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## Human perception and environmental risk index modelling with GIS in Yakutsk urban region (North-Eastern Siberia)

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# EUGEO 2021

8<sup>TH</sup> EUGEO CONGRESS ON THE GEOGRAPHY OF EUROPE  
June 28 – July 1, 2021 | Prague, Czechia

## Book of Abstracts



FACULTY OF SCIENCE  
Charles University





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## Introduction

Dear colleagues,

The Faculty of Science of Charles University and the Czech Geographical Society in cooperation with the Association of Geographical Societies in Europe (EUGEO) organized the 8<sup>th</sup> EUGEO Congress on the Geography of Europe, which was held in Prague from June 28 to July 1, 2021.

The congress continued the tradition of the EUGEO biannual congresses, bringing together geographers from all over the world. The main topic of the congress, Sustainable geographies in the heart of Europe, referred to the passion geographers have for the exploration of the world that surrounds us. Understanding complexity and fragility of geographical environment as well as of the own discipline has been an essential part of many geographical efforts. The congress welcomed all geographers, physical and human alike, and also a number of interested scholars from related disciplines.

Zdeněk Kučera

Chair of the organizing committee

Tadeusz Siwek

Chair of the scientific committee

Pavel Chromý

President of the Czech Geographical Society



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## Organizing Committee

Zdeněk Kučera (Chair of the organizing committee, Director of the Historical Geography and Environmental History Section, Czech Geographical Society; Charles University, Faculty of Science, Prague)

Dana Fialová (Vice-chair of the organizing committee, Vice-president of the Czech Geographical Society; Charles University, Faculty of Science, Prague)

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### Scientific Committee

Tadeusz Siwek (Chair of the scientific committee, Vice-president of the Czech Geographical Society; Member of the National Geographical Committee / University of Ostrava, Faculty of Science)

Pavel Chromý (President of the Czech Geographical Society / Charles University, Faculty of Science, Prague)

Vít Vilímek (Chair of the National Geographical Committee / Charles University, Faculty of Science, Prague)

Jaromír Kolečka (Member of the National Geographical Committee / Masaryk University, Faculty of Education, Brno)

Asya Bogoeva (Association of Professional Geographers and Regionalists, Bulgaria)

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Konrad Czapiewski (Polish Geographical Society)

Elena Dell'Agnese (Italian Geographical Society)

Rubén C. Lois González (Association of Spanish Geographers)

Marina Frolova (Association of Spanish Geographers)

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Leo J. Paul (Royal Dutch Geographical Society)

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Kathy Reilly (Geographical Society of Ireland)

Marin Rusev (Association of Professional Geographers and Regionalists, Bulgaria)

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Massimiliano Tabusi (Italian Association of Geographers)



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Ladislav Tolmáči (Slovak Geographical Society)

Manuel Valenzuela (Real Sociedad Geográfica)

Christian Vandermotten (Royal Belgian Society of Geography)



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### **Towards a Human Security System in the Arctic Zone of the Russian Federation**

#### **Organizers:**

**Alexander Sergunin** (*International Relations, St. Petersburg State University, St. Petersburg, Russia*)

The **main research objective** of this session is to discuss the ways and means of creating a human security system in the Arctic Zone of the Russian Federation (AZRF). This is especially important in the view of several recent Russia's strategic documents on the AZRF development adopted by the President and Parliament in 2020.

Along with the above general goal, there are a number of specific research objectives:

