Supplementary

Plant phenology evaluation of CRESCENDO land surface models. Part II: Trough, peak, and amplitude of growing season.

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This document contains:

– Comparison of monthly Minimum Leaf Area Index among Satellite products (Figure S1);

– Comparison of monthly Minimum Leaf Area Index among Satellite products (Figure S2);

– Difference in minimum Leaf Area Index (LAI) between Copernicus Global Land Service (CGLS) and Models (Figure S3);

– Difference in maximum Leaf Area Index (LAI) between Copernicus Global Land Service (CGLS) and Models (Figure S4);

– Comparison in the Leaf Area Index (LAI) peak timings between satellite products and land surface models for each biome retrieved from ESA-CCI land cover product (Figure S5);

– Comparison in the Leaf Area Index (LAI) trough timings between satellite products and land surface models for each biome retrieved from ESA-CCI land cover product (Figure S6);

– Comparison in the Leaf Area Index (LAI) seasonal amplitude between satellite products and land surface models for each biome retrieved from ESA-CCI land cover product (Figure S7).
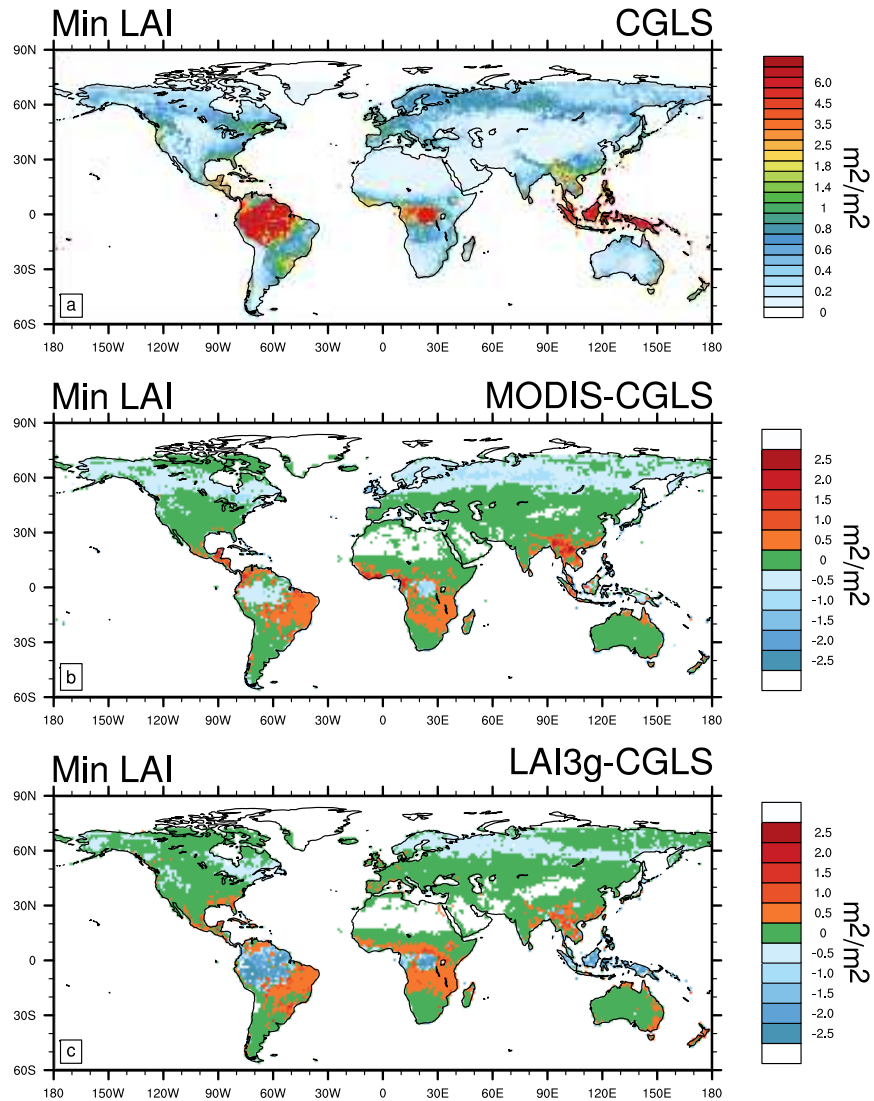
Figure S1. Comparison of monthly Minimum Leaf Area Index (Min LAI, in m^2/m^2) among Satellite products, a) Min LAI for the Copernicus Global Land Service data (CGLS) and the differences in Min LAI between b) MODIS and CGLS, and c) LAI3g and CGLS. Note that LAI data are available from 56°S to 72°N, which is the range covered by CGLS.
