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Geoscientific Model Development

Supplement of

Ecosystem age-class dynamics and distribution in the LPJ-wsl v2.0 global ecosystem model

Leonardo Calle and Benjamin Poulter

Correspondence to: Leonardo Calle (lcalle@umd.edu)

Table S1. LPJ-wsl Plant Functional Types (PFTs) phenology parameters and bioclimatic limits. Growing Degree Day (GDD) base is the temperature at which annual GDD sums begin. GDDmin is the minimum GDD required for establishment. GDDramp is the number of days required for full leaf out. Tmin and Tmax are the minimum and maximum annual temperatures for establishment, respectively. Trangemin is the minimum annual temperature range for establishment, and only relevant for the BoNS PFT.

Code	name	Habit	GDDbase	GDDmin	GDDramp	Tmin	Tmax	Trangemin
TrBE	Tropical Broadleaf Evergreen Tree	Evergreen	0.0	0	1000	15.5	1000.0	NA
TrBR	Tropical Broadleaf Raingreen Tree	Deciduous	5.0	0	1000	15.5	1000.0	NA
TeNE	Temperate Needleleaf Evergreen	Evergreen	5.0	900	1000	-2.0	20.0	NA
TeBE	Temperate Broadleaf Evergreen	Evergreen	5.0	1200	1000	3.0	18.8	NA
TeBS	Temperate Broadleaf Summergreen	Deciduous	5.0	1200	300	-17.0	15.5	NA
BoNE	Boreal Needleleaf Evergreen	Evergreen	5.0	600	1000	-32.5	-2.0	NA
BoBS	Boreal Broadleaf Summergreen	Deciduous	5.0	350	200	-1000.0	-2.0	NA
BoNS	Boreal Needleleaf Summergreen	Deciduous	2.0	350	100	-1000.0	-2.0	43
C3GR	C3 Perennial Grass		5.0	0	100	-1000.0	15.5	NA
C4GR	C4 Perennial Grass		5.0	0	100	15.5	1000.0	NA

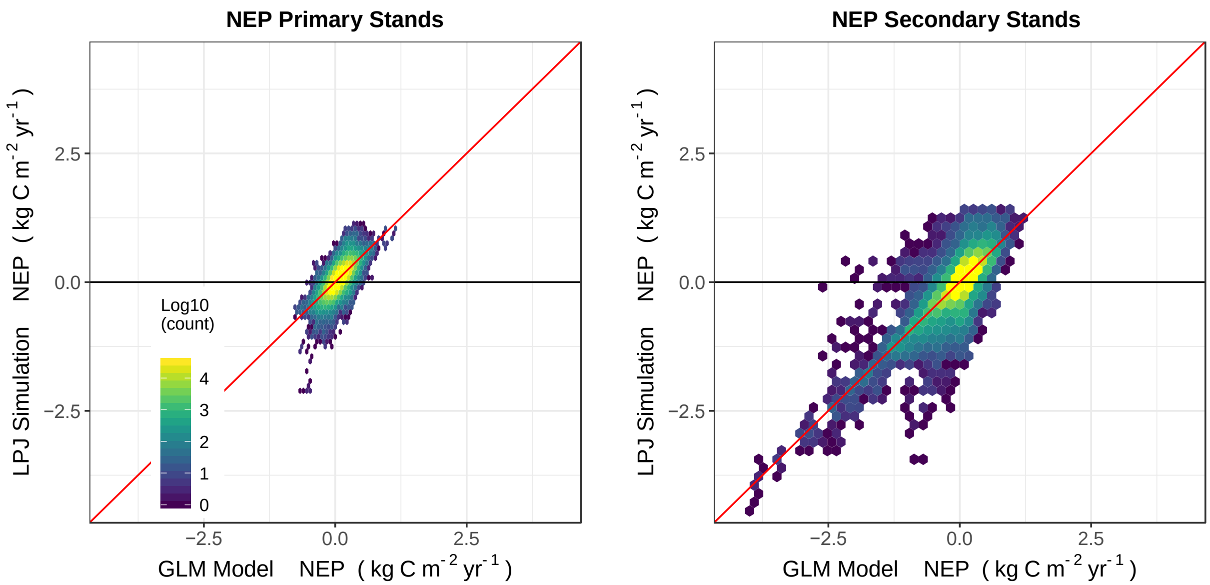

Figure S1. Annual (2000-2017) NEP fluxes from LPJ-wsl simulations versus predictions of LPJ-wsl fluxes based on a generalized linear model (flux = precipitation + temperature + age-class); coefficients were allowed to vary by grid-cell, in essence, reducing the effect of variation in plant composition, soil texture and hydrology. Coloring is by density of grid-cells on a log scale; diagonal red line is the 1:1 correspondence line. For primary stands, R^2 = 0.60, and for secondary stands, R^2 = 0.65.