- To explore an emerging Russian discourse on human security and its relationships with other security-related concepts – national security, soft security, societal security, personal security, sustainable development, etc. Major Russian social science paradigms' interpretations of the human security concept will be analyzed. The panelists will discuss whether and how the human security concept is applicable to the Russian Arctic, and why it can be helpful for developing a sustainable development strategy for this macro-region. These issues will be examined in a joint paper by professors Maria Lagutina and Valery Konyshov, Faculty of International Relations, St. Petersburg State University, Russia.
- To examine whether the human security concept is embedded in the AZRF federal, regional and municipal documents, such as programs and plans of socioeconomic and environmental development, or not? It is also important to discuss what should be done to improve the strategic planning process in the AZRF? This problematique will be covered by Prof. Alexander Sergunin, Faculty of International Relations, St. Petersburg State University.
- To develop an AZRF environmental security index in order to rate Russian Arctic regions on its basis. In their joint paper, Dr. Nikolai Bobylev (Institute of Earth Sciences, St. Petersburg State University) and Prof. Sebastien Gadal (Aix Marseille Université, Aix en Provence, France) suggest their own methodology for constructing this rating. The ecological block of indicators includes three groups of parameters: impact on atmospheric air and water environment and waste management. The ecological-economic block of indicators includes characteristics, such as the expenditures on environmental protection and investments in this area per capita. The socio-ecological block includes two main parameters: the comfort of living in Arctic cities (index of the quality of the urban environment; share of the population with high and very high levels of pollution; provision of the population with clean drinking water) and the state of urban infrastructure (degradation of the infrastructure in areas, such as water supply, sewerage, waste collection and disposal, pollution control activities, and the degree of housing improvement).

**Keywords:** Russia, Arctic, human security, sustainable development, strategic planning

**ID:** 8

**Planning for human security strategy in the Russian Arctic urban centers: challenges and opportunities**

*Alexander Sergunin*



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**ID: 16**

**Environmental security via sustainable development goals: Localization in the Arctic Region**

*Nikolai Bobylev, Sebastien Gadal*

**ID: 336**

**Human perception and environmental risk index modelling with GIS in Yakutsk urban region (North-Eastern Siberia)**

*Sébastien Gadal, Moisei Zakharov, Jurate Kamicaityte*

**ID: 396**

**Adapting to new realities: Renewable energies and a low carbon future for the Russian Arctic in the aftermath of COVID-19**

*Valentina Ignatyeva, Sebastien Gadal*



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**ID:** 336

**Session:** Towards a Human Security System in the Arctic Zone of the Russian Federation

### **Human perception and environmental risk index modelling with GIS in Yakutsk urban region (North-Eastern Siberia)**

**Sébastien Gadal** (Aix-Marseille Université, CNRS ESPACE UMR 7300 & North-Eastern Federal University, Aix-en-Provence, France), **Moisei Zakharov** (Aix-Marseille Université, CNRS ESPACE UMR 7300 & North-Eastern Federal University, Aix-en-Provence, France), **Jurate Kamicaityte** (Faculty of Civil Engineering and Architecture, Kaunas University of Technology, Kaunas, Lithuania)

One of the challenges of human security in the Arctic regions, and more specifically in the Eastern Siberian Arctic regions, concerns the assessment of inhabitants' exposure to recurrent environmental risks for the urban population in a geophysical environment characterized by notable change dynamics. The latter is known as permafrost degradation, water flooding (river, geomorphologic canals, and plateau's erosion flooding) and ice breakup, erosion, and forest fires. Urban centers and villages are confronted with a multiplicity of natural hazards. However, the evaluation of their exposure is partial or non-existent; hence there is the need to create indices of potential exposure to environmental risks. They are built by spatial analysis of survey data on the perception and knowledge of the local population and remote sensing that are integrated into Geographic Information Systems. Knowledge and understanding of how local people perceive the natural and anthropogenic environment in the context of climate change and its consequences are some of the key factors in creating effective urban planning strategies for the cities in the high-risk zones of environmental hazards. The urban region of Yakutsk is the test study area for the construction of these indicators of human security in the Siberian Russian Arctic. The large urban area with more than 350,000 people in one of the coldest regions in the world is confronted by the acceleration of global warming and urbanization on a recurrent and seasonal basis. This hazardous occurrence is combined with the risks of forest fires, erosion, floods, and permafrost degradation affecting infrastructures, settlements, industrial and agricultural areas.

**Keywords:** human security environmental risk index, Arctic urban centers, perceptive knowledge, GIS, spatial analysis