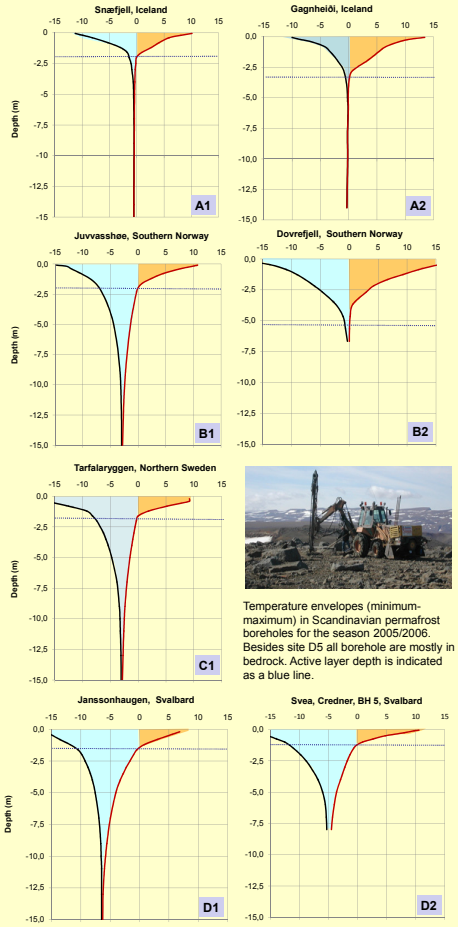
Mapping and Modelling the Distribution of Permafrost in the Nordic Countries

Etzelmüller, B.[1)], Farbrot, H.[1)], Humlum, O.[1)], Christiansen, H. [2)], Kristensen, L. [2)], Juliussen, H. [2)], Isaksen, K. [3)], Schuler, T.V. [1)], Ødegård, R.S. [4)], Guðmundsson, Á.[5)], Midttømme, K. and Ridefelt, H.[6)]

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Ground temperatures monitoring – IPY-TSP Norway



Temperature envelopes (minimum-maximum) in Scandinavian permafrost boreholes for the season 2005/2006. Besides site D5 all borehole are mostly in bedrock. Active layer depth is indicated as a blue line.

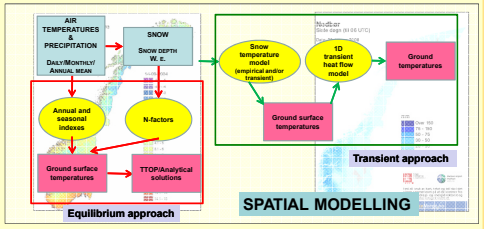
Ground temperature modeling - CRYOLINK

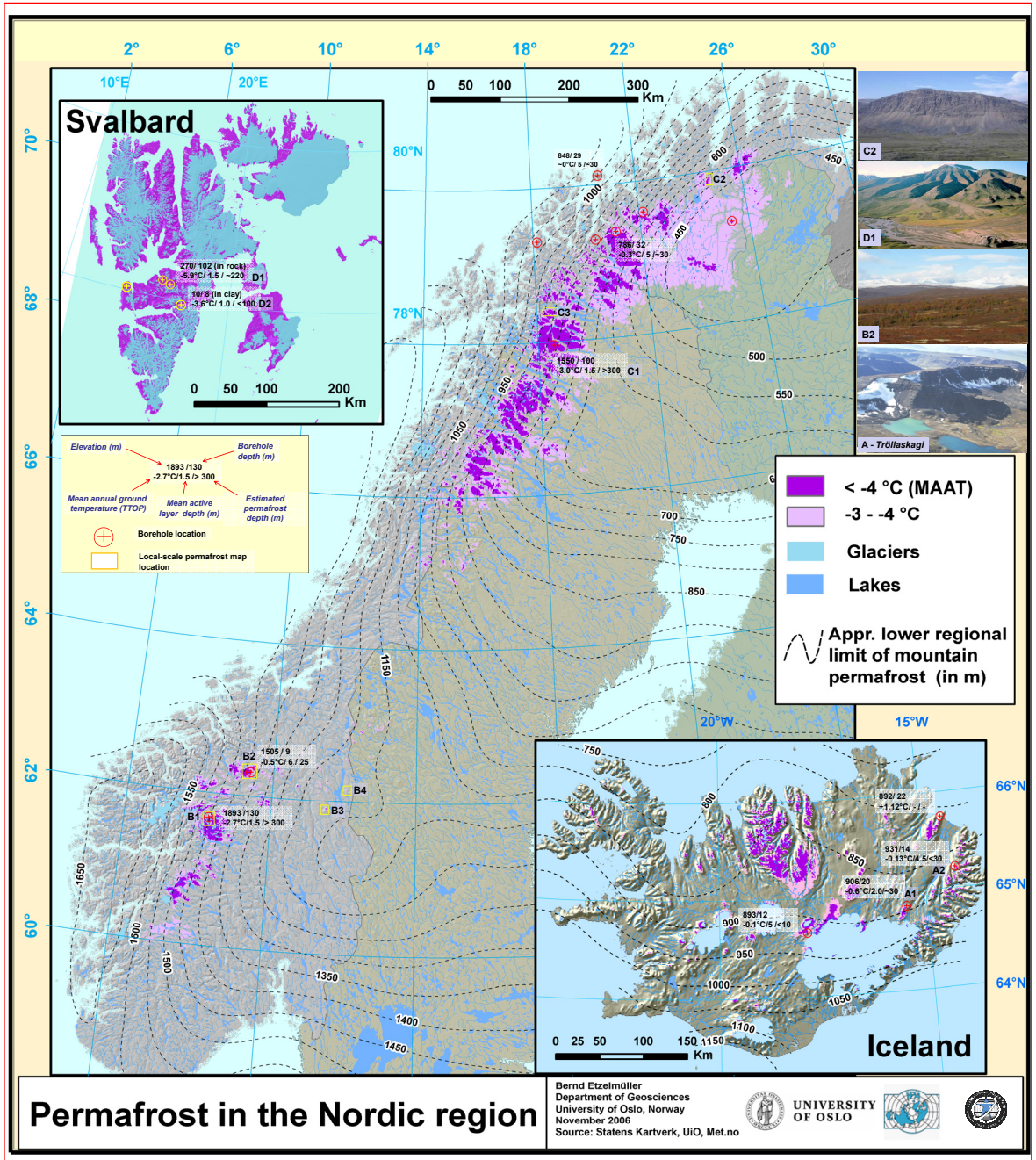
CRYOLINK will contribute to improve understanding of permafrost and seasonal frost in mountainous areas of southern Norway.

