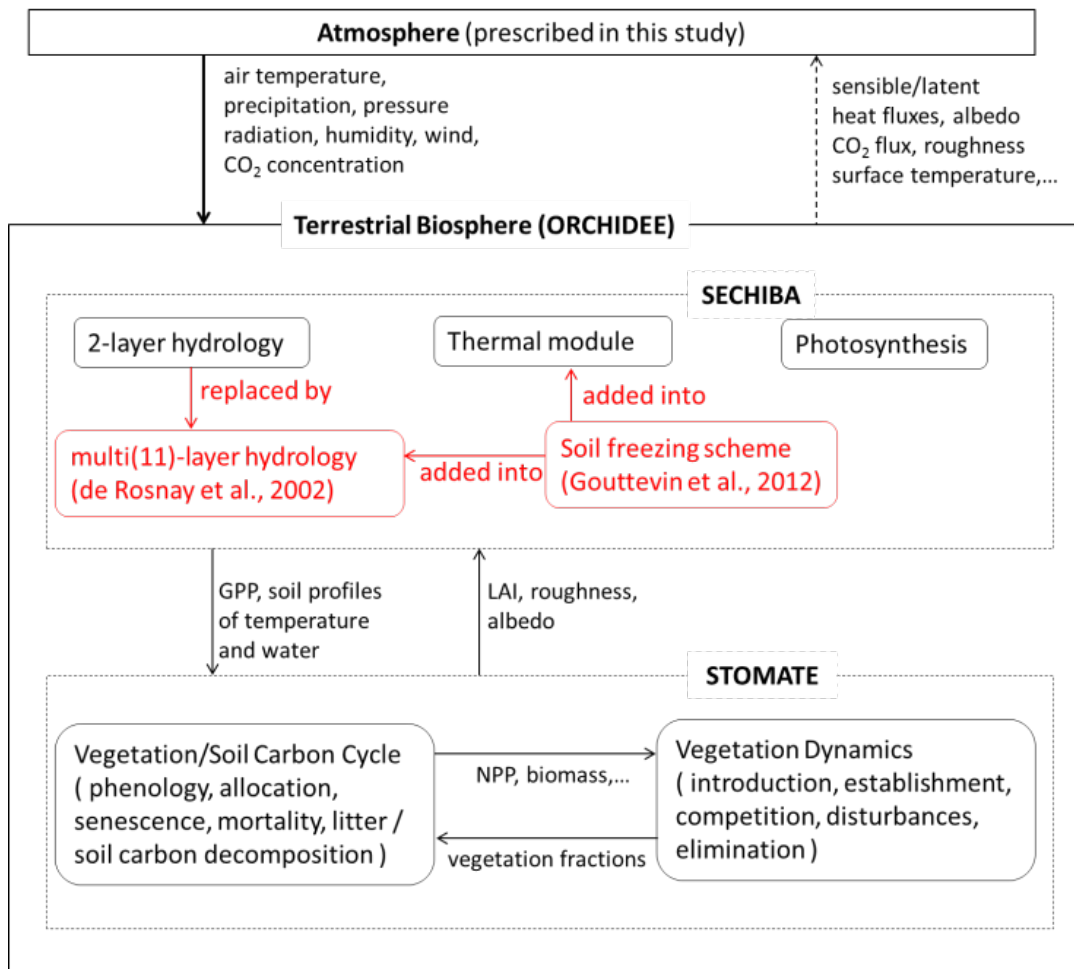Geoscientific
Model Development
Discussions

Supplement of

Improving the dynamics of northern vegetation in the ORCHIDEE ecosystem model

D. Zhu et al.

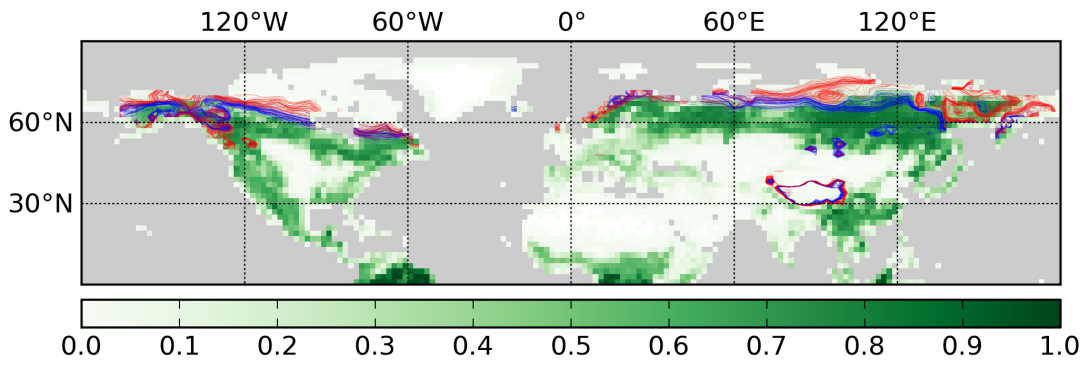*Correspondence to:* D. Zhu (dan.zhu@lsce.ipsl.fr)

