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**Title:** *Development and verification of glacier module in the framework of process-based hydrological model at glacier catchment in Svalbard*

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Discharge characteristics of rivers in Arctic regions are assumed to be sensitive indicators of climate change. Moreover, climate modelling studies indicate that climate changes will be particularly intense in high-latitudinal regions. In this respect the expected increase in the freshwater supply to the Arctic Ocean is of particular importance. Modelling of the water fluxes in glacier catchments requires special approaches in hydrological modeling.

The aim of the study was to develop and test a glacier module in the frame of distributed hydrological model Hydrograph in small glacier watershed in Svalbard, Norway. The model was created with the goal to achieve general character and has single structure for watersheds of any scale and landscape zone. Development of the glacier module is a necessary task to achieve a model's universality. Hydrograph model includes representation of the all other essential components of the land hydrological cycle. Most of the model parameters are observable landscape properties which can be estimated apriori, systematized and transferred to ungauged areas without calibration.

The study object is the small glacier watershed in Svalbard with an area of 44 km2. It is located in Wedel Jarlsberg Land, SW Svalbard. Glacier Werenskiold covers 27,4 km2 and is 9,5 km long. It is situated between 0-600 m a.s.l. and is very shallow (50-140 m). Field measurements were carried out in a hydrometric profile with the water gauge.

From 2007 to 2012 hydrological and meteorological data were collected in the basin. As more than half of the watershed is covered by glacier it is ideal for the investigation and simulation of the glacier flow formation. The collected data were analyzed and Hydrograph model with developed glacier module was applied to the study basin.

Simulation results showed that the glacier module in the framework of Hydrograph model is able to realistically reproduce glacier contribution into the river flow of studied watershed and has a potential for applications in other polythermal glaciers including bigger ones.