



Supplement of

Evaluation of snow cover properties in ERA5 and ERA5-Land with several satellite-based datasets in the Northern Hemisphere in spring 1982–2018

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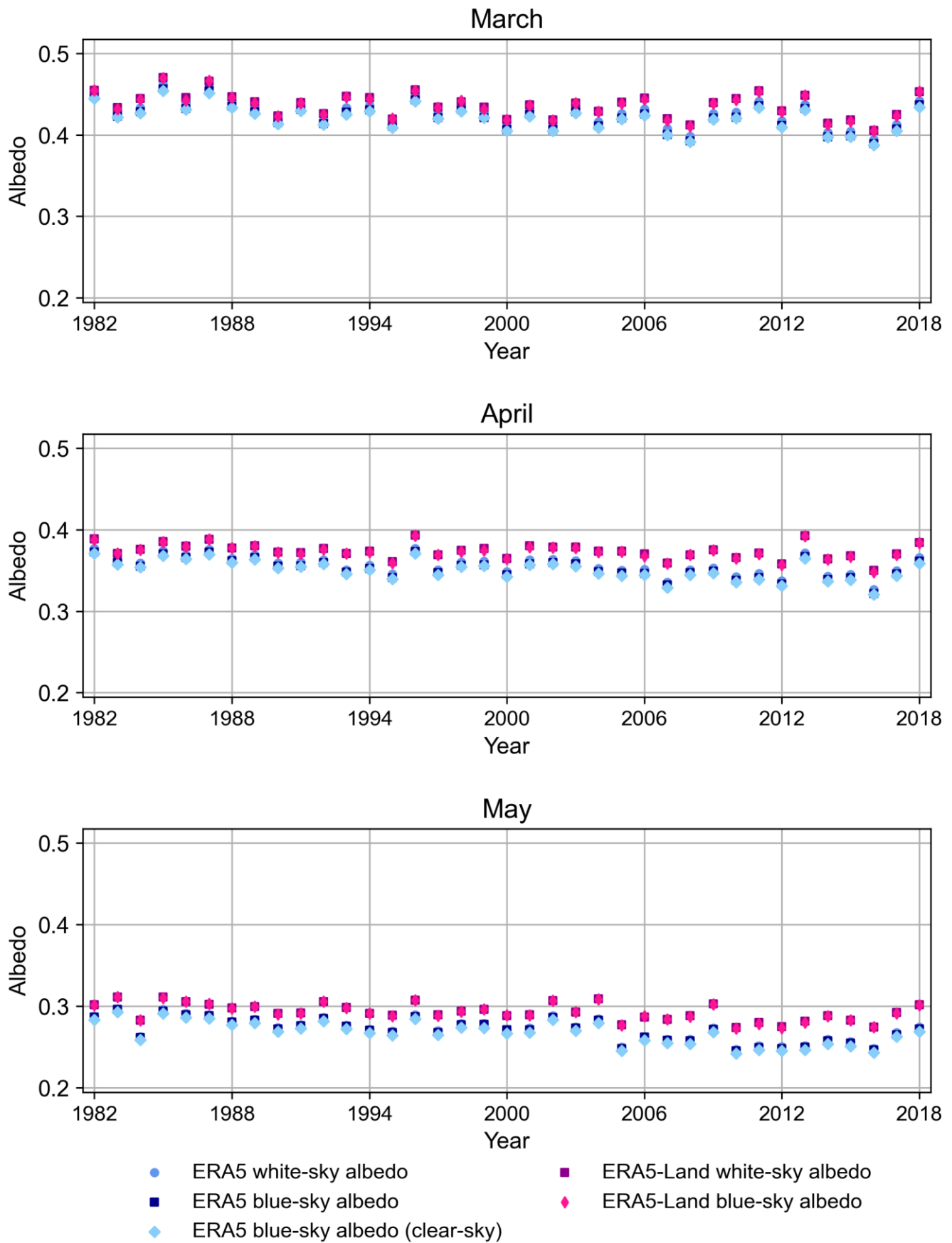


Figure S1. Monthly timeseries of different albedo estimates in ERA5 and ERA5-Land.