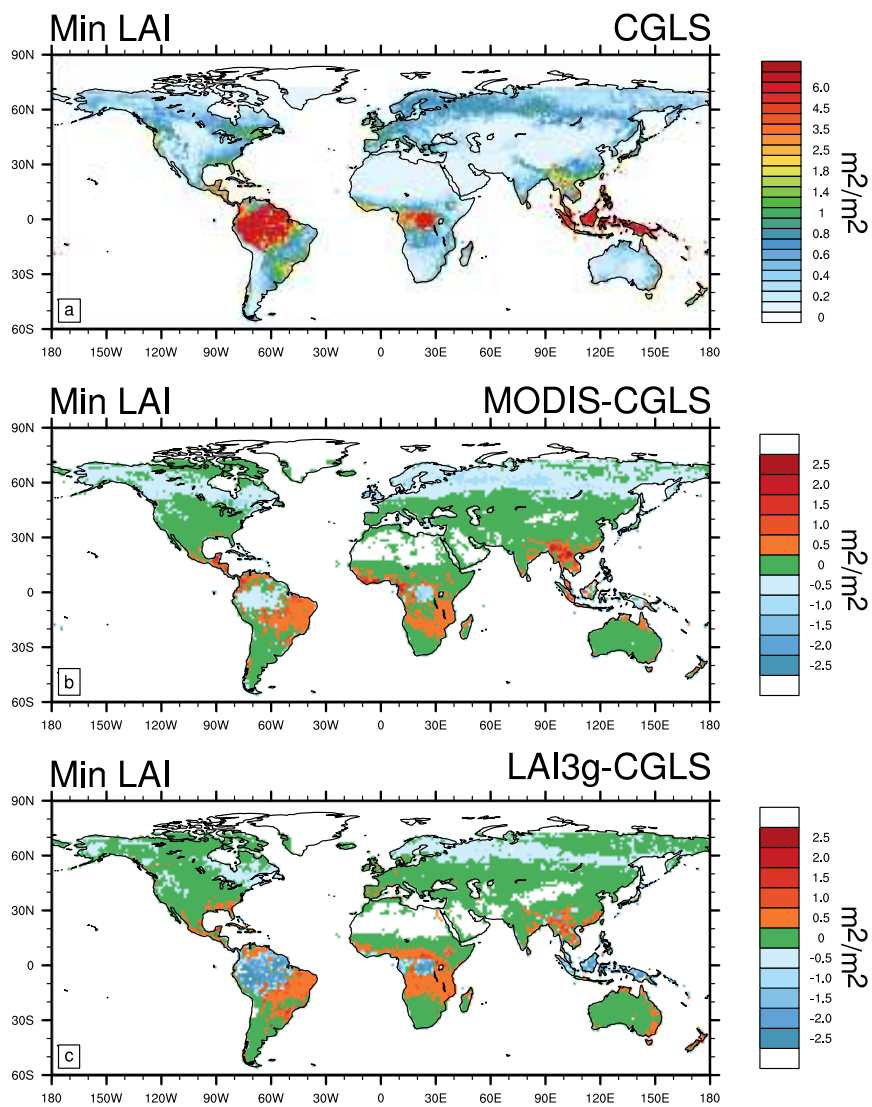
Figure S2. As for Figure S1 but for Maximum Leaf Area Index (Max LAI).
