

Still Mysterious Svalbard Glaciers (Their Evolution and Environmental Impact)

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Why Svalbard glaciers are so important? They cover only 12 % (c. 34,000 sq. km) of the of the entire glaciers and ice caps area in the Arctic (excluding Greenland Ice Sheet) but are the best studied polar ice masses over the world. Variety of glacier types and sizes together with long series of observations and relatively easy access make Svalbard a key area for experimental research and monitoring of changes. This presentation highlights crucial findings that are arising from the study of different responses of glaciers to climate warming across the Svalbard Archipelago with a focus on Southern Spitsbergen, where the Polish Polar Station is located. Special attention is paid to tidewater glaciers producing >10 Gt of icebergs yearly. Calving comprises more than 1/3 of the total ablation and is the major factor of front recession. Area of glaciers in the Hornsund Fjord basin decreases by more than 3 sq. km/yr during last years. Such recession will lead to opening of new marine strait between Hornsund and Barents Sea in next decades. More frequent surges of glaciers have been observed latterly. Examples of impact of rapid deglaciation and glacier surges on marine and terrestrial environment are given in the talk.

Progress in research provide more data on the surge phenomena and factors driving of iceberg calving. Higher level of knowledge pose new important questions. Selected fundamental ones on evolution of glaciers under climate warming are raised in this presentation. Svalbard ice masses are still mysterious and fascinating.

The archipelago is a sort of field laboratory for detailed studies of glacial processes in polar areas which provide results for further implementation to models of large ice sheets. Behavior of Svalbard glaciers is a regional issue but with a global reach providing clues to understand worldwide environmental changes.