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Supplement of

The regional climate model REMO (v2015) coupled with the 1-D freshwater lake model FLake (v1): Fenno-Scandinavian climate and lakes

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Table S1. The observation locations with the measurement periods in different lakes from the SYKE data.

Lake	Surface temperature	Vertical water temperature	Ice period	Ice and snow depth
Haukivesi 62°06'N, 28°26'E	Oravi 1979-2015 Savonlinna 1986-1993	-	Oravi 1979-2015 Siitinselkä 1991-2006	Oravi 1990-2015
Inari 68°57'N, 27°40'E	Nellim 1979-2014	Nellim 1979-2013	Nellim 1979-2015 Inari 1979-2015	Nellim 1979-2015 Inari 1979-2014
Kallavesi 62°50'N, 27°47'E	Kallavesi 1979-2015	Säyneensalo 1981-2015	Kallavesi 1979-2015 Ruokovesi 1979-1990	Säyneensalo 1981-1999 Itkonniemi 1979-2015
Lappajärvi 63°08'N, 23°40'E	Halkosaari 1979-2015	-	Halkosaari 1979-2015	Halkosaari 1979-2015
Näsijärvi 61°34'N, 23°46'E	Kyrölahti 1996-2015	Pengonpohja 1979-2013	Tampere 1979-2015 Palovesi 1979-2015	Tampere 1979-2015 Palovesi 1979-2015 Valkeenkivenlahti 1985-1990 Kyrölahti 1992-2013 Aittolahti 1981-1984
Oulujärvi 64°20'N, 27°15'E	Manamansalo 1979-2015	-	Melalahti 1980-2014 Vaala 1979-2015	Manamansalo 1979-2015 Paltaselkä 1999-2015
Pielinen 63°15'N, 29°42'E	Nurmes 1979-2015	Nurmes 1979-2013	Nurmes 1979-2015 Lieksa 1979-1992	Nurmes 1979-2015 Kuivaniemi 1981-1992
Pyhäjärvi 61°00'N, 22°18'E	Säkylä 1996-2015	Säkylä 1989-2015	Kauttua 1979-2015	Kauttua 1990-1991 Säkylä 1992-2015
Päijänne 61°29'N, 25°26'E	Kalkkinen 1980-1999 Sysmä 1979-2015	Linnansaari 1979-2014	Tehi 1979-2015 Sysmä 1979-2015 Päijänne 1979-2015 Vesijärvi 1979-2015	Tehi 1979-2015 Sysmä 1979-2015 Päijätsalo 1981-1999 Linnasaari 1981-1999 Kalkkinen 1979-1991 Haapaniemi 1979-1986
Saimaa 61°15'N, 28°15'E	Lauritsala 1979-2015	-	Lauritsala 1979-2015 Pökkäänlahti 1990-2015	Lauritsala 1979-2015

