18-24 June, 2015, Bulgaria

15th INTERNATIONAL MULTIDISCIPLINARY SCIENTIFIC GEOCONFERENCE SGEM 2015

Ecology, Economics, Education and Legislation

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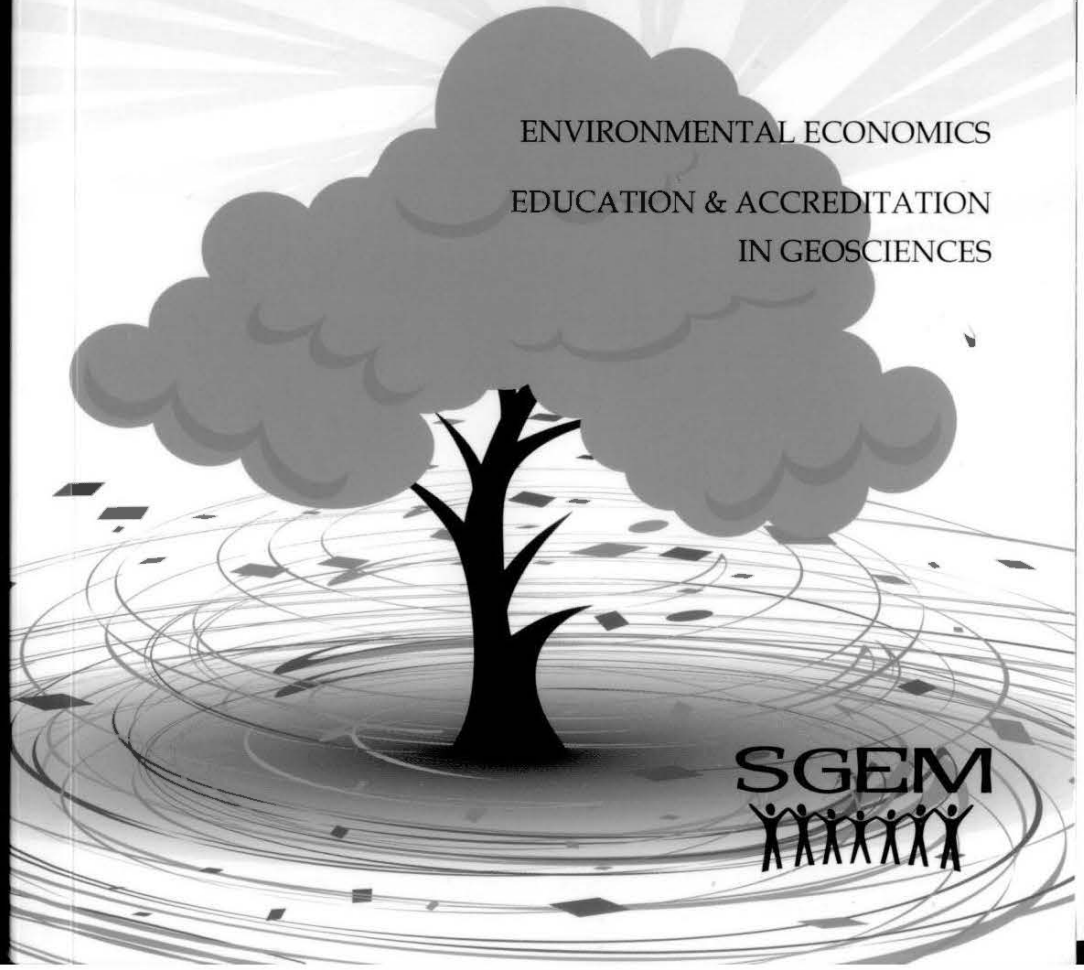
Volume III

ENVIRONMENTAL ECONOMICS

EDUCATION & ACCREDITATION IN GEOSCIENCES



SGEM

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ENVIRONMENTAL ECONOMICS, EDUCATION AND ACCREDITATION IN GEOSCIENCES

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[4] Buysse K., Verbeke A., Proactive environmental strategies: a stakeholder management perspective, Strategic Management Journal, Vol. 24, Issue 5, 2003, pp 453-470;

[5] Carballo-Penela A., Castromán-Diz J.L., Environmental Policies for Sustainable Development: an Analysis of the Drivers of Proactive Environmental Strategies in the Service Sector, Business Strategy and the Environment, DOI:10.1002/bse.1847.

