



Observing and real-time evaluating of snow cover for flood forecasting service in the Czech Republic

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Snow cover accumulation and melting is a significant part of the hydrological cycle in the central Europe. Rapid snow melting combined with rainfall in spring caused many historical floods in the Czech Republic like disastrous floods in 1784, 1845, 1940 or most recently 2006. But estimation of water content in snow cover is important also for reservoir operation and planning, because spring melting donates reservoirs for water supply during the rest of the year. Therefore snow cover measurement and real-time evaluation is a significant part of the operational hydrological forecasting service.

There are about 400 gauges providing weekly (Monday) measurements of snow depth (SD) and snow water equivalent (SWE) in the Czech Republic. Data are collected by forecasting offices of Czech Hydrometeorological Institute and stored in operational database CLIDATA. Besides that comparative measurements of SD and SWE for open space and forest are made in the network of 20 profiles.

Evaluation of snow water amount in important basins (especially those of large reservoirs) is made within CLIDATA-GIS module. Data are interpolated in space using orographical dependent interpolation method. As there is usually no continuous snow cover in the Czech Republic linear interpolation fails to reflect reality if it interpolates between zero and non zero values on the mountain slopes. Therefore the regular (3 km) network of pseudo gauges was design. During interpolation hydrologist manually defines the altitude of actual snow line. Based on that, pseudo gauges below defined threshold are set equal to 0, while gauges above the threshold are not taken into account during the interpolation.

Testing of accounting for differences in snow cover in open space and forest is under development to be implemented into computation procedure next winter season.

Output 500 m grid is used to compute the total amount of snow and average SWE for the network of more than 90 basins. Data are provided to River Authorities, who operate reservoir, and other users. SWE data are also used for verification of states (computed SWE) in hydrological models used for real-time forecasting in the Czech Republic.

Comparison to the original method of computing snow cover amount (using simply averages of station observation in 100 elevation zones average for 14 basins in the Czech Republic) proved applicability of the method.