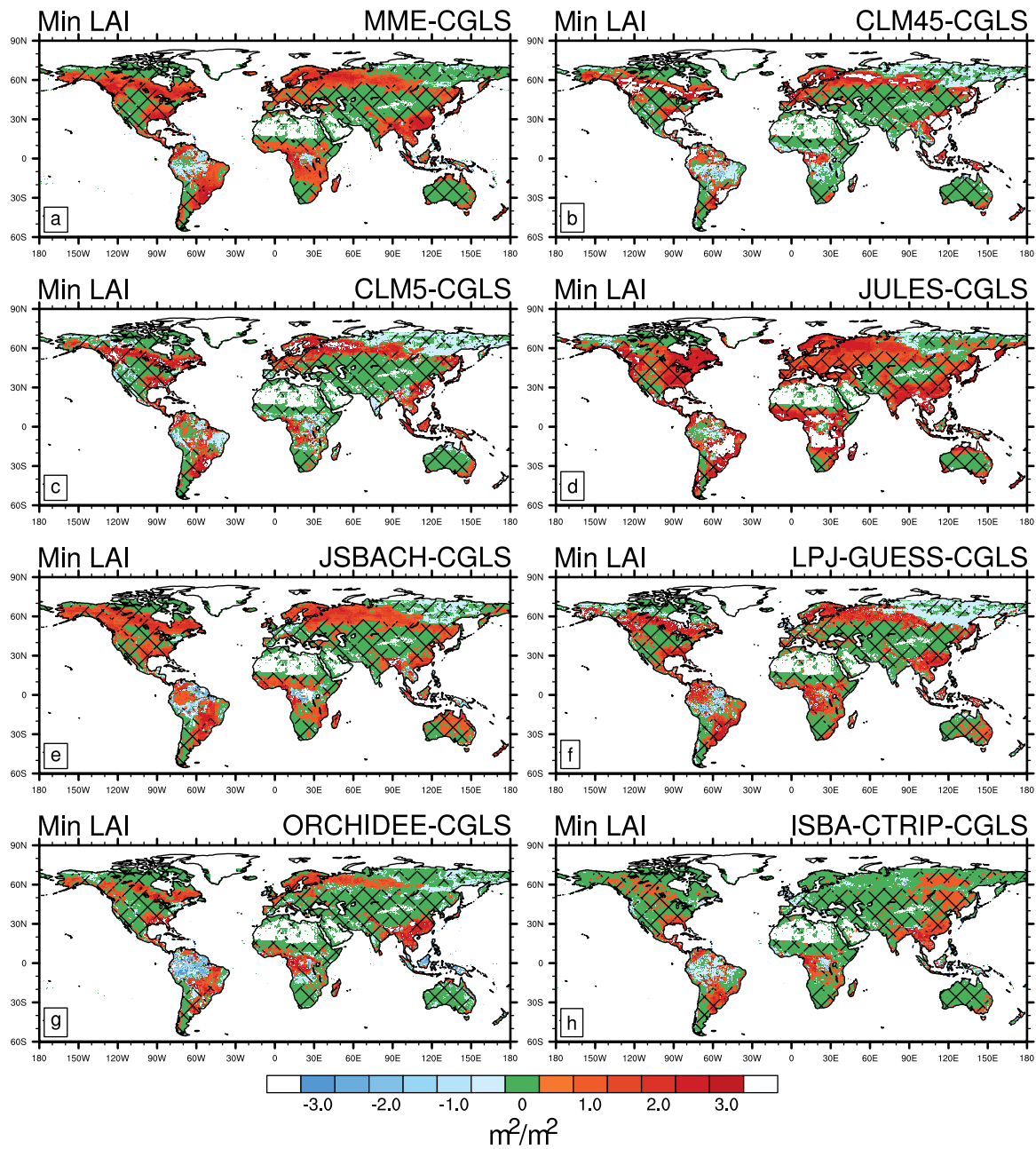
Figure S3. Difference in minimum Leaf Area Index (LAI) between Copernicus Global Land Service (CGLS) and a) Multi Model Mean (MME); b) CLM4.5; c) CLM5.0; d) JULES; e) JSBACH; f) LPJ-GUESS; g) ORCHIDEE; h) ISBA-CTRIP. Note that LAI data are available from 56°S to 72°N, which is the range covered by CGLS.
