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SPATIAL DIVERSITY OF AIR RELATIVE HUMIDITY IN THE NORTHERN PART OF THE KAFFIØYRA PLAIN AND ON THE WALDEMAR GLACIER (NW SPITSBERGEN) FROM SEPTEMBER 2010 TO AUGUST 2013

Patrycja Ulandowska Monarcha *(Nicolaus Copernicus University, Poland)*
Rajmund Przybylak *(Nicolaus Copernicus University, Poland)*
Andrzej Arazny *(Nicolaus Copernicus University, Poland)*

ulamona@doktorant.umk.pl

This paper presents the spatial diversity of air relative humidity (2 m a.g.l.) in the northern part of the Kaffiøyra Plain and on the Waldemar Glacier (NW Spitsbergen), from September 2010 to August 2013, based on measurements taken at six sites located in different environments. Results are described for years and seasons, defined as: autumn (Sep-Oct), winter (Nov-Mar), spring (Apr-May) and summer (Jun-Aug). In the period from September 2010 to August 2011, the highest relative humidity was noted on mountain ridges (89%) and near the coast of the Greenland Sea (88%). The lowest value of humidity (79%) occurred at a tundra site called 'Terrace', located about two kilometres from the coast. In the entire period of observations, for which a reduced number (3) of observation sites exists, drier air (83%) was observed at the Kaffiøyra-Heggodden (KH) site, located in the terminal-lateral moraine of the Aavatsmark Glacier, whereas the wettest air (85%) was measured at the firn part of the Waldemar Glacier (LW2). Relative humidity generally shows an increase as altitude increases above sea level. The marked influence of atmospheric circulation on relative humidity was also noted. In the study period, as compared to long-term values from 1951 to 2006, 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. Most humid air in the study area occurred within the circulation types SEc+Sc+SWc and SEa+Sa+SWa (positive anomalies varied from 7% to 9%), and the driest (negative anomalies from 6% to 9%) during air advection from the eastern sector within both anticyclonic and cyclonic weather patterns. The smallest differences (up to 2%) were connected with non-advectional weather type Ka+Ca.