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CRYOLINK – Permafrost and seasonal frost in Southern Norway

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In the Nordic countries (Norway incl. Svalbard, Sweden, Finland and Iceland) permafrost is widespread, and ranges from continuous permafrost in Svalbard towards wide-spread discontinuous permafrost in high-mountain regions of Iceland and the Scandes to isolated patches related to palsas, especially in Iceland and northern Scandinavia. Numerous studies exists, especially in Norway and Svalbard, addressing the distribution and thermal regime of permafrost. This presentation focus on a new modelling projects (CRYOLINK).

Regional spatial modelling in mountains until now mainly used empirical or statistical modelling approaches. The new project funded by the Norwegian Research Council (NRC) aims to apply existing and develop new numerical modelling tools to address the near-surface heat transfer processes and the spatial distribution of surface and ground temperatures, seasonal thaw and seasonal freezing. As a first step we use a 1D heat flow model to address thermal responses in the ground to atmospheric forcing. Furthermore, the project aims to establish appropriate relations describing the influence of snow, vegetation (surface offset) and ground type (thermal offset) for the near-surface energy exchange processes, as a basis for further spatial modelling of permafrost and seasonal frost. The Norwegian Water and Energy Directorate (NVE) and the Norwegian Meteorological Institute (met.no) have developed gridded air tempera-

ture and snow data fields (daily, ground resolution 1 km), making it possible to derive $N-$factor fields and calculate GST, TTOP and permafrost thickness. The project ultimately aims to develop a spatially distributed model, which yields spatial fields of ground surface temperatures, ground temperatures, active layer thickness and timing and seasonal ground freezing depth and timing, as a response to past and future climate change.