CROLINK aims to apply existing and develop new modelling tools to address the near-surface heat transfer processes and the temporal and spatial distribution and variability of ground temperatures, thaw and freeze depths.

CRYOLINK will

- establish valid N-factors describing the influence of snow, vegetation and substrate for the near-surface energy exchange processes, by using new and existing temperature monitoring networks
- will use and further develop spatially distributed equilibrium and transient heat-flux models to produce fields of ground temperatures, depths of active layer thickness and seasonal ground freezing, as well as an assessment of thermal response to past and future climate change





Permafrost in the Nordic region

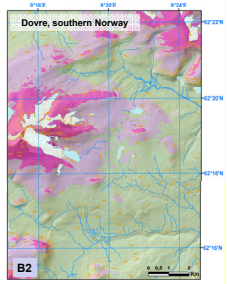
Bernd Etzelmüller
Department of Geosciences
University of Oslo, Norway
November 2006
Source: Statens Kartverk, UiO, Met.no

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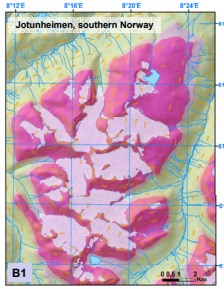
Contact TSP-NORWAY (IPY-project): Dr. Hanne Christiansen
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Contact CRYOLINK (NRC-project): Dr. Bernd Etzelmüller
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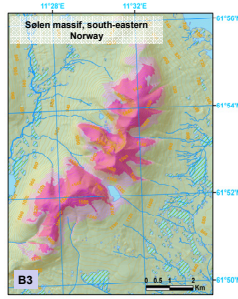
Local-scale permafrost maps using statistical and empirical spatial models



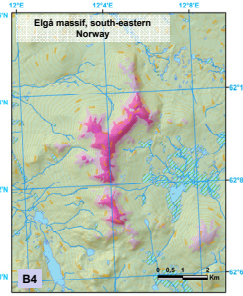
Permafrost map over the Dovre area. The map is calculated based on BTS measurements and subsequent logistic regression analysis. Significant parameters were *elevation* and *PR*. (Based on Ketil Isaksen and others).



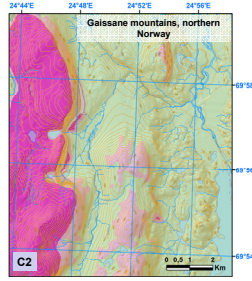
Permafrost map over the Jotunheimen area. The map is calculated based on BTS measurements and subsequent logistic regression analysis. Significant parameter was *elevation*. (Based on Ketil Isaksen and others).



Permafrost map over the Sølen area. The map is calculated based on BTS measurements and subsequent logistic regression analysis. Significant parameters were *elevation* and *PR*. (From Eva Heggem and others).



Permafroet map over the Elgå area. The map is calculated based on BTS measurements and subsequent logistic regression analysis. Significant parameters were *elevation* and *wetness index*. (From Eva Heggem and others).



Left: Permafrost map over a mountain area south of Lakselv, northern Norway. The map is calculated based on BTS-measurements and a multi-criteria analysis (MCA). Significant parameters were *elevation*, *PR*, *topographic wetness* and the presence of *block-rich material*. (From Herman Farbrot and others).

Continuous permafrost *(permafrost probability > 0.8)*
Discontinuous permafrost *(permafrost probability 0.5 - 0.8)*
Sporadic to no permafrost *(permafrost probability < 0.5)*
Glaciers
Lake
Contours
Rivers

Below: Permafrost map over the Abisko area. The map is calculated based on BTS measurements and subsequent logistic regression analysis. Significant parameters were *elevation* alone in the west and *elevation* and *PR* in the east. (From Hanna Ridefelt and others).