Mean differences in April 1982-2018

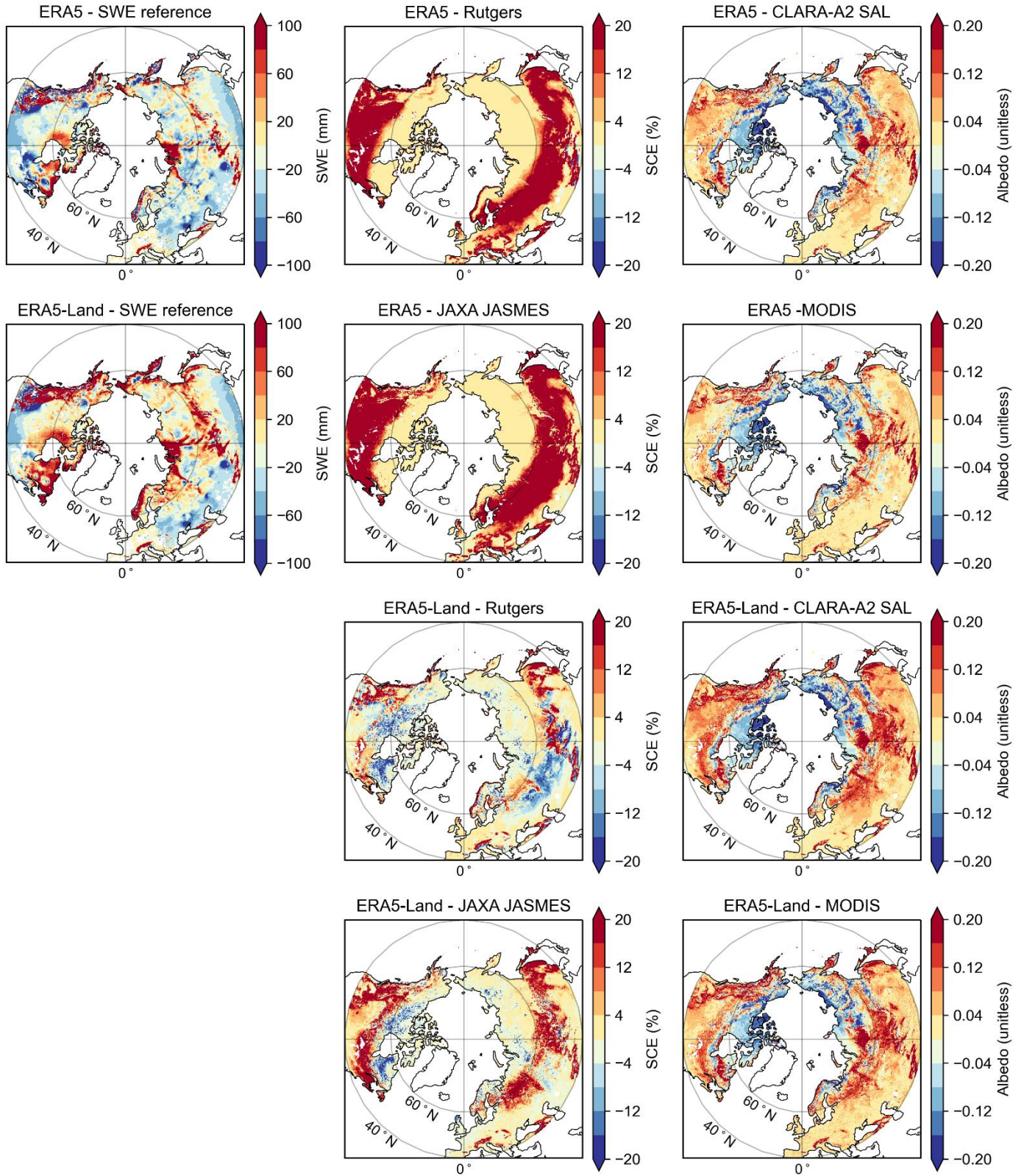


Figure S2. Monthly mean difference between ERA5 and ERA5 and each reference dataset in April 1982-2018 (ERA5-Land - MODIS 2000-2018).