[6] González-Benito J., González-Benito Ó., A review of determinant factors of environmental proactivity, Business Strategy and the Environment, Vol. 15, Issue 2, 2006, pp 87-102;

[7] González-Benito J., González-Benito O., Environmental proactivity and business performance: an empirical analysis, Omega, Vol. 33, Issue 1, 2005, pp 1-15;

[8] Hunt C.B., Auster E.R., Proactive environmental management: avoiding the toxic trap, Sloan Management Review, Vol. 31, No. 2, 1990, pp 7-18;

[9] Murillo-Luna J.L., Garcés-Ayerbe C., Rivera-Torres P., Barriers to the adoption of proactive environmental strategies, Journal of Cleaner Production, Vol. 19, Issue 13, 2011, pp 1417-1425;

[10] Roome N., Developing environmental management systems. Business Strategy and the Environment. Vol. 1, Issue 1, 1992, pp 11-24;

[11] Ryszko A., Environmental proactivity, eco-innovation and firm performance, evidence from Poland, Innovation Vision 2020: from Regional Development Sustainability to Global Economic Growth, Proceedings of the 25th International Business Information Management Association Conference, ISBN 978-0-9860419-4-5, Amsterdam, Netherlands 2015, pp 454-467;

[12] Sharma S., Vredenburg H., Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities, Strategic Management Journal, Vol. 19, Issue 8, 1998, pp 729-753.

ENVIRONMENTAL SECURITY ISSUES IN THE RUSSIAN ARCTIC

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ABSTRACT

The aim of this study was to present the need for environmental risks assessment for sustainable socio-economic development and environmental safety in the Russian Arctic. The method applied was a descriptive-analytical method which based on the official data. The problem of preserving and protecting the natural environment of the Arctic in the face of increasing industrial activity on the background of modern regional and global climate change was presented as very actual. Arctic wildlife management area was also proved of particular importance in the light of global natural and socio-economic changes, the increasing availability of Arctic sea areas attracting more and more attention to energy, transport, recreational facilities, as environmental issues in the Arctic could be an obstacle to the development of shelf resources. Analyzing the state environmental programs in the Arctic, it was revealed that the state environmental monitoring were not able to effectively address the problem of information support of environmental safety. The evaluation and prediction of ecological state were not given the systemic nature. The practical value of the paper was determined by the possibility to use the proposed methodological decisions by regional authorities in the Russian Arctic.

Keywords: environmental risks, environmental security, the Arctic zone

INTRODUCTION

The Arctic trend of nature management acquires a particular significance in the focus of global environment and social-and-economic changes in the modern world. The increasing availability of the Arctic sea water areas draws more and more attention to energy, transport, recreational development of the Arctic zone of our planet. At the same time, more attention is drawn to issues of ecological safety of activity in the Arctic which is becoming the cornerstone of the problem and can be an obstacle in development of resources of the Arctic shelf. In this regard, it is necessary to develop methods that could assess environmental risks against adverse impact on the environment. It is also required to develop guidelines for ensuring ecological safety.

In Basics of the State Policy of Russia in the Arctic for the Period till 2020 and for a Further Prospective it is written that the main goal of state policy of Russia in the Arctic in the field of science and technologies is to ensure high level of fundamental and applied scientific research to accumulate data and to create modern scientific and geo-information bases for management of the Arctic territories [1].

Nature management lays anthropogenic burden on the environment in some water [redacted] of the Arctic Ocean that are adjacent to Russia and also on some territories of the Ar[redacted] zone of Russia which are characterized by existence of hot spots, high level of ecological damage, potential sources of pollution. We actualize the problem [redacted] preservation and protection of the Arctic environment under conditions of the increas[redacted] industrial activity in the focus of modern regional and global climate changes.

