Extrapolation is not enough: Impacts of extreme land-use change on wind profiles and wind energy according to regional climate models

Wohland et al.

Supplementary material

5 Interpolation to hub height winds
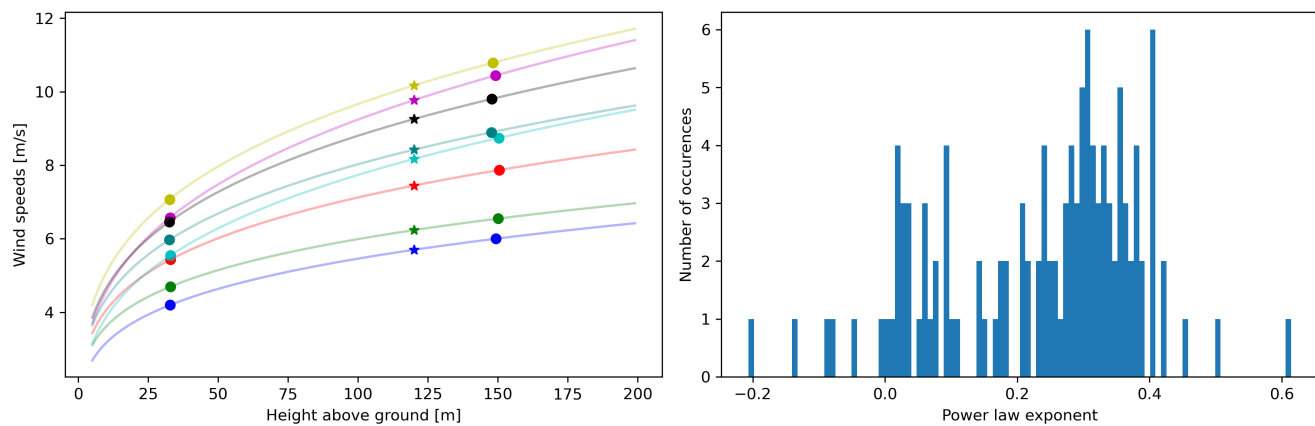
Figure S1. Example of wind speed interpolation to hub height. Wind speeds at 120m (stars) are computed from the closest two model levels (circles) by fitting the power law exponent α at each time step and each location. The subplot on the left shows 8 example profiles. The subplot on the right shows the distribution of power law exponents during one example timestep.

Seasonal evolution of changes

GERICS
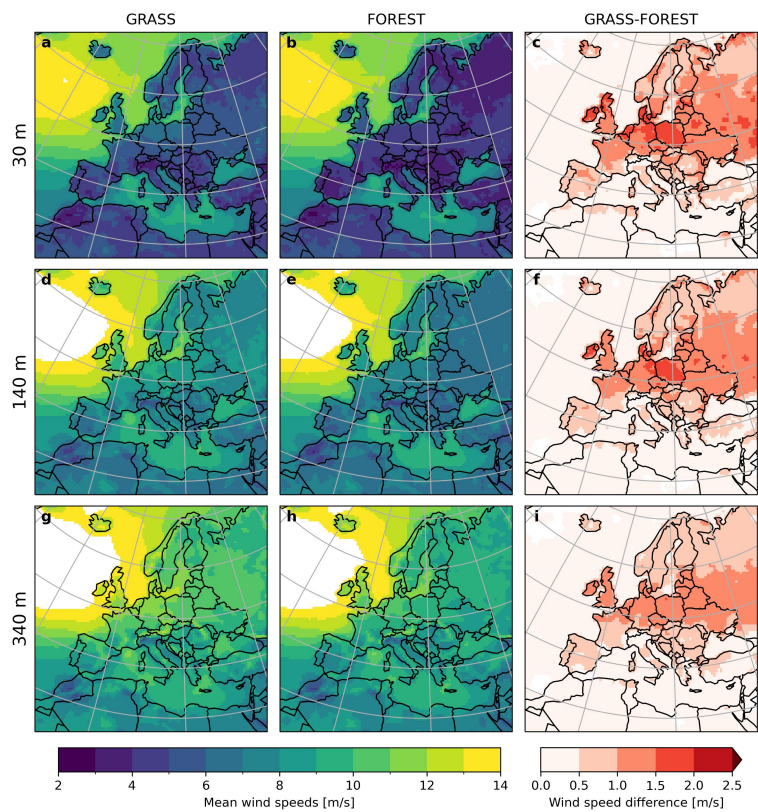
Figure S2. Same as Fig. 1 but for DJF only. White values in d, e, g, h exceed 14 m/s.
