, A R Khafizova and V P Fomin.....448

[Responsibility for the Violation of Ecological Safety Requirements](#)

J I Selivanovskaya and I Gilmutdinova.....455

[Bioconversion of oil sludge into biomass of lipid metabolites for use as a source of biofuel](#)

T N Shchemelinina, N V Matistov, M Yu Markarova and E M Anchugova.....460

[The carbonaceous sorbent based on the secondary silica-containing material from oil extraction industry](#)

I V Starostina, D V Stolyarov, Ya N Anichina and E V Porozhnyuk.....464

[Priority chemical pollutants of drinking water in the city of Kazan: approach based on risk assessment](#)

N V Stepanova, N S Arkhipova and S F Fomina.....471

[Recovery of ostracod with known ages in differently textured sediments and comparison of toxicity of heavily contaminated sediments with ostracod *Heterocypris incongruens* and amphipod *Hyalella azteca*](#)

N Yu Stepanova, O V Nikitin, V Z Latypova, I B Vybornova, G S Galieva and R V Okunev.....476

[The use of expanded clay dust in paint manufacturing](#)

S V Sverguzova, Zh A Sapronova, Yu L Starostina and E A Belovodskiy.....485

[Results of adolescent health risk assesment on exposure to habitat water peroral factor in conditions of a large industrial city](#)

E R Valeeva, N V Stepanova, G A Ismagilova, A I Ziyatdinova and D A Semanov.....491

[The sustainable utilization of malting industry wastewater biological treatment sludge](#)

T A Vasilenko, A V Svintsov and I V Chernysh.....497

[Anthropogenic impact signatures revealed in the travelling ionospheric disturbances by regional GPS interferometry](#)

V I Zakharov and Ya A Ilyushin.....505

4. Strategies for Biological Resources Protection and Optimization

[The dynamics of fauna and population of birds in agricultural landscapes on the border of Kazan International Airport](#)

A F Bespalov and A N Belyaev.....511

[Dendroclimatic research on Scots pine growing under the conditions of the raised bog in the Volga-Kama region, Russia](#)

R Chugunov, P Iskandirov and D Tishin.....517

[Cladocera from bottom deposits as an indicator of changes in climate and ecological conditions](#)

L A Frolova.....521

[Invasive species in phytocenosis of Sterlitamak town \(Republic of Bashkortostan, Russia\)](#)

Ya M Golovanov, L M Abramova and S S Petrov.....525

[Rare species of the genus *Oxytropis* DC. \(Fabaceae\) from the flora of the Republic of Bashkortostan under cultivation within the city of Ufa](#)

N V Maslova, O A Elizaryeva, G M Galikeeva and N M Tyutyunova.....531

[The Dilemmas of Energy: Essential energy services and potentially fatal risks](#)

J H Perkins.....538

[Migratory birds are the source of highly toxic organic pollutants for indigenous people in the Russian Arctic](#)

A A Pesiakova, E V Gusakova, A N Trofimova and T Yu Sorokina.....542

[Morphological and ecological preadaptations as the basis of bird synanthropization under transformed environment conditions](#)

I I Rakhimov and K K Ibragimova.....547

[Chorological classification approach for species and ecosystem conservation practice](#)

T V Rogova, M V Kozevnikova, V E Prokhorov and N O Timofeeva.....551

[Functional approach in estimation of cultural ecosystem services of recreational areas](#)

I S Sautkin and T V Rogova.....555

[Productivity of *Polytrichum juniperinum* Hedw. in forest ecosystem of Tatarstan](#)

N R Shafigullina and E N Karzhavkina.....560

[The role of vertical structure in maintaining the stable functioning of meadow phytocenoses of the Middle Ob floodplain](#)

L F Shepeleva.....565

[Acclimation of *Juglans mandshurica* Maxim. and *Phellodendron amurense* Rupr. in the Middle Volga region](#)

D Tishin, M Fardeeva, N Chizhikova and R Rizatdinov.....572

5. Mathematical Methods and GIS Technologies in Ecology and Management of Natural Resources

[Mathematical modeling of a dynamic thin plate deformation in acoustoelasticity problems](#)