THE CLIMAT AND ENVIRONMENTAL SECURITY IN THE ARCTIC

The necessity of the scientific substantiation of the Russian Federation's Arctic zone's environmental security is determined by the provisions of the Environmental doctrine of the Russian Federation, the Climate doctrine of the Russian Federation, a significant climate change in the Arctic. The Arctic Ocean phytoplankton primary production increased by about 20 %. It was due to the increase of the open water area and the duration of the open water season. Summer warm-up of the greater water area helps to increase the biomass production.

Climate warming and reducing sea's ice cover provides a more open marine access to the Arctic and longer navigation seasons, what increases the interest to the Arctic because of its huge oil, natural gas and mineral resources reserves. But the ice spatial distribution changes can create new problems. More intense commotion will develop on the ice-free sea surface. In this regard, coastal erosion is expected to accelerate. The icebergs formation intensification can also represent an additional hazard for oil tankers and drilling platforms. Increased shipping in the Arctic has negative effects in the form of pollution of the marine and air environment in the marine vessels areas.

Change the state of the permafrost in the Far North of Russia as a result of warming c[redacted] cause a cascade reaction of many natural systems and processes in the Arctic that will eventually exacerbate existing problems and lead to the new environmental problems. The greatest danger is a man-made accident-related violation of the terms of reliable operation of infrastructure and the destruction of its elements (pipelines, water intake and water treatment facilities). As a result, we have environmental damage and risk to public health due to the deterioration of water quality, increased risk of infectious disease transmission by the destruction of burial ground of cattle and waste storage on permafrost, etc. Unfortunately, statistics on incidents have been often used as a political tool and have not been completely reliable [2]. According to Russia's Ministry of Civil Defence, Emergencies and Disaster Relief [3], there were 5 accidents on main and intrafield pipelines in 2014 which led to emergency situations (compared with 9 in 2013 and 15 in 2012). The extent of oil leaks resulting from pipeline accidents is differently estimated. According to Greenpeace [4], on average, at least 5 million tonnes of oil leaks out annually in Russia as a result of accidents, with the amount of oil entering the Arctic Ocean estimated at 500.000 tonnes.

The rising of the World ocean level is an important risk factor, and it will be maintained in the long term. The flooding of low coastal areas and the intensification of the sea coasts destruction should be taken into consideration in future plans for socio-economic development of regions. Examples of the Total company incident on the oil and gas platform in the British sector of the North sea, which led to the natural gas leak in 2012, and the disaster at the Fukushima atomic power station as a result of tsunami obviously show that hydro-meteorological (including climatic) and geographic factors are extremely important for environmental risk assessment, since these factors can

strengthen/weaken the effect of anthropogenic impact or be a cause of environmental disasters.

Ecological security cannot be considered in isolation from the current environmental conditions, and trends of hydro-meteorological conditions as natural ecological risk factor. The Arctic is a part of the global climate system, where natural and anthropogenic fluctuations of weather and climate characteristics are most pronounced as a consequence of inter-latitudinal advective exchange, internal communication between components of the Arctic climate system and global changes. Nowadays, there are two of the biggest challenges stimulating great interest to the Arctic Ocean: (i) great sensitivity of the Arctic to climate variations, leading to the need of creating models to obtain quantitative estimates of climate change taking into account the processes in the Ocean; (ii) the vulnerability of the Arctic environment, which determines the need to assess the role of the Ocean in the transfer of substances, including pollutants components and radionuclide. As a consequence, there is a need to provide a comprehensive basis for the models calculation and prediction the ecological status of the region and its individual parts.

In recent decades, there has been substantial change in the Arctic. The frequency of passing and intensity of cyclones was found to increase considerably, that led eventually to the rise of air temperature. Because of this warming the extremeness of climate events began to appear more frequently. Extreme intensification of cyclonic component of polar vorticity and the increase of air temperature resulted in a decrease in ice thickness and the shrinking Arctic ice. [5]. As a result of enhanced warming of the last decades, the September Arctic sea ice (SI) decreased significantly. At the same time the thickness of sea ice decreased, primarily due to the decrease in the amount of multi-year ice [6]. In July 2013 weather was unusually warm in the most part of the Russian Arctic regions. Only in Yakutia it was warm as usual when average temperature amplified to 13.1 °C. The most abnormal average July temperature was observed in the regions of intensive oil and gas exploration: Yamalo-Nenets and Nenets Autonomous areas and the Republic of Komi with the temperature anomaly of 3.9, 4 and 2.9 °C respectively. One of the important measures to reduce or prevent the risk of serious adverse effects of dangerous events may be basing on historical experience. As applied to the complex hydro-meteorological characteristics of the natural environment, this means the use of climate information as for preventive risks assessment at the expense of hydro-meteorological factors, so for elimination of consequences of dangerous phenomena.

