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## ABSTRACT

### **Influence of atmospheric circulation on air temperature and relative air humidity in the northern part of the Kaffiøyra Plain (NW Spitsbergen) in period September 2010 - August 2013**

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Atmospheric circulation is a significant element shaping the climate of Svalbard. In this work relationships between this factor and air temperature and relative air humidity in the northern part of the Kaffiøyra Plain and the Waldemar Glacier (September 2010 - August 2013) was analysed. Study area contains non-glacial environment with site located on front-lateral moraine of the Aavatsmark - Kaffiøyra - Heggodden ( $\phi=78^{\circ}41'N$ ,  $\lambda=11^{\circ}51'E$ ,  $h=11,5$  m a.s.l.). Daily values of selected temperature parameters - mean ( $t_i$ ), maximum ( $T_{max}$ ), minimum ( $T_{min}$ ) and diurnal temperature range ( $A$ ) have been used. Daily types of atmospheric circulation for Spitsbergen made by T. Niedźwiedź also has been used. The air temperature and relative air humidity measurements were taken by HOBO ProV2 loggers located in solar radiation shield at the height of 200 cm above ground level. Results are described for years and seasons, defined as: autumn (Sep-Oct), winter (Nov-Mar), spring (Apr-May) and summer (Jun-Aug).

In the study period, as compared to long-term values from 1951 to 2009, a decrease in the frequency of occurrence of anticyclonic types and an increase in the frequency of cyclonic types (by 10% and 6.8%, respectively) was also noted. In the period 2010 - 2013 air temperature in the Kaffiøyra - Heggodden site depends mainly on direction from which masses are coming without regard to kind of baric situation (cyclonic or anticyclonic). The highest temperatures were measured during cyclonic and anticyclonic circulation types from south-west sector ( $Sc+SWc+Wc$  - amount to  $1,4^{\circ}C$ ,  $Sa+SWa+Wa$  -  $0,9^{\circ}C$ ) with positive anomalies varied from  $2^{\circ}C$  to  $3^{\circ}C$ . During air masses advection from north sector the lowest value of air temperature was recorded (from  $-3,5^{\circ}C$  to  $-3,8^{\circ}C$ ). Relative humidity generally shows an increase as altitude increases above sea level. The significant influence of atmospheric circulation on relative air humidity was also observed. Most humid air in the Kaffiøyra Plain occurred within the circulation types from south sector ( $SEc+Sc+SWc$  and  $SEa+Sa+SWa$ ) with positive anomalies varied from 7% to 9%. The driest air (negative anomalies from 6% to 9%) during air advection from the eastern sector within both anticyclonic and cyclonic weather was observed. The smallest differences (up to 2%) were connected with non-advectional weather type ( $Ka+Ca$ ).

