



Supplement of

Land-atmosphere interactions in sub-polar and alpine climates in the CORDEX flagship pilot study Land Use and Climate Across Scales (LUCAS) – Part 1: Evaluation of the snow-albedo effect

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Supplemental Material



Figure S1: Snow cover for the 10 RCMs, the reanalyses ERA5-Land and MERRA-2, and the satellite observations MODIS-AQUA and MODIS-TERRA for January to May. Bars represent the median, boxes the interquartile range, and whiskers the minimum/maximum values. Dots indicate models lying outside the range of the reference datasets MERRA-2, ERA5-Land, and MODIS-AQUA, i.e., the 25th (75th) model percentile is higher (lower) than the highest 75th (lowest 25th) quantile of the reference datasets. Data for MODIS are displayed for cloud cover fraction thresholds of 50% and 20%.



Figure S2: As in Figure 2 but using the period 2003-2015 for all datasets.



Figure S3: Surface snow amount for the 10 RCMs, the reanalyses ERA5-Land and MERRA-2 for January to May. Bars represent the median, boxes the interquartile range, and whiskers the minimum/maximum values. Dots indicate models lying outside the range of the reference datasets MERRA-2 and ERA5-Land, i.e., the 25th (75th) model percentile is higher (lower) than the highest 75th (lowest 25th) quantile of the reference datasets.



Figure S4: Timing of maximum snow mass (100%) and timing of reduction to 80% and 20% snow mass for Scandinavia, East Baltic, and East Europe for RCMs, the satellite product GlobSnow (v3.0;), MERRA-2, and ERA5-Land. The box-and-whisker plots indicate the interannual variability for the 29 winters between 1986/87 to 2014/15; white lines represent the median, boxes the interquartile range, and whiskers the minimum and maximum values. Note that the 20% snow mass estimates in Scandinavia for GlobSnow only contain 27 years since GlobSnow did not reach 20% snow mass in 1996 and 1997 as it does not provide data during summer months.



Figure S5: As in Figure 6 but using the period 2003-2015 for all datasets that are shown.