Even a quick analysis of the impact of climate change on natural, economic and social systems shows exceptional complexity and ambiguity of the expected impacts that can have the fundamental role for the population and the economy. For example, according to [7], climate warming and particularly the ice cover's decrease of the Arctic seas may increase the duration of the summer navigation and development in this regard marine industry, including marine transportation of goods, creating favorable conditions for access by sea to the natural resources of the Arctic, including the birthplace of energy resources on the shelf of the Arctic ocean. On the other hand, the same natural factor could increase the damaging effects of storms on coastal zone, could harm economic objects located there, especially on infrastructure and can threat to the lives of people living there, can cause sharp deterioration of conditions and environment of some species of fauna, their reduction, disappearance and migration of existing species of

plants and living organisms, invasion of new species of plants, insects, microorgani
etc.

Rapid climate change has impact on Arctic ecosystems and marine biological resour
It is a threat to biodiversity in the Arctic, its unique and fragile ecosystems. As a res
of the melting of sea ice and reduce its surface unique habitats of Arctic flora and fau
are disappearing. Thus, according to Stirling et al. [8], there is the reduction of are
suitable for successful hunting of polar bears, which, in particular, has already led to a
reduction in the population of bears of western Hudson Bay by nearly 22% [9
Downsizing and reduction of offspring was observed in the seals, hooded seals in th
north-east Atlantic and harp seals in the White Sea [10]. As stated in [11], long-livi
crustaceans, such as gammarus Vilkitsky need their life cycle year-round presence
ice, so with the increase in the area only seasonal availability of sea ice, reduces th
range of this species. This means that the climatic factor should be considered as a basi
part of the problem of environmental safety. Monitoring of changes in the sea ice, ocean
and atmosphere, and their connection with the processes in the Arctic climate system
and global climate change is an urgent problem [7].

ECOLOGICAL RISKS ASSESMENT

The increasing needs to ensure ecological safety of activity in the Arctic require
assess environmental risks and to find ways of their decrease. The paradigm of risk
thinking is becoming a standard norm. Large groups of experts in federal and scientific
companies are engaged in assessing risks in various fields of activity. However, neither
uniform risk theory nor standard terminology has been worked out so far. At the same
time, extra difficulties when determining environmental risks are caused by such
circumstances as ambiguity and logical contradictions that are present in such basic
concepts as environment, factors of ecological danger (causes for environmental risks),
environmental risks, harm and damage to the environment.

Issues of ecological safety of activity which is currently becoming the cornerstone o
the problem and which can be an obstacle in development of resources cause the need
develop methods that could assess environmental risks against adverse impact on the
environment. It is also required to develop guidelines for ensuring ecological safety.
Economic and other types of activity affect the environment causing negative changes
to the quality of it and becoming a source of this adverse impact.

Therefore, the adverse consequences concept is the foundation in assessing
environmental risks. Thus, the object of risks is quality of the environment while the
subject of risks can be economic and other types of activity, cases of emergency of
natural and technogenic origin. Legislature does not define the adverse consequences
concept; instead, there is a term negative changes. Among negative changes of the
environment legislature considers degradation of natural ecological systems, change
and/or destruction of genetic fund of plants, animals and other organisms, exhaustion of
natural resources. There are also other types of negative changes the structure of which
is not described yet. As quality of the environment means the state of the environment
characterized by physical, chemical, biological and other indicators and/or their set, the
negative changes concept needs to be specified. Here, it is necessary for us to
understand that assessment of negative changes (adverse impact), as a result of negative
impact, represents itself an extremely complex scientific challenge solution to which
requires participation of experts of various profiles.