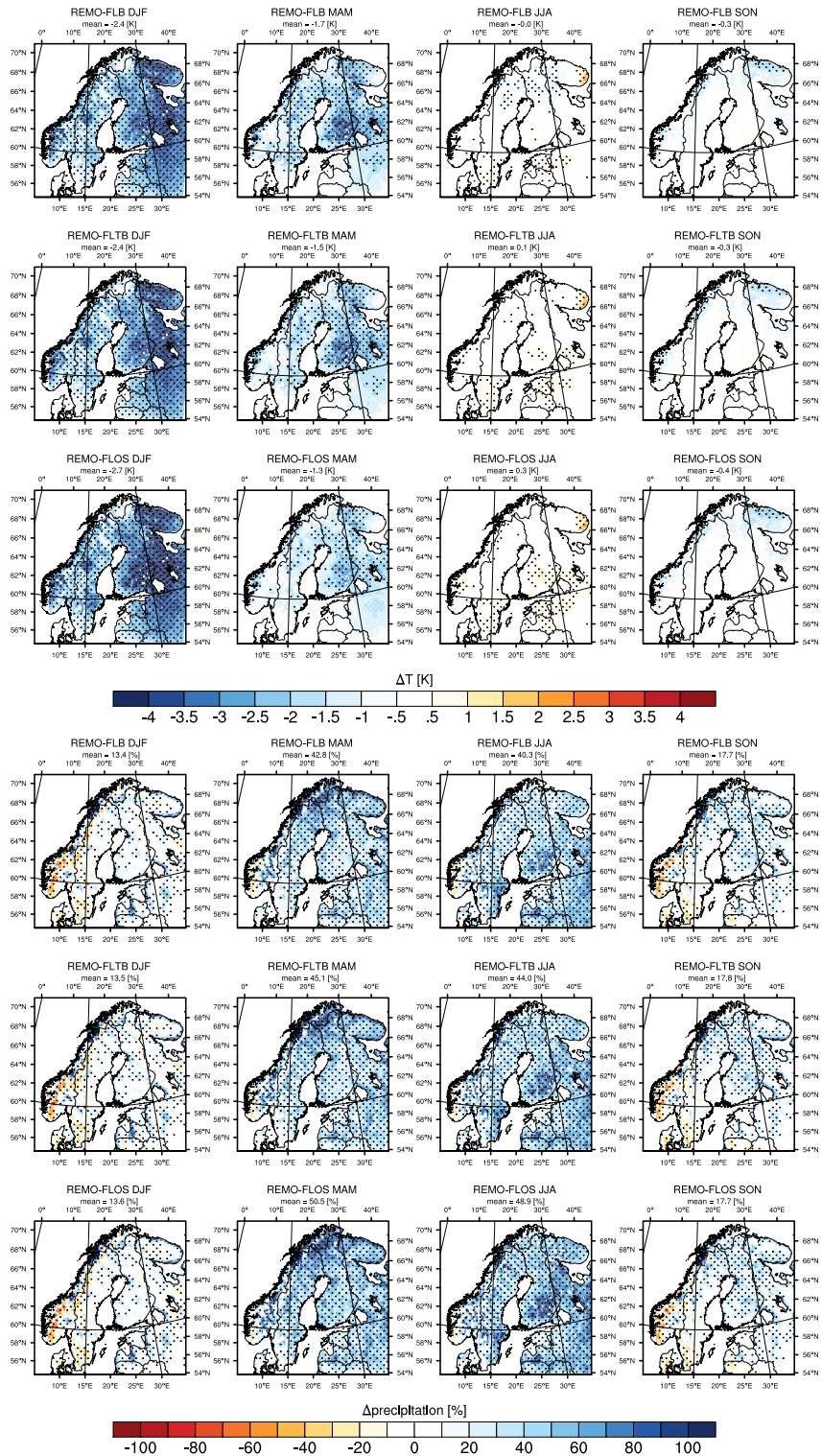


Figure S1. 2-m temperature and precipitation biases of REMO-FLake with the BATS snow albedo scheme (REMO-FLB), REMO-FLake with the combined temperature-dependent and BATS snow albedo scheme (REMO-FLTb) and REMO-FLake with original snow heat conductivity approach (REMO-FLOS) compared to E-OBS data. The seasonally averaged results are from the time period of October 1979 - March 2015. Dots indicate statistically significant differences with p -values < 0.05 .

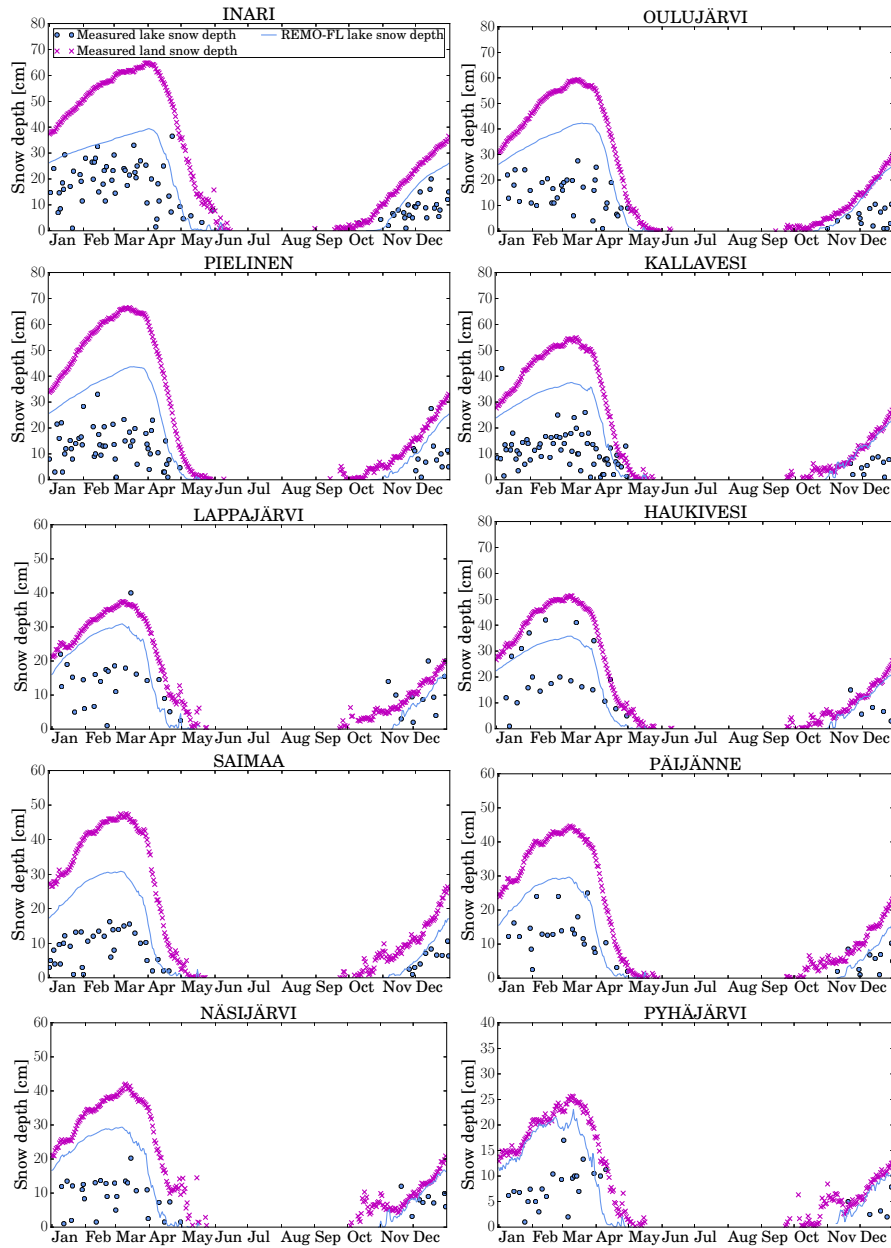


Figure S2. The measured and modelled snow depths on land and lake surface. The values have been averaged for the time period of 1979–2015. The snow depths over land areas are acquired from the Finnish Meteorological Institute’s own database (Aalto et al., 2016).

References

Aalto, J., Pirinen, P., and Jylhä, K.: New gridded daily climatology of Finland: Permutation-based uncertainty estimates and temporal trends in climate, *Journal of Geophysical Research: Atmospheres*, 121, 3807–3823, <https://doi.org/10.1002/2015JD024651>, <http://dx.doi.org/10.1002/2015JD024651>, 2015JD024651, 2016.