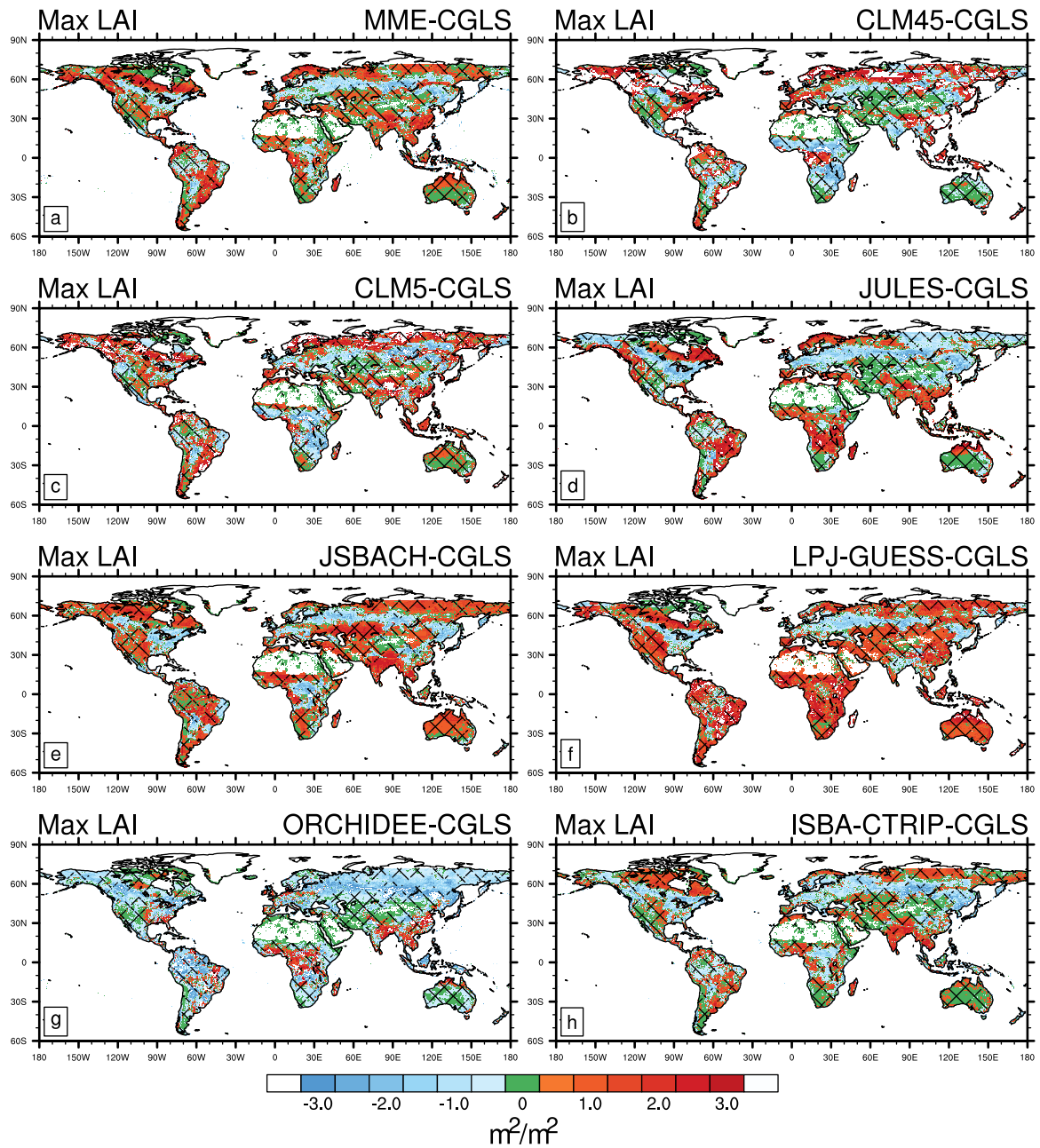
Figure S4. As for Figure S3 but for Maximum Leaf Area Index (LAI).