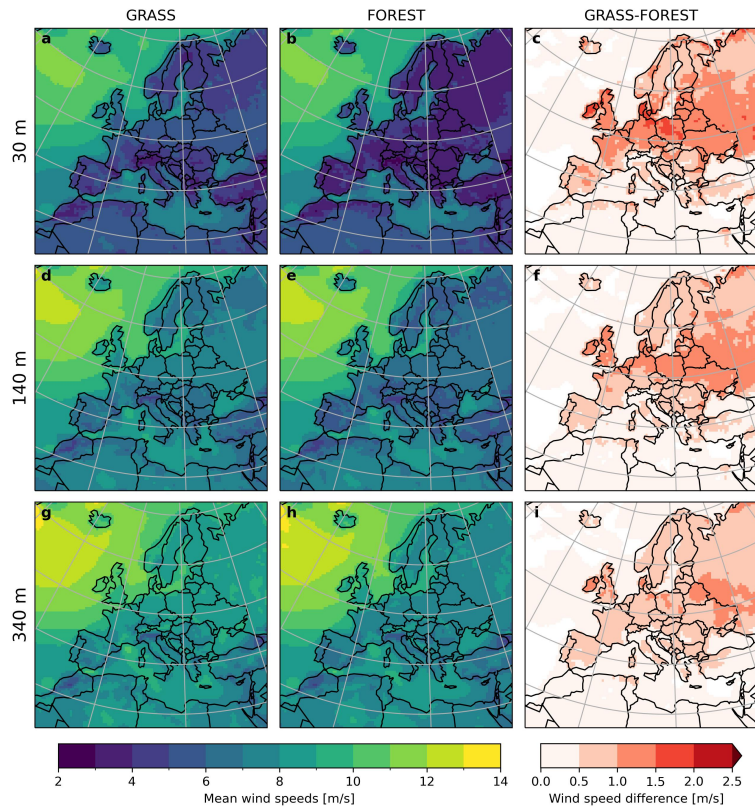
Figure S3. Same as Fig. 1 but for MAM only.
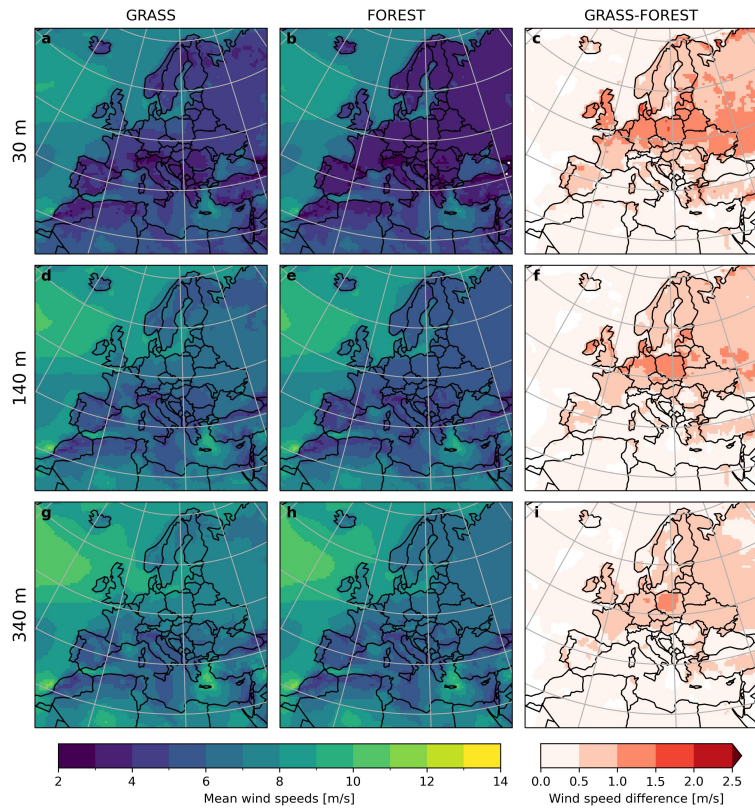
Figure S4. Same as Fig. 1 but for JJA only.
