

Towards a well-founded and reproducible snow load map for Austria

Michael Winkler and Harald Schellander

ZAMG - Central Institute for Meteorology and Geodynamics, Innsbruck, Austria

"EN 1991-1-3 Eurocode 1: Part 1-3: Snow Loads" provides standard for the determination of the snow load to be used for the structural design of buildings etc. Since 2006 national specifications for Austria define a snow load map with four "load zones", allowing the calculation of the characteristic ground snow load s_k for locations below 1500 m asl. A quadratic regression between altitude and s_k is used, as suggested by EN 1991-1-3.

The actual snow load map is based on best meteorological practice, but still it is somewhat subjective and non-reproducible. Underlying snow data series often end in the 1980s; in the best case data until about 2005 is used. Moreover, extreme value statistics only rely on the Gumbel distribution and the way in which snow depths are converted to snow loads is generally unknown. This might be enough reasons to rethink the snow load standard for Austria, all the more since today's situation is different to what it was some 15 years ago:

Firstly, Austria is rich of multi-decadal, high quality snow depth measurements. These data are not well represented in the actual standard. Secondly, semi-empirical snow models allow sufficiently precise calculations of snow water equivalents and snow loads from snow depth measurements without the need of other parameters like temperature etc. which often are not available at the snow measurement sites. With the help of these tools, modelling of daily snow load series from daily snow depth measurements is possible. Finally, extreme value statistics nowadays offers convincing methods to calculate snow depths and loads with a return period of 50 years, which is the base of s_k , and allows reproducible spatial extrapolation.

The project introduced here will investigate these issues in order to update the Austrian snow load standard by providing a well-founded and reproducible snow load map for Austria. Not least, we seek for contact with standards bodies of neighboring countries to find intersections as well as to avoid inconsistencies and duplications of effort.