Trends in April 1982-2018

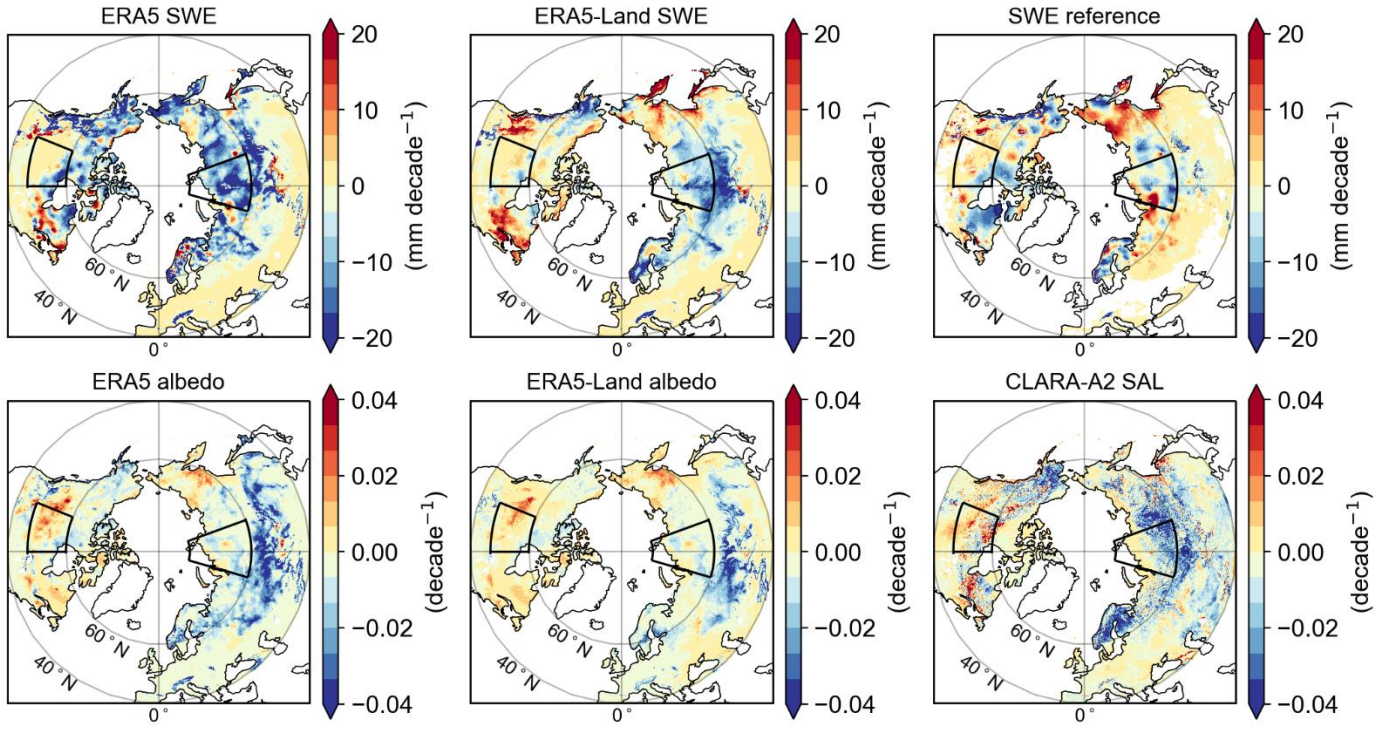


Figure S3. (top row) SWE trends in April 1982-2018. (bottom row) Albedo trends in April 1982-2018.