When describing objects of environment protection, we must mention that negative impact of economic and other types of activity includes pollution, exhaustion, degradation, damage, destruction and other kinds of influence. In addition, legislature equates with negative impact degradation and/or destruction of natural objects possessing special nature protection, scientific, historical-and-cultural, esthetic, recreational, healthcare and other valuable significance being under special protection, and also an obstacle to implement functions of ecological, sanitary-and-hygienic and recreational significance to territories being part of the green fund. Obviously, there is a certain overlapping of concepts impact and consequence since, e.g., 'emissions of polluting substances into the atmosphere' cannot have (at least theoretically) consequences, while 'degradation and/or destruction of natural objects' obviously relates to consequences. We should note that interrelation of impact and consequences is not quite trivial and it is insufficiently worked out by scientists. However, it is intuitively clear that negative changes of the state of the environment can be also caused by other reasons of natural and technogenic origin.

From the scientific point of view, the weakest link in the analysis of ecological safety is justification of influence of technogenic or natural impact on realization of negative ecological consequences. Simultaneously, extra difficulties are problems of fundamental origin, namely, problems of development of predictive population models, methods of transfer of test results for separate species on the population, research of inter-specific effects, assessment of impact of multiple sources (in general and for private risks), approaches development to assess the spatial and temporary variability of introduced factors to specify the scales of assessment of risks and development of approaches to determine the ecological importance of impact both on population and on eco-indicators (and their corresponding relationship), etc.

Assessment of environmental risks has to be based on authentic data regarding the extent of impact of results of economic and other types of activity on the environment and regarding the results of this impact. However, the analysis shows that monitoring of the environment of the Arctic is pretty fragmentary which is caused by the departmental dissociation. At the same time, access to data is, as a rule, limited or depends on serious bureaucratic difficulties. Nevertheless, federal program Environmental Protection for 2012-2020 indicates that the effecting system of the state environmental monitoring (state monitoring of the environment) is not capable of effective solving tasks of information support to ensure ecological safety. "Lack of reliable and coordinated temporary sets of data on the state of the environment is one of the major obstacles when increasing efficiency of the policy and programs". Assessment of environmental risks has versatile character with a very wide range of information resources. Foreign scientific organizations, as a rule, conduct research on a wide scope of issues – starting with the condition of the environment and finishing with terms of activity of the population of the polar countries. The interdisciplinary research principle is being widely applied.

THE CONCEPT OF ECOLOGICAL MONITORING IN THE ARCTIC

The current system of state environmental monitoring is not able to solve effectively the problem of information support of environmental safety, as noted in the state program "Protection of environment" for 2012-2020. It seems obvious that observation of the physical and chemical composition of the environment is dominant, while efforts to

obtain the final result, the evaluation and prediction of ecological state, are not given systemic nature. This is partly explained by the extreme complexity of the task, methodological problems and legal support are still far from being solved.

It must be admitted that a unified state system of environmental monitoring in the Russian Arctic is not currently available, environmental studies are conducted in individual departments and are not comprehensive. Mainly assessment of the status and air pollution is carried out in the Arctic, as well experts assess land (primarily the permafrost zone), and coastal areas of the Arctic seas of Russia, observation of hydrological, hydrochemical and hydrobiological regime of water objects (including monitoring the status and quality of surface water and groundwater), local monitoring the status of biodiversity and natural ecosystems of the Arctic, episodic socio-economic monitoring.

The main role in providing hydrometeorological safety of life and nature management belongs to the Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet). Environmental threats to the functioning of the economic complex of the region, including oil and gas facilities and navigation along the Northern Sea Route, associated mainly with increased risk and damage from dangerous hydrometeorological events and ice, these threats arise at the present phase of development and the creation of preconditions for economic growth by activating Russian marine activities in the Arctic. Observation of hydrometeorological characteristics and pollution of the Arctic, and research related to the study of natural processes occurring in the permafrost, in the continental shelf, in the water column and airspace, becomes paramount to assess the real picture, environmental control of marine Arctic regions and the development of reliable forecasts for its changes in the conditions of rapidly increasing anthropogenic pressures.

