Society and environment in the context of changing climate in Arctic regions

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ABSTRACT

Municipalities in the Arctic regions have been facing dramatic changes in the climate over the last 30–40 years. The Barents region including the Svalbard archipelago has experienced the strongest warming of all Arctic communities. Climate models indicate that the warming trend will continue. In addition, in response to predicted increase in middle- and high-latitude annual precipitation, the freshwater availability may increase in the Arctic in the future. Changes in type of precipitation, its seasonal distribution, timing, and rate of snowmelt represent a challenge to municipalities and transportation networks subjected to flooding and droughts and to current industries and future industrial development. A reliable well-distributed water source is essential for all infrastructures, industrial development, and other sectorial uses in the Arctic. Fluctuations in water supply and seasonal precipitation and temperature may represent not only opportunities but also threats to water quantity and quality for Arctic communities and industrial use. The impact of future climate change is varying depending on the geographical area and the current state of infrastructure and industrial development. Longyearbyen in the Svalbard archipelago was struck by two avalanches recently with two fatalities. The authorities are now planning mitigation measures such as supporting structures and barriers. Several challenges are facing authorities and consultants involved in designing new infrastructure, snow avalanche and land slide protection structures under climate warming scenarios. This presentation will discuss the main challenges for Arctic engineers engaged in future infrastructure development.

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