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Atmospheric precipitation in the high-mountain positions of the Low and High Tatras

M. Ostrozlik

Geophysical Institute of SAS, Physics of the atmosphere, Bratislava, Slovakia (geofostr@savba.sk)

In the last time a great attention is paid to the problem of the long-term variability of atmospheric precipitation because precipitation belongs to the responsive indicators of climatic changes. A special attention is paid not only to the extremes anomalies of precipitation, but also to the reasons which cause these effects. Precipitation regime in Slovakia has been significantly changed in the 20th century. It was probably due to by changes in the atmospheric circulation above Central Europe. Possible changes in the air pressure fields above Europe and the North Atlantic in the 21st century can essentially influence the position and variability of the polar frontal zone as well as the general circulation patterns. This is a factor which determines many characteristics of the climatic system, including precipitation.

The aim of the study is an analysis of time series of atmospheric precipitation at Chopok (φ = 48° 56' N, λ = 19° 35' E, h = 2004 m a.s.l.) in the Low Tatras and at Skalnaté Pleso (φ = 49° 12' N, λ = 20° 14' E, h = 1778 m a.s.l.) and Lomnický štít (φ = 49° 12' N, λ = 20° 13' E, h = 2634 m a.s.l.) in the High Tatras. It follows, that the actual solution of the chosen problem is based on experiment. Based on the experimental data of precipitation (measurements are carried out 3 times a day in the climatic terms 7, 14, and 21 h of the local time) at the mentioned localities during the 1955-2007 period the daily and annual sums of precipitation were calculated which served as a basis for the time series analysis. To estimate the trend of precipitation (q) with the time (t) (variable t denotes the corresponding year in the time series) the method of regression analysis was applied. In the first approximation a simple linear model was assumed and by the method of the least squares the regression coefficients were calculated.

By processing of the extensive material from measurements of precipitation during the investigated period many statistical characteristics of the number and amount of precipitation were obtained.