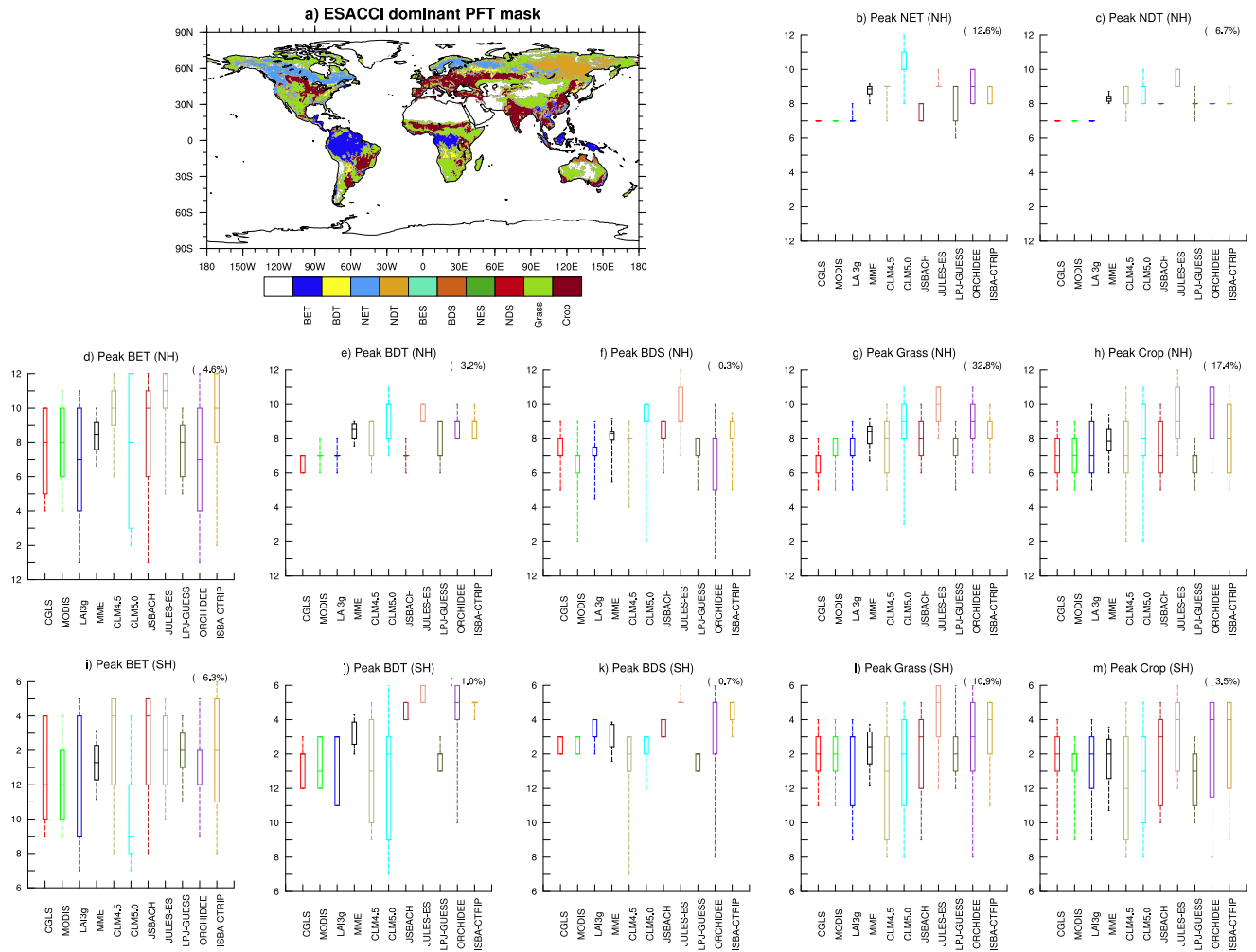
Figure S5. (a) Global distribution of the main land cover types for the 2000–2011 period based on ESA CCI data (Li et al., 2018). Comparison in the Leaf Area Index (LAI) peak timings between satellite products (CGLS, red; MODIS, green; LAI3g, blue) and land surface models (LSMs: MME, black; CLM4.5, dust; CLM5.0, cyan; JSBACH, dark red; JULES, pink; LPJ-GUESS, dark green; ORCHIDEE, purple; ISBA-CTRIP, dark yellow) in (b) needle-leaf evergreen tree (NET) in the Northern Hemisphere (NH); (c) needle-leaf deciduous tree (NDT) in the NH; broadleaf evergreen tree (BET) in the (d) NH and (i) SH; broadleaf deciduous tree (BDT) in the (e) NH and (j) SH; broadleaf deciduous shrub (BDS) in the (f) NH and (k) SH; grass-covered areas (Grass) in the (g) NH and (l) SH; and crop-covered areas (Crop) in the (h) NH and SH (m). Note that no area is dominated by broadleaf evergreen shrub (BES), needle-leaf evergreen shrub (NES), or needle-leaf deciduous shrub (NDS) biome. The boxplots represent the median, 25/75th percentile, and 10/90th percentile of the distribution of grid points belonging to each biome illustrated in panel (a). Each panel shows in parentheses the percentage of global vegetated area covered by each biome. Note that the y axis is different in the NH and SH panels, but in both cases the summer season is central along the axis.