I B Badriev and V N Paimuhin.....578

[MODELING OF HYDRAULIC FRACTURING ON THE BASIS OF THE PARTICLE METHOD](#)

D V Bereznoi, N F Gabsalikova, V G Izotov and V V Miheev.....587

[Mathematical simulation of the low-temperature plazma at the interaction with oil products](#)

V Ju Chebakova and I B Badriev.....592

[Dynamics of intense rainfalls in the southern half of European Russia for the period 1960-2015](#)

N Chizhikova.....598

[Landscape fire in East Siberia: medical, ecological and economic aspects](#)

N V Efimova, V S Rukavishnikov, G A Zabuga and T A Elfimova.....605

[Mapping of Vegetation with the Geoinformation System and Determining of Carrying Capacity of the Pre-Urals Steppe area for a Newly Establishing Population of the Przewalski Horse *Equus ferus przewalskii* at the Orenburg State Nature Reserve](#)

N I Fedorov, O I Mikhailenko, T L Zharkikh and R T Bakirova.....611

[A three-dimensional model of solar radiation transfer in a non-uniform plant canopy](#)

N T Levashova and Yu V Mukhartova.....616

[Description of bioremediation of soils using the model of a multistep system of microorganisms](#)

A I Lubysheva, K A Potashev and O A Sofinskaya.....623

[A two-dimensional hydrodynamic model of turbulent transfer of CO₂ and H₂O over a heterogeneous land surface](#)

Yu.V. Mukhartova, A.S. Krupenko, P.A. Mangura and N.T. Levashova.....629

[Palaeoecological data as a tool to predict possible future vegetation changes in the boreal forest zone of European Russia: a case study from the Central Forest Biosphere Reserve](#)

E Yu Novenko, A N Tsyganov and A V Olchev.....636

[Influence of forest cover changes on regional weather conditions: estimations using the mesoscale model COSMO](#)

A V Olchev, I A Rozinkina, E V Kuzmina, M A Nikitin and G S Rivin.....642

[Recovery of continuous field of ecological-climatic indices based on the meteorological stations data](#)

A A Saveliev and A M Domnina.....649

[Use of GIS Technologies in Order to Assess the Degree of Transformation of the Land Cover Structure](#)

D A Tretyachenko, Y S Greenfieldt, O A Klimanova, N N Alekseeva, M A Arshinova and E Y Kolbowsky.....654

[Geographic Information System and Geoportal «River basins of the European Russia»](#)

O P Yermolaev, S S Mukharamova, K A Maltsev, M A Ivanov, P O Ermolaeva, A I Gayazov, V V Mozzherin, S V Kharchenko, O A Marinina and F N Lisetskii658

[Calculation of concentration fields of high-inertia aerosol particles in the flow past a cylindrical fibre](#)

T S Zaripov, A K Gilfanov, S K Zaripov, O D Rybdylova and S S Sazhin.....667

[Groundwater movement simulation by the software package PM5 for the Sviyaga river adjoining territory in the Republic of Tatarstan](#)

E A Kosterina and Z Sh Isagadzhieva.....672

[Comparison of two methods of numerical tracking of the soil contamination dynamics during a leak from a pipeline](#)

E A Kosterina.....677

6. Soil and Land Resources, their Conservation and Efficient Management, and Food Safety

[Man-induced transformation of mountain meadow soils of Aragats mountain massif \(Armenia\)](#)

M H Avetisyan.....683

[Mathematical models application for mapping soils spatial distribution on the example of the farm from the North of Udmurt Republic of Russia](#)

P M Dokuchaev, J L Meshalkina and A M Yaroslavtsev.....688

[The organic matter of the different ages fallow Luvisols](#)

K G Giniyatullin, A A Valeeva, E V Smirnova, R V Okunev and L I Latipova.....695

[Mapping of Soil-Ecological Conditions of a Medium-Size Industrial City \(Birobidzhan City, Jewish Autonomous Oblast, FarEast of Russia as an Example\)](#)

V B Kalmanova and L A Matiushkina.....700

[Lignin in the Organic Matter of the Soils of the Russian Plain as Biomarker of Palaeoenvironment](#)

I V Kovalev and N O Kovaleva.....707

[Isotopic signature of Tian-Shan mountain soils as a record of climatic changes of the Late Pleistocene and Holocene](#)

