

Peculiarities of Snow Cover in Belarus

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Abstract : On the average snow covers Belarus for 75 days in the south-west and 125 days in the north-east. During the cold season snowpack often destroys due to thaws, especially at the beginning and end of winter. Over 50% of thawing days have a positive mean daily temperature, which results in complete snow melting. For instance, in December 10% of thaws occur at 4 °C mean daily temperature. Stable snowpack lying for over a month forms in the north-east in the first decade of December but in the south-west in the third decade of December. The cover disappears in March: in the north-east in the last decade but in the south-west in the first decade. This research takes into account that precipitation falling during a cold season could be not only liquid and solid but also a mixed type (about 10-15 % a year). Another important feature of snow cover is its density. In Belarus, the density of freshly fallen snow ranges from 0.08-0.12 g/cm³ in the north-east to 0.12-0.17 g/cm³ in the south-west. Over time, snow settles under its weight and after melting and refreezing. Averaged annual density of snow at the end of January is 0.23-0.28 g/cm³, in February - 0.25-0.30 g/cm³, in March - 0.29-0.36 g/cm³. Sometimes it can be over 0.50 g/cm³ if the snow melts too fast. The density of melting snow saturated with water can reach 0.80 g/cm³. Average maximum of snow depth is 15-33 cm: minimum is in Brest, maximum is in Lyntupy. Maximum registered snow depth ranges within 40-72 cm. The water content in snowpack, as well as its depth and density, reaches its maximum in the second half of February - beginning of March. Spatial distribution of the amount of liquid in snow corresponds to the trend described above, i.e. it increases in the direction from south-west to north-east and on the highlands. Average annual value of maximum water content in snow ranges from 35 mm in the south-west to 80-100 mm in the north-east. The water content in snow is over 80 mm on the central Belarusian highland. In certain years it exceeds 2-3 times the average annual values. Moderate water content in snow (80-95 mm) is characteristic of western highlands. Maximum water content in snow varies over the country from 107 mm (Brest) to 207 mm (Novogrudok). Maximum water content in snow varies significantly in time (in years), which is confirmed by high variation coefficient (Cv). Maximums (0.62-0.69) are in the south and south-west of Belarus. Minimums (0.42-0.46) are in central and north-eastern Belarus where snow cover is more stable. Since 1987 most gauge stations in Belarus have observed a trend to a decrease in water content in snow. It is confirmed by the research. The biggest snow cover forms on the highlands in central and north-eastern Belarus. Novogrudok, Minsk, Volkovysk, and Sventayny highlands are a natural orographic barrier which prevents snow-bringing air masses from penetrating inside the country. The research is based on data from gauge stations in Belarus registered from 1944 to 2014.

Keywords : density, depth, snow, water content in snow

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