

Measuring snow water equivalent

Water equivalent of snow cover is the average amount of water existing as snow, i.e. the mass of snow per area unit. It is usually given as millimetres, as the numerical value of a water layer corresponding to the snow cover, in millimetres, is the same as that of the mass of the snow, in kilograms, within a square meter. The water equivalent of snow is determined by snow course measurements. A snow course is a 2 to 4 km long trail through various terrains typical for the area. Along the snow course, the number of snow depth measurements, made by using a measuring stick is usually 80. For obtaining the density, the snow is weighed at 8 points along the snow course.



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About 150 snow courses are operated by the Finnish Environment Institute; the measurements are made once or twice a month. The measurements have started already during the 1930's while the results have mainly been stored to the hydrological database since the 1980's. Until 1968, the snow courses were measured on the 16th of each winter month, thereafter usually twice, the 1st and 16th of each month. Since 1996 the measurements were again made only on the 16th of each month, with the exception of the small research catchments at which the measurement of the 1st of the month is made during the spring months. For the days between the measurements, daily values of water equivalent are calculated by a model.

Areal water equivalents of snow (mean values of water equivalent for a catchment) are calculated for the same catchments for which the areal precipitation values are also available. The hydrological database contains water equivalent values since 1946; the total number of areas in the database is 250. Since 1990, the number of areas, for which the water equivalent is determined, is around 110; the boundaries of 108 of them have been published in a report (Vesi- ja ympäristöhallinnon julkaisuja /

Publications of Water and Environment Administration - series A 165). The coordinates given are those of the outlet of the catchment, and the municipality and the regional centres for economic development, transport and the environment are also those within which the outlet is located.

Until 1990, the areal water equivalents of snow were computed by the isohyet method, as were the areal precipitations. From 1990, the areal values have been computed by using a grid point model. By this method, the effects of elevation and the coast, as well as the changes in locations of the snow courses, can be taken into account in calculation. However, the records are not entirely homogeneous, as the method of computation and the locations of snow courses have varied. Moreover, in the 1970's and the 1980's, data from other sources – the Finnish Meteorological Institute, the regional water and environment administration, hydropower companies – were used besides the ordinary snow courses.