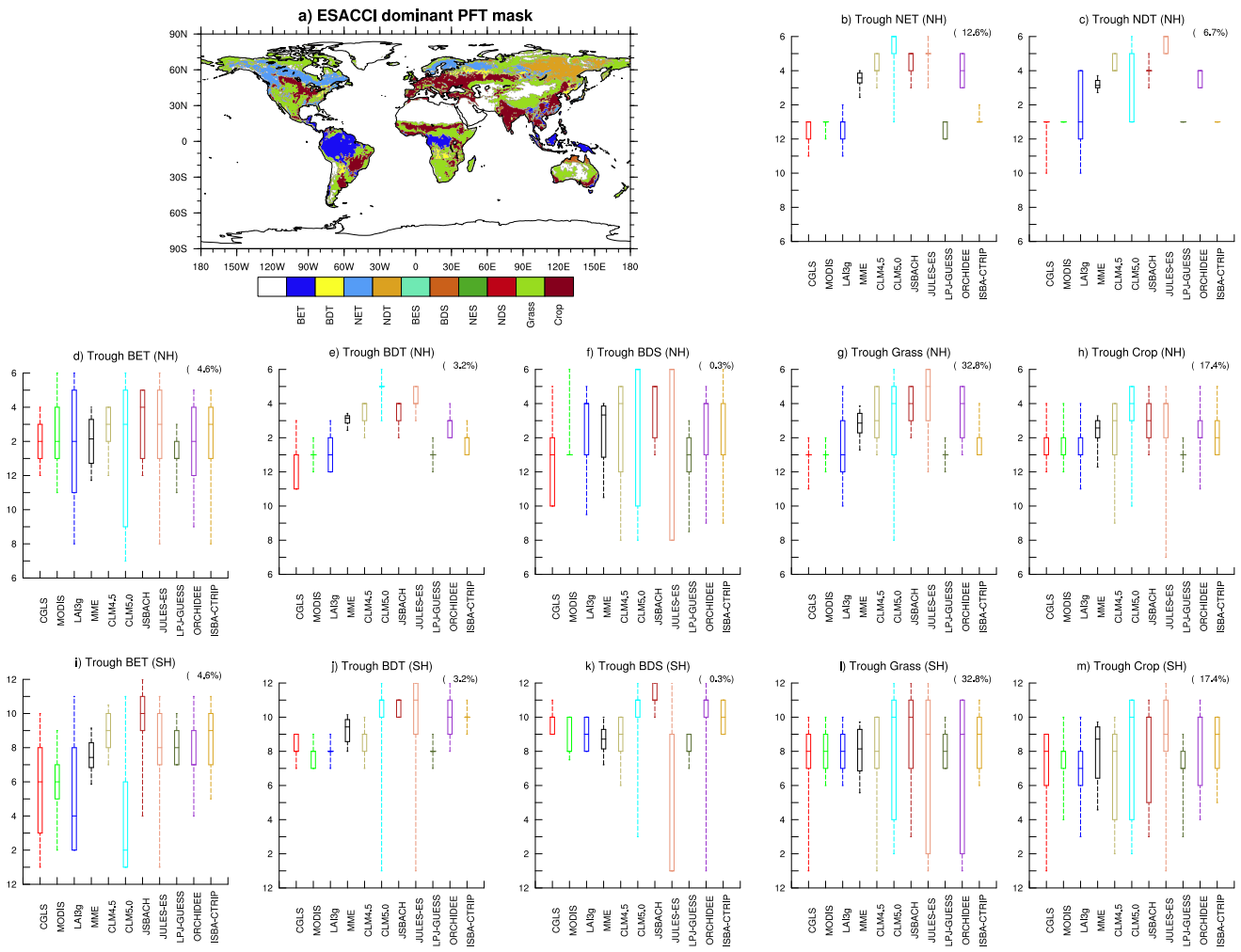
Figure S6. As Figure S5 but for Leaf Area Index (LAI) trough timings. In this case, the winter season is central along the y-axis.
