Geophysical Research Abstracts,
Vol. 11, EGU2009-9464-2, 2009
EGU General Assembly 2009

Long-term changes of snow cover characteristics regime in Slovakia

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Analysis of snow cover regime changes within the territory of Slovakia represents the essential goal of this contribution. Snow cover characteristics, such as snow cover depth as well as snow water equivalent, play an important role in different climatological and hydrological analyses and they are widely used in operative meteorological service, particularly during the winter season. From the climatological viewpoint the snow cover is one of the mostly influenced due to ongoing climate change. Recently some increase in winter precipitation has been registered, mainly in the northern Slovakia. This resulted in significant increase of new snow cover in the high mountain localities at some extreme events, mainly above 1300 m a.s.l. Such examples are well known not only in Slovakia, but also at many sites in the Alps (the newest events occurred in the 2008/09 winter). On the other side significant decrease of snow cover days was observed in the lowlands.

There are about 700 precipitation gauges in Slovakia every year since 1951 and some lower number since 1921. In 1980 the Slovak Hydrometeorological Institute decided to create precipitation database, including all snow data (climatologic database is ready for 1961-2008). Altogether 600 station data are complete in 1981-2008. In spite of shorter 30-year period, it is considered long enough to identify principal changes in snow cover during current climate change. This snow cover series is very valuable also for future analysis in some years or decades.

In the paper the new and the total sow cover data observed once a day are analyzed. The elaboration brought plenty of characteristics, never issued in Slovakia up to present. Because of existence of limited snow characteristics for the period 1921-2000, some comparisons are included as well. Limited area in the paper enables to present selected information only.

The analysis presented here is focused mainly on the changes in annual regime and territorial distribution of snow cover due to warming of climate and change in precipitation. Very important is the dividing line between the influence of rising temperature and increasing winter precipitation. Recent investigation supports the fact that it lies about 900 m a.s.l. and it tends slowly to increase. Below this boundary decrease of snow is observed and above it some increase. Finally some extreme events with high new and total snow cover depth are listed. Snow cover analysis is highly important also in terms of prevention of dangerous avalanche events occurring in Slovakia every year.