Trends in May 1982-2018

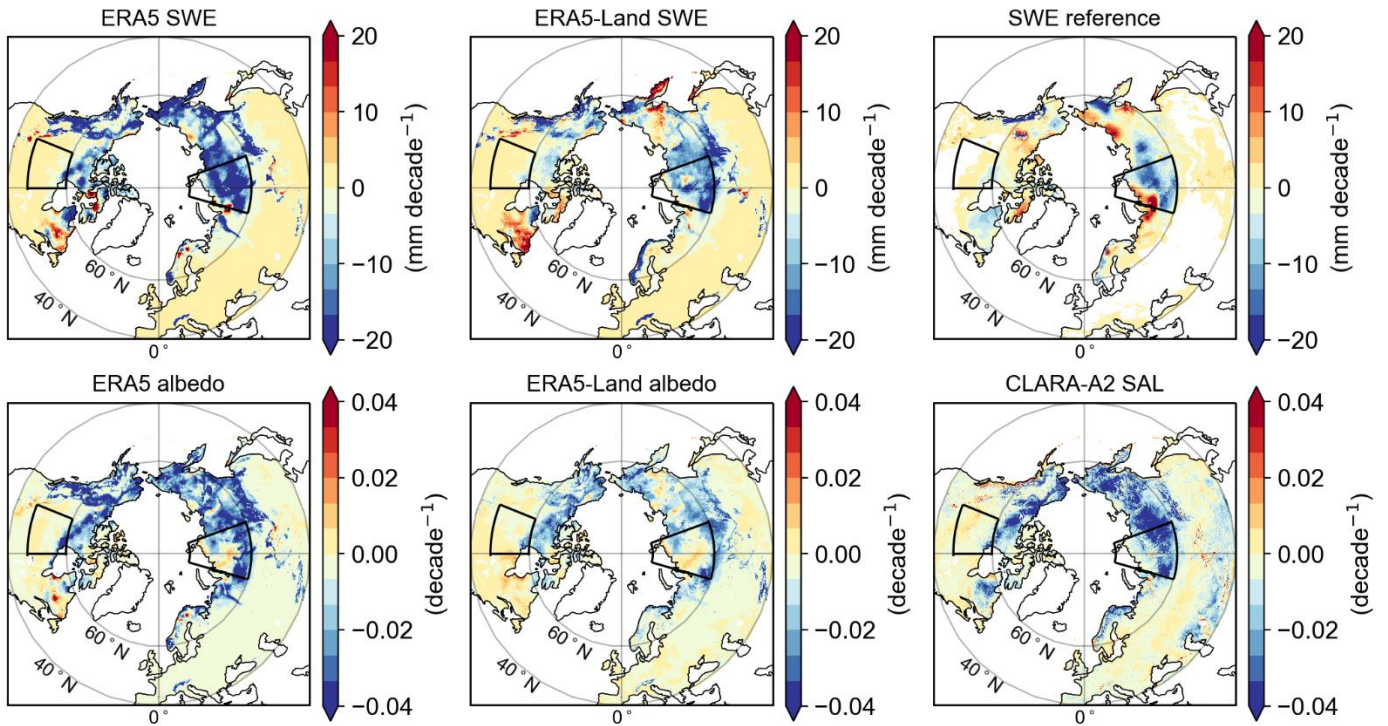


Figure S4. (top row) SWE trends in May 1982-2018. (bottom row) Albedo trends in May 1982-2018.

Trends in April 2000-2018

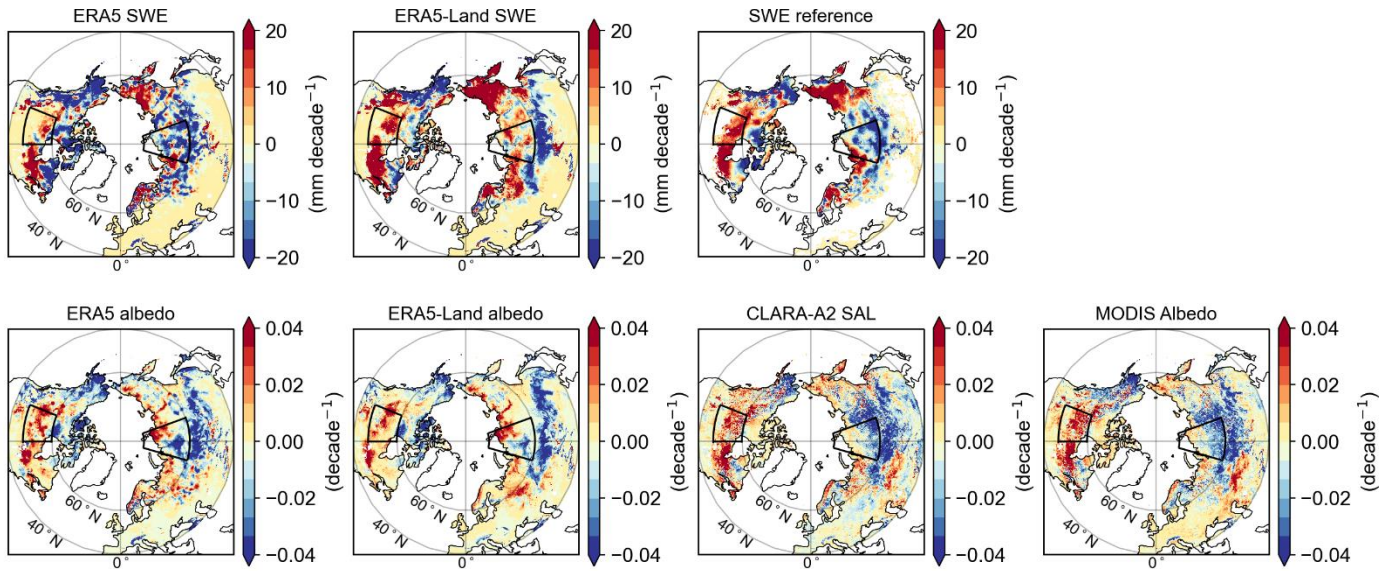


Figure S5. (top row) SWE trends in April 2000-2018. (bottom row) Albedo trends in April 2000-2018.