It is necessary to implement expensive measures to restore and develop new technological infrastructures on the basis of Roshydromet in the Arctic region, taking into consideration the prospects for recovery of navigation on the Northern Sea Route, the scale of the works on arrangement and exploitation of the Arctic shelf, it is also necessary to restore the network of polar stations to monitor the condition and environmental pollution in the region. Automated tools and technical equipment of forecasting centers in the Arctic should be also placed in remote areas, new vessels for continuous monitoring of waters of the Arctic seas should be constructed.

State Scientific Center of the Russian Federation "Arctic and Antarctic Research Institute" (AARI) discharges a large amount of work to monitor hydro-meteorological processes, including work for the ice engineering research for design work on the development of oil and gas of the Russian Arctic and continental shelf [6], [12]. A typical example is conducting exploration and meteorological research on the East Prinovozemelsk license areas in the Kara Sea during 2012-2013. The main objective of the work was to provide observation, collection and compilation of data on hydro-meteorological and ice regime, iceberg conditions and environmental conditions in the area of the Novaya Zemlya archipelago, that were needed to assess the impact of adverse environmental factors on the waterworks and transport infrastructure during the development of the East Prinovozemelsk license areas in the southwestern part of the Kara sea. AARI made marine expeditions to study the hydrometeorological regime of the Kara Sea ice and made research in the water area the license areas.

Complex of hydro-meteorological and ice research was conducted during expeditions, including the following types of work: ships of hydro-meteorological observations; installation on the east coast of Novaya Zemlya archipelago two autonomous weather stations, satellite monitoring of icebergs in the coastal region of the Novaya Zemlya; statement of autonomous buoys on icebergs to determine the parameters of the drift, determination of morphometric parameters of icebergs using aerial photography and drift with the ship's radar, statement autonomous buoy stations for measuring flows, sea level and excitement for the duration of the expedition, statement bottom autonomous buoy stations for a one-year period for the measurement of flows, drift ice and ice precipitation, measurement of morphometric parameters of hummocks and physico-mechanical properties of ice.

Another example is the complex sea-based Arctic expedition "Yamal-Arctic – 2012" (August – September 2012). Expedition of survey flooded areas of radioactive waste and spent nuclear fuel took on the ship Northern Hydromet control "Ivan Petrov". 16 specialists from Russian and Norwegian research institutions and International Atomic Energy Agency took part in this expedition. Work was carried out in the bays of the Novaya Zemlya archipelago, and also in adjacent water area of the Kara Sea. AARI annually conducts 10-15 expeditions to the Arctic Ocean and the Arctic seas, including the drifting station "North Pole". Theoretical investigations of AARI helped to get the map of vulnerability of the Russian areas of the Arctic Ocean and the coastal areas to the technological and hydro-meteorological effects [13].

CONCLUSION

Given the need for a standardized approach to data collection we should strengthen international cooperation and to build capacity for data collection. It is also necessary to improve access to information. International Polar Year 2007/08 highlighted the most pressing scientific issues, it became clear which direction we need to develop in the first place now, in times of climate change, the most urgent need to continue monitoring the state of the Arctic climate system for the continuous assessment of the stability and extent of emerging changes.

In conclusion, we note that the solution of such complex problems of environmental safety can only be provided for close international cooperation. Environmental problems are inseparable from the problems of the control of the current state of the environment and climate change.

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REFERENCES

[1] Basics of the State Policy of Russia in the Arctic for the Period till 2020 and for a Further Prospective, 2008. http://www.rg.ru/2009/03/30/arktika-osnovy-dok.html

[2] Lesikhina N., Rudaya I., Kireeva A., Krivonos O. & Kobets E. Offshore Oil and Gas Development in Northwest Russia: Consequences and Implications, Saint-Petersburg: Bellona, 2007.