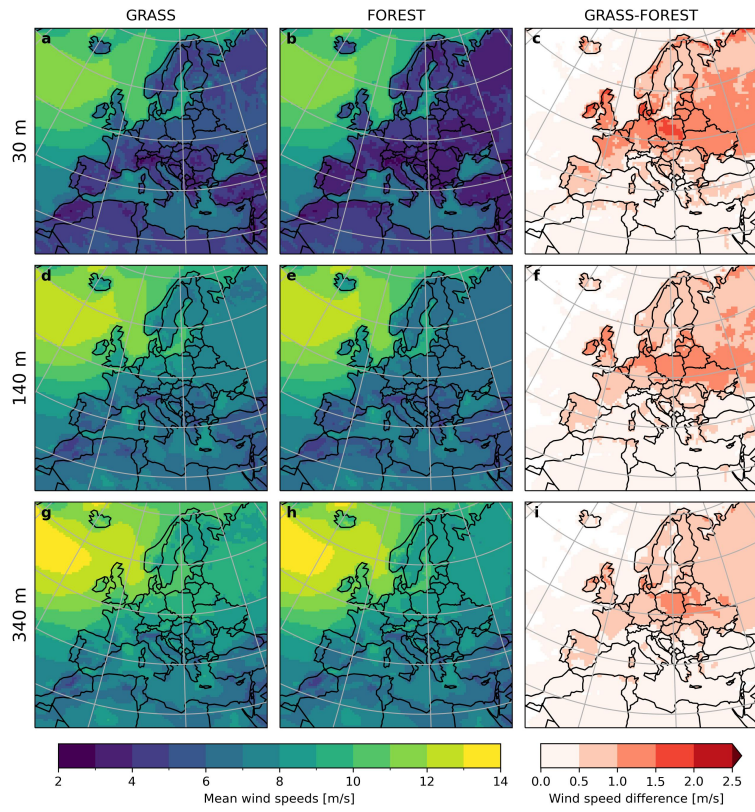
Figure S5. Same as Fig. 1 but for SON only.
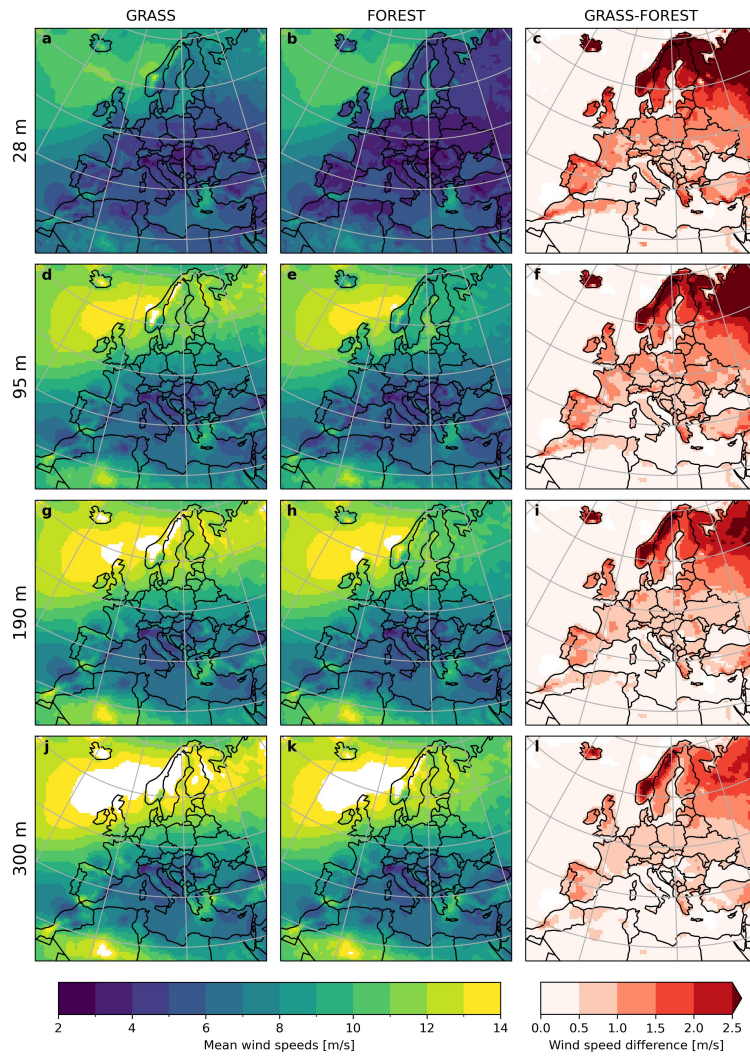
Figure S6. Same as Fig. 2 but for DJF only. White values in d, e, g, h exceed 14 m/s.
