

Dynamics of runoff from selected catchments of the northern part of the Wedel Jarlsberg Land (Spitsbergen) in summer seasons 2014-2016

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The research works were conducted in summer seasons 2014-2016 during three polar expeditions of the Maria Curie Skłodowska University in Lublin to Spitsbergen. The study area is located in the northern part of the Wedel Jarlsberg Land (W Spitsbergen), and covers two rivers draining catchments with different degrees of glaciation. The first of the monitored rivers is Scottelva. It is a braided proglacial river, primarily fed by waters from the Scott Glacier. Its catchment occupies more than 10 km². Almost half of the area is occupied by a glacier in the phase of retreat. The second of the observed rivers is Chamberlinelva, constituting a periglacial braided river with pronival rhythms at the beginning of the ablation season and with a contribution of proglacial alimentation (particularly in the second half of the season). Its inconsiderably glaciated catchment occupies approximately 55 km². 17% of the area is covered by the Crammerbreane glaciers.

The objective of the research was to determine the runoff dynamics in the Scottelva and Chamberlinelva Rivers, and to determine the impact of weather conditions on runoff from polar catchments with different degrees of glaciation and different system of proglacial drainage.

The research was conducted in summer months: July and August (in 2015 also in June). It covered recording water stages and discharge measurements in the rivers, as well as recording meteorological elements influencing the amount of runoff. Pressure limnigraphs were installed in the rivers, recording water stages every 10 minutes. Every several days, in conditions of different water stages, discharge measurements were performed by means of a current meter, and photographic documentation was prepared. Registration of meteorological data (air temperature at an altitude of 200 cm above ground level, amount of atmospheric precipitation, and wind velocity and direction) was done by means of an automatic meteorological station (METmini 5) with a 10-minute time step.

The effect of the conducted research is the preparation of characteristics of runoff dynamics in the Scottelva and Chamberlinelva Rivers, as well as comparison of discharges in the monitored rivers, differing in the regime and degree of glaciation of the catchment. Moreover, the cause-and-effect relationships between measured meteorological elements and discharge values were determined. Water stages in Chamberlinelva, a relatively large river, were not recorded before 2014. In the case of Scottelva, averaging results from three years of modern measurements and their comparison with published data from before more than 20 years ago permitted the determination of the trend of multiannual transformations.