N O Kovaleva.....714

[Mercury in the Soil of the Tunka Depression](#)

E E Lyapina and A A Cherkashina.....720

[Carbon balance assessment by eddy covariance method for agroecosystems with potato plants and oats & vetch mixture on sod-podzolic soils of Russia](#)

J L Meshalkina, A M Yaroslavtsev, I I Vasenev, I V Andreeva and M V Tihonova.....724

[Assessment of environmental stability of agroserous soil according to indicator of energy potential of organic substances](#)

S G Murtazina, L G Gaffarova and MG Murtazin.....729

[Investigation of biological destruction of benzo\[a\]pyrene and polycyclic aromatic hydrocarbons of biochar in soil](#)

R V Okunev, E V Smirnova, A R Sharipova, I M Gilmutdinova and K G Giniyatullin.....733

[Digital soil mapping as a basis for climatically oriented agriculture a thematic on the territory of the national crop testing fields of the Republic of Tatarstan, Russia](#)

I A Sahabiev, K G Giniyatullin and S S Ryazanov.....738

[The Carbon Isotope Composition of Organic Matter and the Age of Paleosols from Wurm Glaciations Interstadials to Holocene \(Bryansk region, Russia\)](#)

E M Stolpnikova, N O Kovaleva and I V Kovalev.....746

[Characteristics of the surface chemistry of linden pyrochar after removal of labile organic matter](#)

A A Valeeva, E V Smirnova, K G Giniyatullin, V V Vorobev, L R Biktasheva and A N Grachev.....752

7. Social, Economic and Ecological Aspects of Urban Territories Development Analysis and Management

[Comparative recreational assessment of Karaganda city public green spaces](#)

I S Akylbekova and T Yu Zengina.....759

[Wetlands 'Zaymische' as a promising protected natural territories in the republic of Tatarstan](#)

N Yu Assanova and N M Mingasova.....767

[Methodology of ecooriented assessment of constructive schemes of cast in-situ RC framework in civil engineering*](#)

I P Avilova and M O Krutilova.....773

[State and business co-operation in settling socio-economic issues: forward to sustainable development of ecologically unfavorable regions](#)

N N Bashkirova and S N Lessovaia.....780

[Evaluation of the lake Lyabiazhie \(Kazan, Russia\) state by indicators of communities of hydrobionts](#)

O Derevenskaya and N Urazaeva.....786

[Ecological planning of urbanized areas in the south of the Far East \(Birobidzhan city as an example\)](#)

V B Kalmanova.....792

[Inventory of water objects for purposes of development objectives and design of natural frame of Kazan \(Russia\)](#)

N M Mingazova.....798

[Role of the state in solving the environmental problems of the industrial monoprofile cities](#)

L M Musina and M U Neucheveva.....803

[Influence of unreasoned economic activity on the condition of macrophytes of the Bol'shoje Goluboye Lake](#)

O V Palagushkina, N R Zaripova, N M Mingazova and T O Yarutkin.....809

[Economic regionalization and choice of strategic development directions of municipalities of the Republic of Tatarstan](#)

M V Panasyuk.....813

[Analysis of natural prerequisites for the development of ecological tourism in the Belgorod region](#)

Eu A Pendyurin, S N Glamazda, O N Genenko and S A Ryadnova.....821

[The peculiarity of small lakes formation in the urban territory of Kazan, Russia](#)

I S Shigapov.....827

[A study of temporal dynamics and spatial variability of power frequency electromagnetic fields in Saint-Petersburg](#)

V I Sturman.....832

[THE ROLE OF FINANCIAL SECTOR IN PROVIDING SUSTAINABLE DEVELOPMENT GOALS](#)

G F Tokareva, O I Shalina and E E Barkova.....839

[The problems of formation and conservation of the green frame \(green carcass\) of the satellite city \(on the example of Zelenodolsk\)](#)

J Zakirova and S Khusnutdinova.....845

REPRODUCTIVE INDICATORS OF LEGUMINOUS PLANTS AS A
CHARACTERISTIC OF THE ECOLOGICAL STATE OF URBAN AREAS

R I Zamaletdinov, S M Okulova, E A Gavrilova and A A Zakhvatova.....851