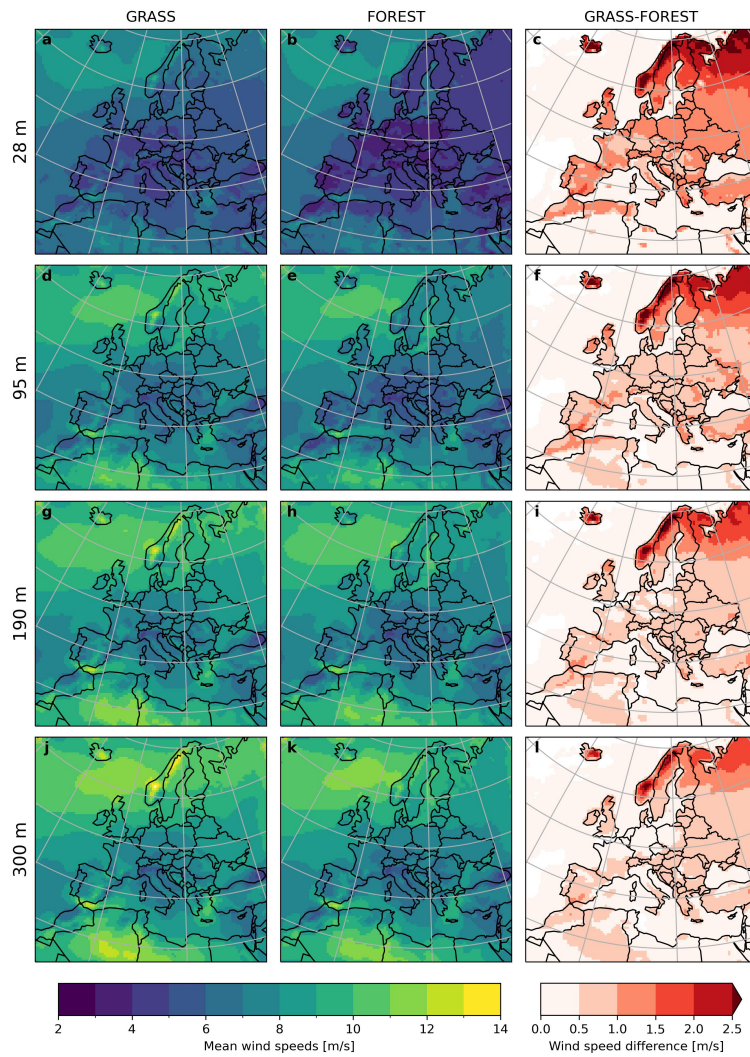
Figure S7. Same as Fig. 2 but for MAM only.