Trends in May 2000-2018

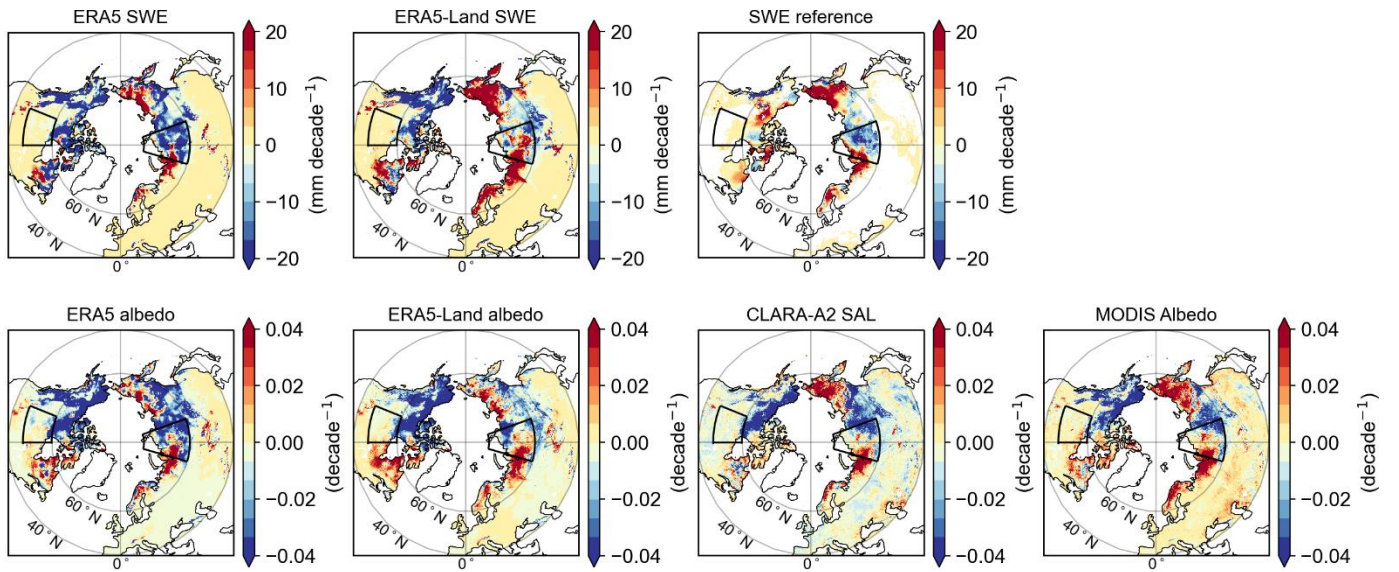


Figure S6. (top row) SWE trends in April 2000-2018. (bottom row) Albedo trends in April 2000-2018.

