

The Russian Far North – a landscape in transition

The Russian Far North is constantly changing with respect to natural as well as socio-economic conditions. Larger temperature and precipitation changes than elsewhere in the world are predicted for this region (IPCC 2013). It includes most of the Northern Eurasian tundra biome with its abundance of small lakes and extends into the taiga forest transition zone. A large proportion is underlain by permanently frozen ground causing specific geomorphological processes at the surface. The Russian Far North is also rich in natural resources, especially oil, gas and ores. Their extraction requires the development of infrastructure and movement of workers over long distances. Local and distant but connected communities have been confronted with these changes for several decades, what lead inevitably to transitions.

Current geographical research deals with these changes and their local impact as well as connections within Russia and globally. Especially the Yamal peninsula has been studied for several decades. Industrial development has led here to land cover changes as revealed by satellite data (Kumpula et al. 2011, 2012). The development of a crater-like hole drew worldwide media attention to this region in summer 2014. Leibman et al. (2014) argue that this feature is a result of increasing temperatures and especially the recent occurrence of comparably warm years.

This special issue of FENNIA brings together the research results of natural as well as socio-economic changes in the Russian Far North. These developments are tightly connected with the rest of the world and are thus of high interest beyond this specific research community. This special issue has evolved from a workshop organized as part of the Austrian-Russian joint project COLD Yamal financed by the Austrian Science Fund and the Russian Foundation for Basic Research (I 1401-N29 and 13-05-91001-AH8 a) which aims to advance our knowledge on landscape dynamics in permafrost regions with focus on Yamal. Its concept has been further developed within the framework of the recently founded Austrian Polar Research Institute which fosters the interdisciplinary activities and international cooperation of Austrian researchers in polar regions.

Two papers of this volume discuss the impact of natural resources and their exploitation on communities. Four papers deal with permanently frozen ground on the Yamal peninsula and related geomorphological processes at the surface.

Leibman et al. review 25 years of geomorphological research of the Russian Academy of Science and the Tyumen State Oil and Gas University on Yamal. A framework for long term measurements has been established already in the 1980s. Data gathered contribute to the Global Terrestrial Network of Permafrost. “Vaskiny Datchi” is one of 200 CALM (Circumpolar Active Layer Monitoring) sites and more than 800 thermal state measurement locations around the world. It however stands out due to its long records within the Russian Far North. Measurements on active layer depth are available for already more than 20 years. The data show a depth increase during this period. Recent analyses have also included measurements available from satellites. Cryogenic landsliding is a widespread phenomenon on the central Yamal peninsula. It has been shown to be related to subsurface properties such as temperature and moisture content.

Three papers provide further insight and present new research results. Khitun et al. bring together expertise in botany and geomorphology in order to shed light on the process of cryogenic landsliding and its impact on landscape development as well as the ground thermal regime. So far unknown spatial and temporal patterns can be revealed with this method. Dvornikov et al. investigate the relationship between snow cover and the ground thermal regime. The role of vegetation is quantified using a combination of field survey and GIS (Geographic Information System) analyses. Results undermine the need of precise digital elevation models (DEMs) for permafrost modelling. Such data are however only available from ground surveys with sufficient detail although DEMs can be derived from satellite data over larger regions. The suitability of such datasets for the study of land surface hydrology is assessed by Trofaier et al. The drainage network is analyzed for central Yamal and discussed with respect to the abundant seasonally inundated areas. It is suggested that further research is needed in this context with respect to the landsliding in this region.

The role of natural resources for communities in the Russian North is discussed by Saxinger as well as Suutarinen. Saxinger exemplifies the way people are enmeshed with oil and gas resources and the extractive industry. The focus is on commuters coming to the North from as far as the Black Sea coast region. These workers from the South have incorporated the North into their social space. Suutarinen studies the development on the Kola Peninsula in the context of natural resource extraction. Mining, specifically iron ore processing is of high importance in this region. He seeks to explain how the current use of natural resources restrains the sustainable socio-economic development of resource communities.

This special issue highlights the aspects of both human as well as physical geography in a region of rapid change and global importance although generally considered as remote.

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