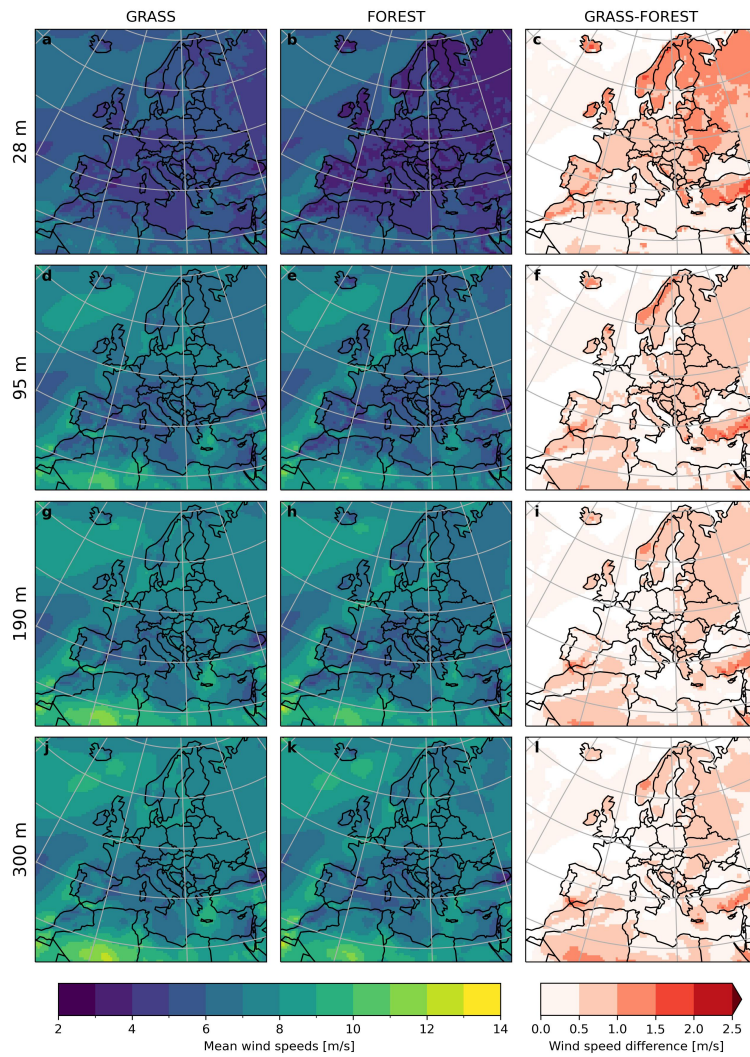
Figure S8. Same as Fig. 2 but for JJA only.
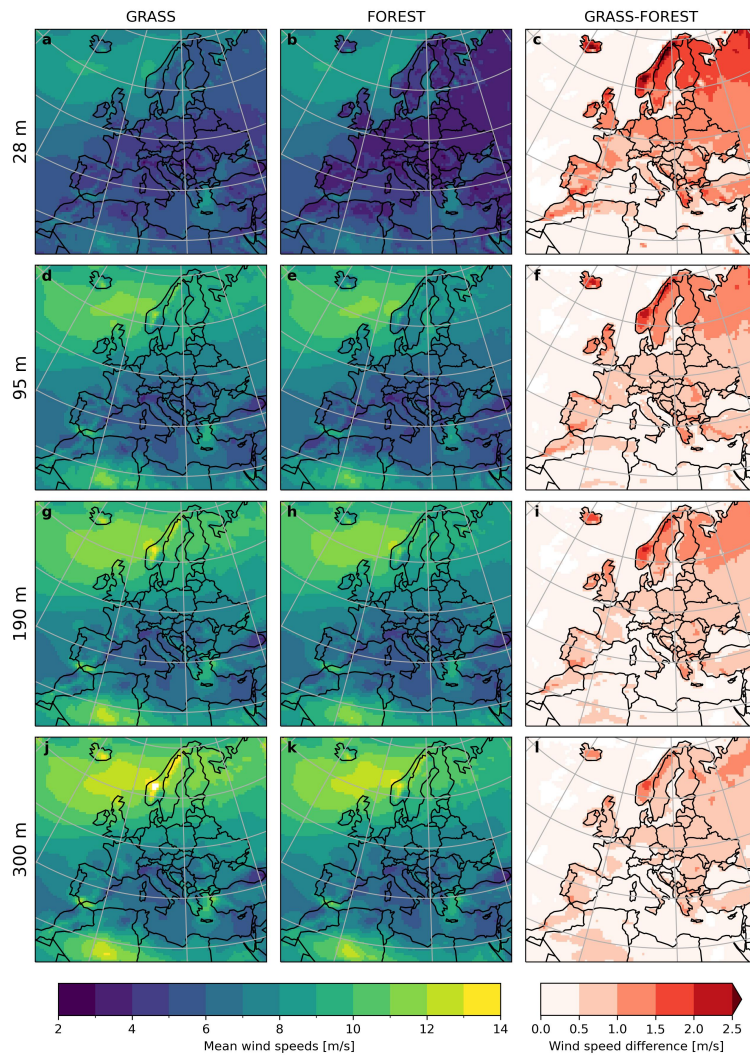
Figure S9. Same as Fig. 2 but for SON only.