Mean snow depth

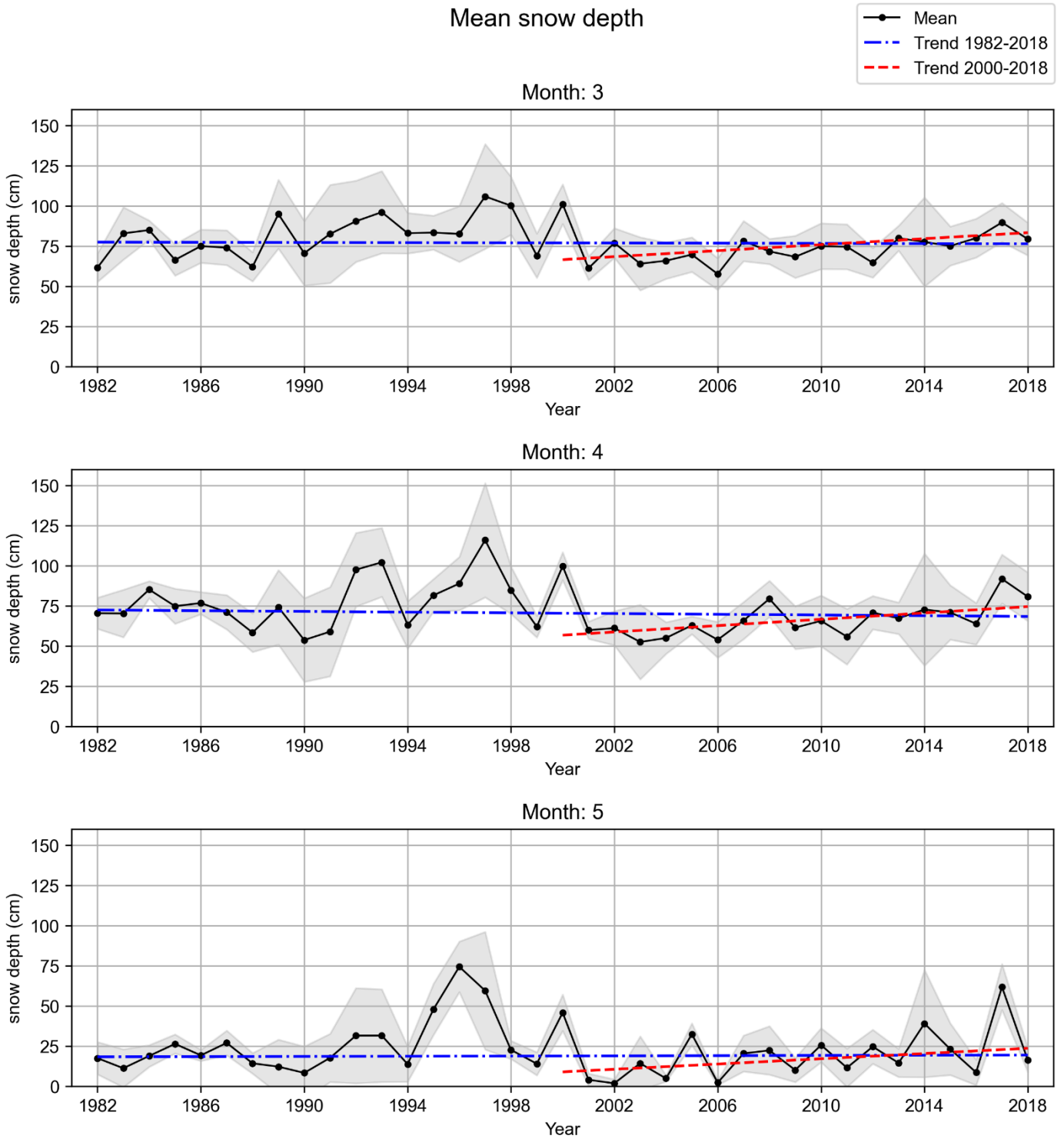


Figure S7. Timeseries of mean in situ snow depth across Lapland. The shaded area is $\pm\sigma$ from the mean value. σ = standard deviation.

Table S1. RMSE for every variable in ERA5 and ERA5-Land compared to each of the reference datasets. The values are calculated separately for each month (March, April, and May) for the entire study period 1982-2018.

	ERA5			ERA5-Land		
	March	April	May	March	April	May
SWE reference	1310 Gt	1400 Gt	1200 Gt	2810 Gt	3160 Gt	2780 Gt
Rutgers (SCE)	$5.4 \cdot 10^6 \text{ km}^2$	$7.6 \cdot 10^6 \text{ km}^2$	$7.8 \cdot 10^6 \text{ km}^2$	$1.3 \cdot 10^6 \text{ km}^2$	$1.0 \cdot 10^6 \text{ km}^2$	$1.2 \cdot 10^6 \text{ km}^2$
JAXA JASMES (SCE)	$5.8 \cdot 10^6 \text{ km}^2$	$9.2 \cdot 10^6 \text{ km}^2$	$9.7 \cdot 10^6 \text{ km}^2$	$0.8 \cdot 10^6 \text{ km}^2$	$2.1 \cdot 10^6 \text{ km}^2$	$2.8 \cdot 10^6 \text{ km}^2$
CLARA-A2 SAL (albedo)	0.02	0.02	0.02	0.03	0.04	0.05