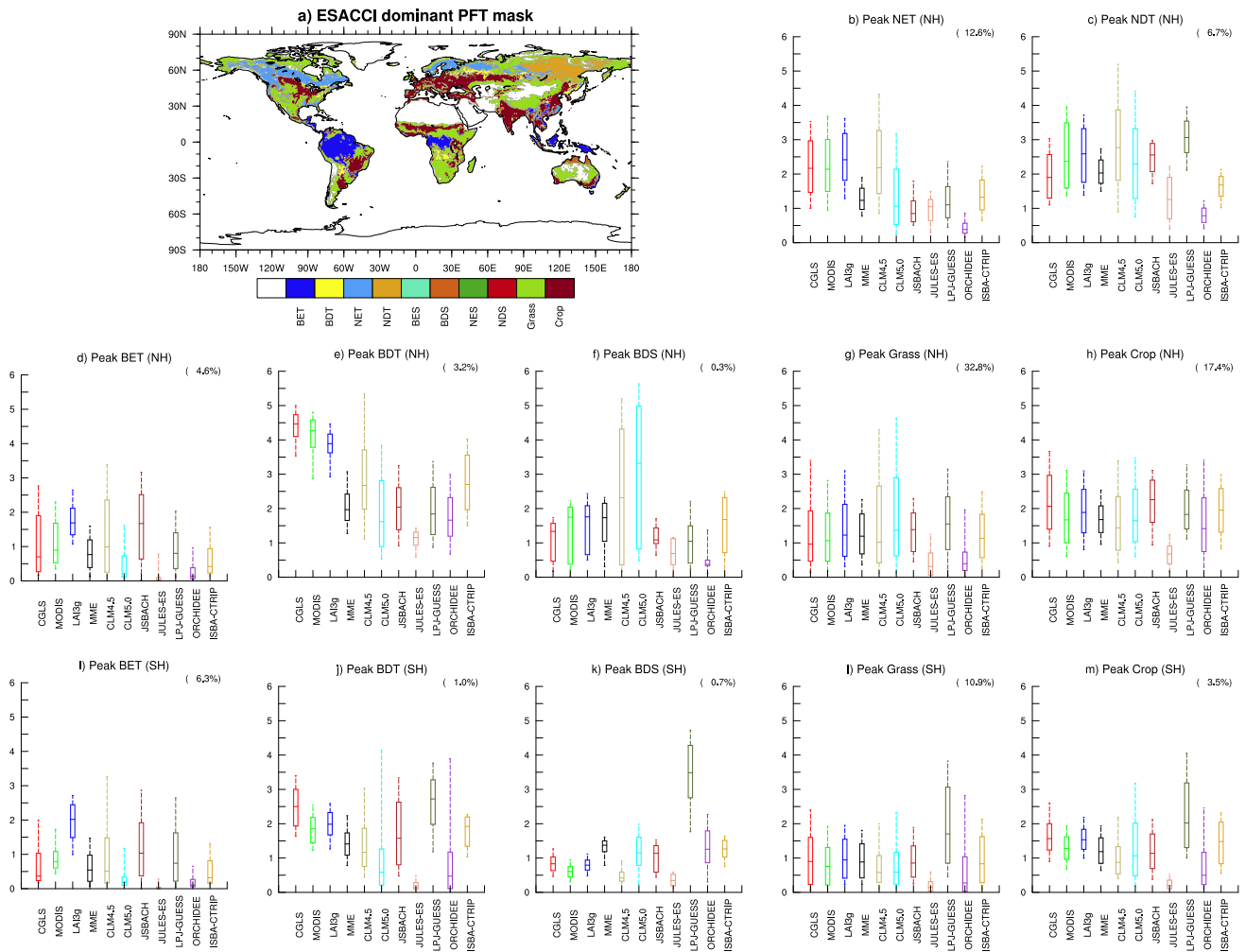
Figure S7. As Figure S5 but for Leaf Area Index (LAI) Seasonal Amplitude.

References

15 Li, W., MacBean, N., Ciais, P., Defourny, P., Lamarche, C., Bontemps, S., Houghton, R. A., and Peng, S.: Gross and net land cover changes in the main plant functional types derived from the annual ESA CCI land cover maps (1992–2015), Earth System Science Data, 10, 219–234, https://doi.org/10.5194/essd-10-219-2018, 2018.