Definition of the onshore area

10   The European offshore area is defined using the static land area fraction file (variable name sftlf) from IDL as follows:

1. Convert to a binary mask by setting all grid cells with land area fraction lower than 50% to zero (other percentages from 10 to 90 where tested and showed virtually identical results)

2. Removing Northern Africa, Iceland, and Eastern end of the domain (specifics can be found in the source code in file utils.py)

15   The resulting mask is presented in Fig. S10.
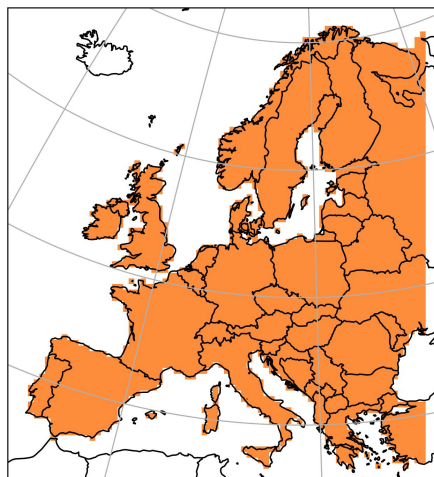
Figure S10. Onshore mask used when analyzing the change over land only.

Daily cycle changes in other locations
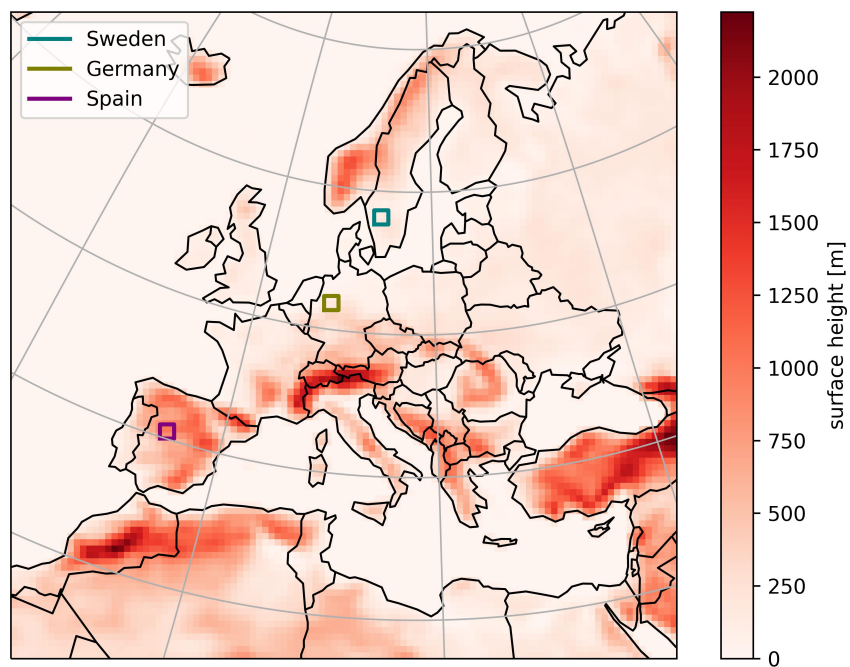
Figure S11. Topography map highlighting the 2x2 grid cell boxes that are used in the analysis of the daily cycle.