1

2

3 Figure S1. Basic structure of ORCHIDEE (rev1322). The improved or new processes

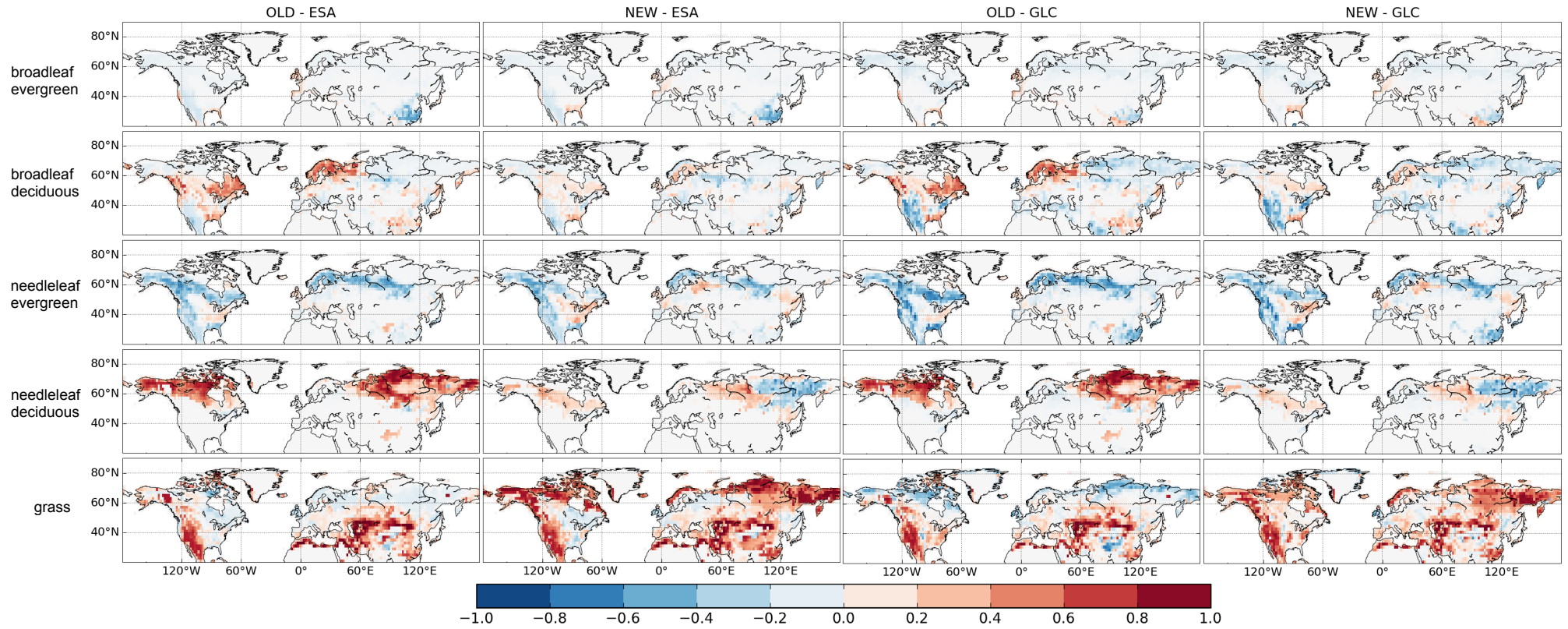4 compared with Krinner et al. (2005) are marked red.

5

6

1

2

3

4   Figure S2. T_{ws} (blue) and T_{GS} (red) isotherms of 7°C for the 50 years from 1951 to 2000,

5   representing northern treeline constraints in Krinner et al. (2005) and new parameterizations

6   (ORC-HL-NVD) respectively, on the map of tree fractions calculated from ESA land-cover
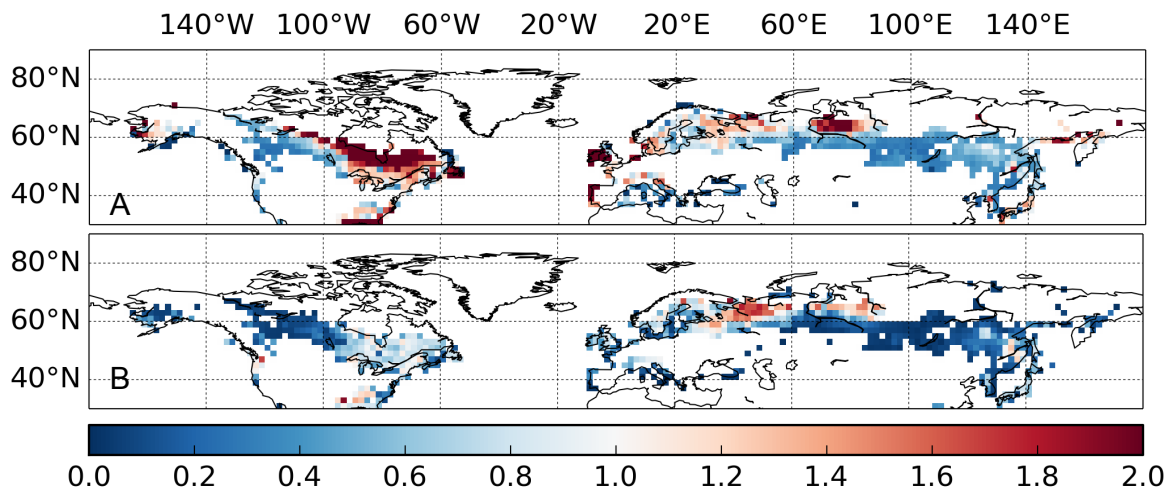
7   map.

1

2

3

Figure S3. Difference of fractional cover between model (OLD and NEW) and observation-derived PFT maps (ESA and GLC) for PFT groups including grass and four tree subtypes.

1

2

Figure S4. (A) Ratio of forest biomass from NEW to Thurner et al. (B) Ratio of forest NPP (average during 2001–2010) from NEW to MODIS NPP. Since MODIS NPP does not separate NPP by tree, grass and crop, the grid cells with > 40% of grass and crop (according to NEW result) are masked out to reduce the disparity between 'forest' NPP and 'total' NPP.

7

8