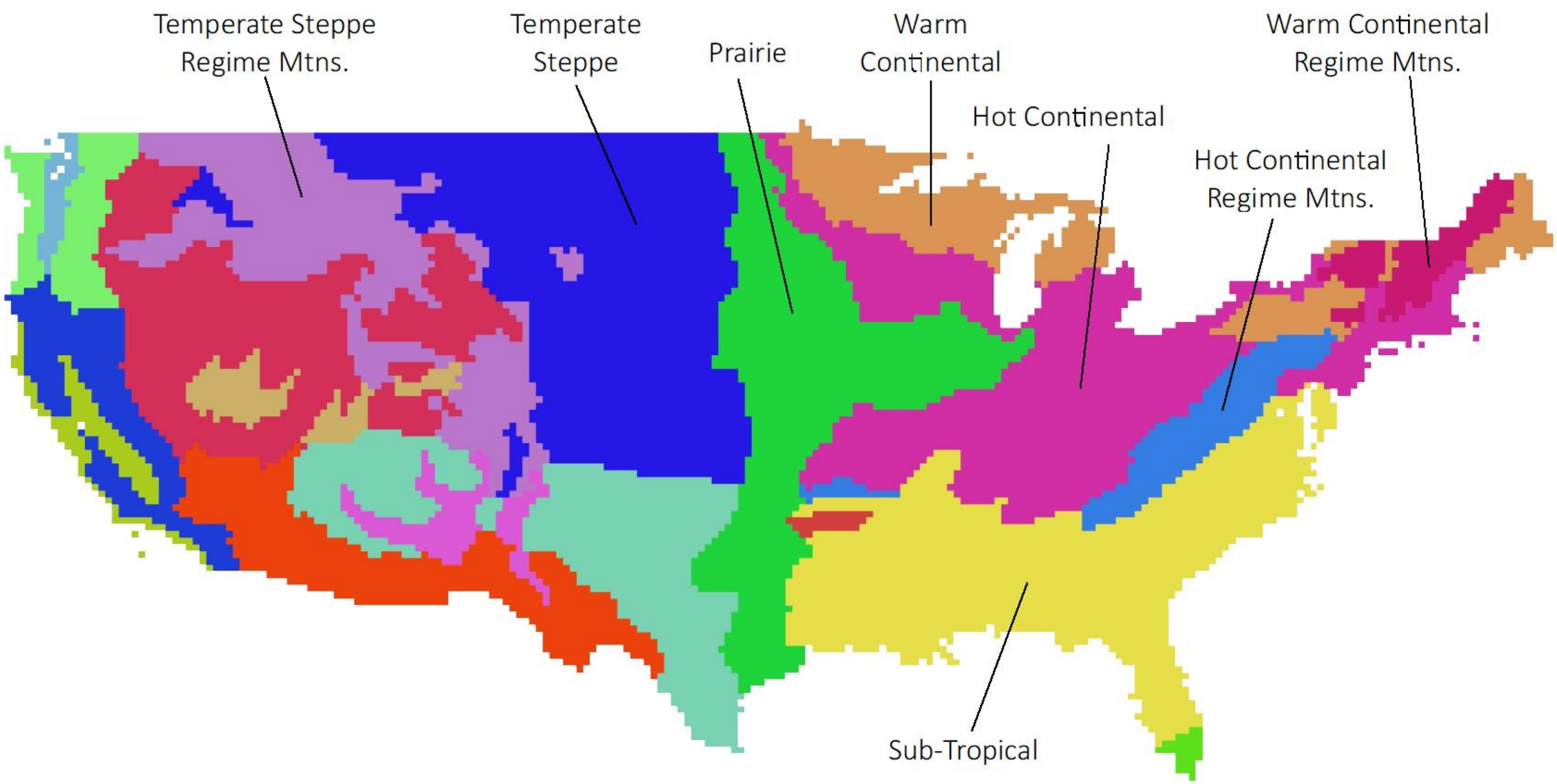

Figure S2. U.S. Forest Service Divisions used to aggregate FIA data for comparison against LPJ simulations. Divisions are delineated based on precipitation levels and patterns as well as temperature.