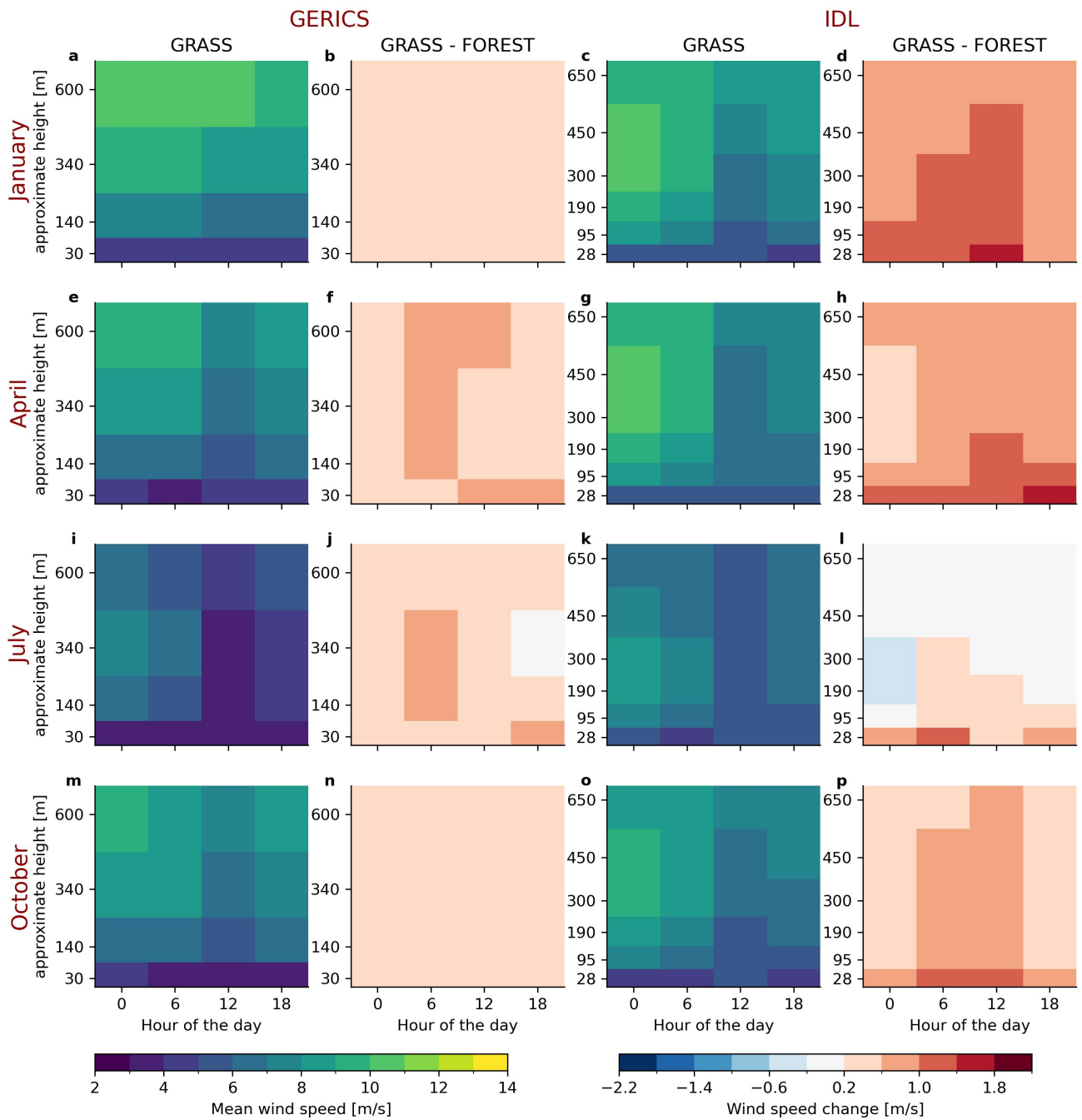
Figure S12. Same as Fig. 5 but for Spain.
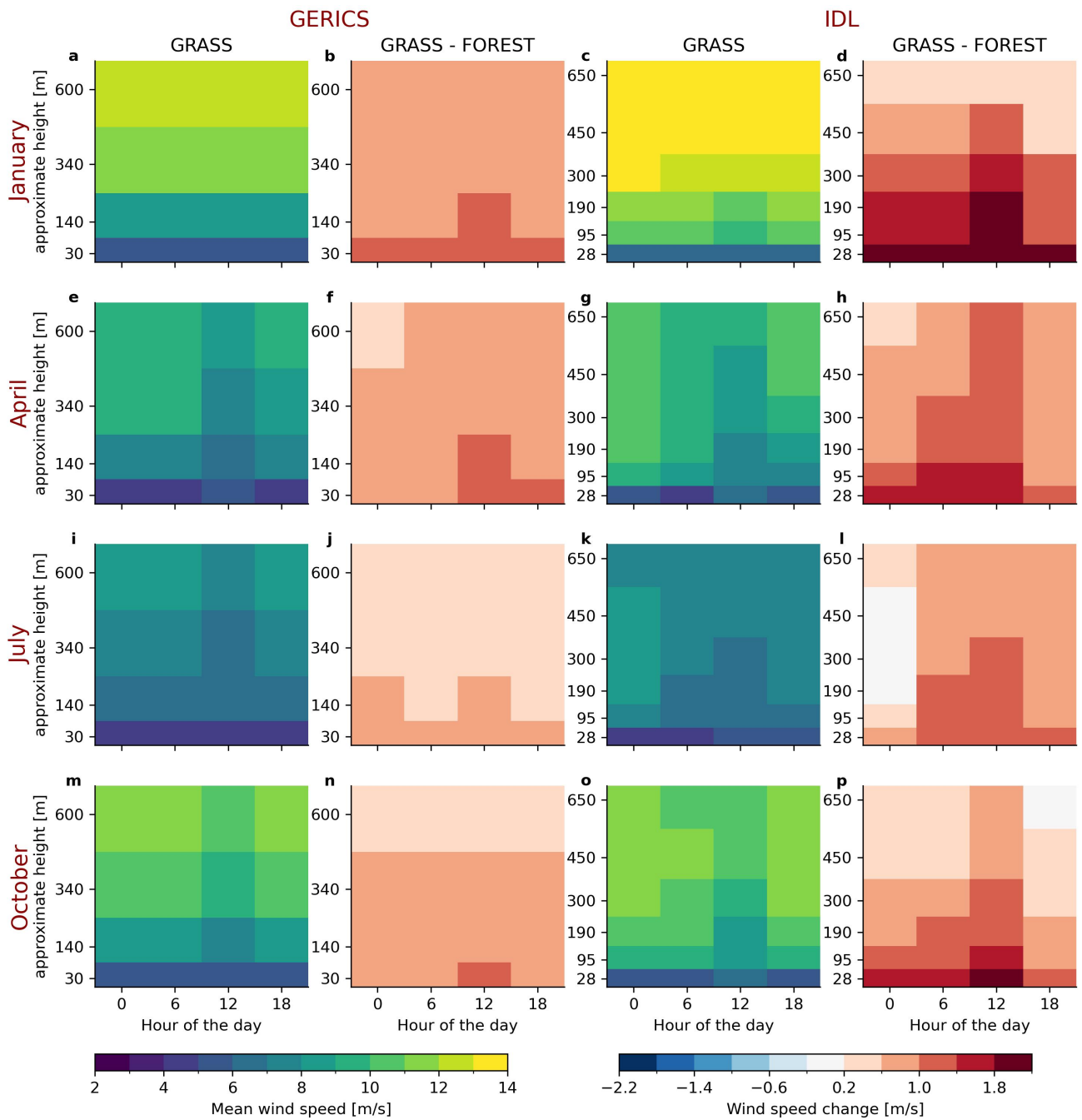
Figure S13. Same as Fig. 5 but for Sweden.

