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Experimental 6-week snow cover and soil frost outlooks

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Climate in the boreal region is characterized by seasonal snow cover and soil frost. Recreational outdoor activities, as well as winter maintenance of roads and railways, for example, are sensitive to snow and soil frost conditions. In addition, due to inherently low ground bearing capacity, timber harvesting and transportation on moist sites, like on drained peatlands, is possible only if the soil is frozen or snow cover is deep enough to carry heavy machines used in forest harvesting.

In the CLIPS (Climate services supporting Public activities and Safety) project, 6-week climate impact outlooks were developed for the Finnish public. Here we demonstrate the applicability of snow cover and soil frost outlooks that were developed in the project during the winter season 2017–2018. The forecast products were based on the 50 member ensemble of extended range weather forecasts from the European Centre for Medium-Range Weather Forecasts (ECMWF) and operationally updated twice a week.

The snow cover outlook developed in the project included both a deterministic forecast of weekly median snow depth and a probabilistic forecast indicating the probability for snow cover to exist. Additionally, the snow-related forecast products included weekly outlooks for the total amount of snowfall and for the number of snowfall days.

The first developed soil frost outlook consisted information about the predicted change in soil frost depth and frost heaving risk. We moreover developed forecast products for the soil frost depth separately on peatland sites and on mineral soils. Moreover, a probability forecast for springtime frost heaving risk on forest truck roads was developed. Examples of the forecast products and first evaluation results are presented for discussion.