[3] Russia's Ministry of Civil Defence, Emergencies and Disaster Relief, 2015. http://www.mchs.gov.ru/document/3516519

[4] Greenpeace, 2015. http://www.greenpeace.org/russia/ru/campaigns/protect-arctic/Black-ice--Russian-oil-spill-disaster/

[5] Frolov I.E. & Gudkovich Z.N. Climatic changes of the ice cover of the Eurasian shelf seas, Scientific research in the Arctic, Vol. 2, Moscow: Science, 2007. 135 p.

[6] Frolov S.V., Fedyakov V.E., Tretyakov V.J., Kline A.E. & Alekseev G.V. New data on changes in ice thickness in the Arctic basin, Reports of Russian Academy of Sciences, vol. 425/issue 1, 2009.

[7] Kattsov V.M. & Porphiriev B.N. Climate change in the Arctic: the consequences for the environment and the economy, Arctic: ecology and economy, Vol. 6/issue 2, pp 66-79, 2012.

[8] Stirling I. & Parkinson C.L. Possible effects of climate warming on selected populations of polar bears (Ursus maritimus) in the Canadian Arctic, Arctic, vol. 59/issue 3, p. 261-275, 2006.

[9] Regehr E.V., Lunn N.J., Amstrup S.C. & Stirling I. Effects of Earlier Sea Ice Breakup on Survival and Population Size of Polar Bears in Western Hudson Bay, The Journal of Wildlife Management, vol.71, pp.2673-2683, 2007.

[10] Kovacs K.M., Lydersen C., Overland J.E. & Moore S.E. Impacts of changing sea-ice conditions on Arctic marine mammals, Marine Biodiversity, vol. 41, pp.181-194, 2011.

[11] Hop H. & Pavlova O. Distribution and biomass transport of ice amphipods in drifting sea ice around Svalhard, Topical Studies in Oceanography, vol. 55, pp.2292-2307, 2008.

[12] Danilov A.I., Dmitriev V.G., Kochemasov Y.V., Kochemasova E.Y., Morgunov B.A., Sedova N.Y. & Sharov A.N. Priorities of long-term development of the Russian Arctic, Saint-Petersburg: AARI, 2008.

[13] The results of IPY 2007/08 and prospects for Russian polar research (2013) / Ed. A.N. Chilingarov, A.I. Bedritsky, V.G. Dmitriev. The series: Russia's contribution to the International Polar Year 2007/08, Moscow: Paulsen, 2009.

ENVIRONMENTAL TAXES ANALYSIS FOR ROMANIA

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ABSTRACT

Environmental taxes aim to produce behavioral change and technological progress that are necessary to obtain environmental goals like preserving, protecting and improving the quality of the environment, protecting human health and rational utilization of natural resources.

This paper performs a quantitative analysis regarding the environmental taxes in Romania, as a Member State of European Union (EU). The covered period is between 2007, after EU integration, and 2012, last year for EUROSTAT published data. The paper aims is to present evolution of the different types of environmental taxes (energy, transport, pollution and resource taxes), calculated by total and by economic activity, and also like ratios relative to GDP or the total revenue from all taxes and social contributions, TSC.

Keywords: environmental taxes, revenues, GDP, environmental policies, financial incentives

INTRODUCTION

In the present and in the future, also, there are real environment problems issued by the production and consumption human`s habits and in order to solve these problems, the profound changes are needed..

In the context of identifying instruments capable of generating such changes across all sectors at minimal cost, the EU has implemented a number of environmental policy tools including the market-based instruments for pollution control and natural resource management to which was expressed a considerable interest in their use and effectiveness [3].

Economic instruments for pollution control and natural resource management use incentive-based tools to ensure that environmental solutions are find at least cost, for correcting externalities and/or for raising revenues for specific purposes. The range of instruments includes, among others, environmental taxes, fees and charges, tradable permits, deposit-refund systems and subsidies that are favored because provide a flexible and cost-effective means for reinforcing the polluter-pays principle and for reaching environmental policy objectives [2].

Defining an environmental tax was a challenge for researchers that was solve. After many discussions, EUROSTAT`s definition, says `a tax whose tax base is a physical unit (or a proxy of a physical unit) of something that has a proven, specific negative impact on the environment`. EUROSTAT publishes, every year, a detailed guideline for