Relative capacity factor change
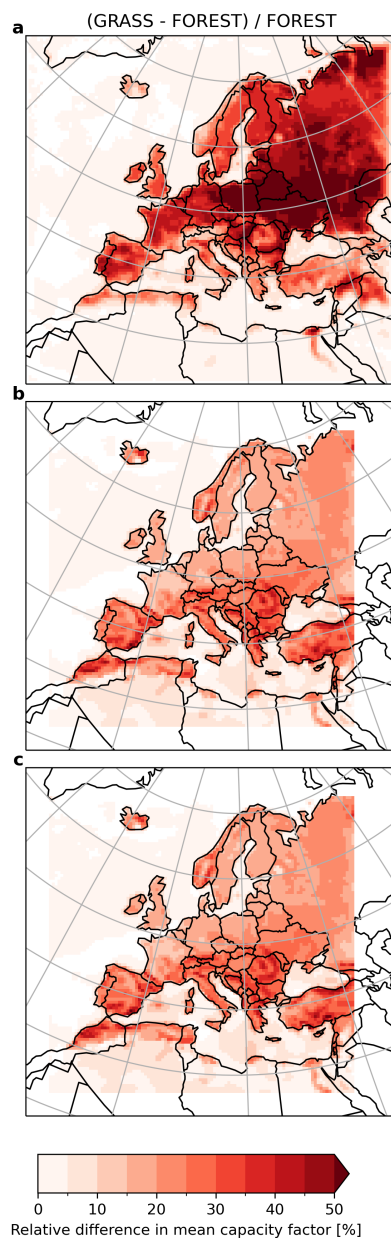
Figure S14. Relative changes of mean capacity factors for GERICS (a), IDL (b), and IDL resampled to 6h values (c).