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LAND LOSS AND SEA TRANSGRESSION DUE TO GLACIAL RECESSION UNDER CLIMATE WARMING IN THE ARCTIC

It is a common but incorrect opinion that a significant land loss and especially an appearance of new islands, due to a sea transgression under climate warming necessitates an appropriate sea level rising, predicted in future, e.g. by the end of our century. However, such a transgression has occurred without any significant sea level rising in many places. If the bottom of a frontal part of a tidewater glacier lies on bedrock below sea level this bedrock has to be inundated by sea during this glacier recession. Numerous descriptions of such a process were published by Pelto (2009–2018, 2017) and Sharov (2014). 34 new straits and islands (each from 0.5 to 59 km^2) have appeared due to recession of Arctic glaciers under climate warming in 1963-2017, as described by Ziaja and Ostafin (2019). Sea level rising was estimated at only 2-3 mm per year in that time. Next straits and islands are in the course of forming, e.g. an unnamed peninsula (ca. 200 km^2) which is very close to separation from the Eastern Greenland mainland at Dove Bay, and the Sørkapp Land peninsula (ca. 1200 km^2) which may be separated from Spitsbergen in the of 21st century (Ziaja and Ostafin 2015). Apart from that, hundreds of new big bays, including fjords, appeared in the 20th and 21st centuries due to glacial recession. The newest of them have not been described yet, e.g. in the Eastern Spitsbergen coast. The new straits and bays, together with releasing of old islands and fjords from land-fastened sea ice, make the Arctic much more available than before and shorten some sea routes. Hence, this kind of transgression (due to glacial recession) influences both natural ecosystems and human economic activities, changing considerably physical and human Arctic geography. In result, both biodiversity and environmental threats are and will be increasing in the Arctic.

Biography

Wieslaw Ziaja has completed his PhD in natural sciences, geography, from the Jagiellonian University. He is a Physical Geographer and Landscape Ecologist, a Professor and Head of the Department of Physical Geography, Institute of Geography and Spatial Management, Jagiellonian University in Cracow (Poland). He took part in 14 summer scientific expeditions to Spitsbergen and has published a few dozen papers in reputed journals and five books. His research interests include landscape and natural environment structure and functioning, geographical aspects of nature and landscape protection, physical geography of the Arctic, North Europe, and the Carpathians. Since 2000 AD, he is focused on landscape and environmental transformation of the Arctic, mainly under a contemporary climate change.

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