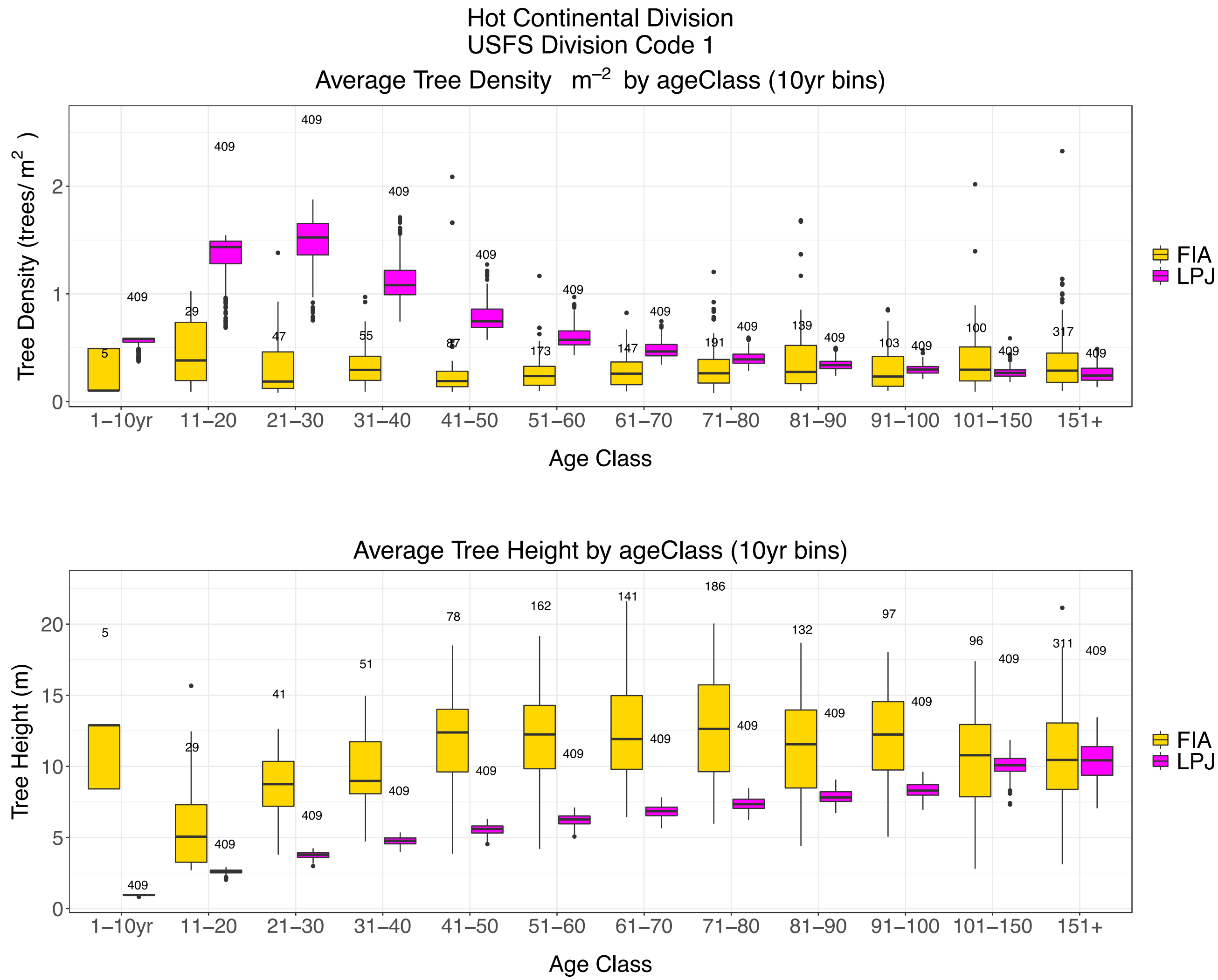

Figure S3. Average stem density (top) and tree height (bottom) by age-class for US Forest Inventory Analysis data and LPJ model simulations for the Hot Continental Division (USFS Division code 1).

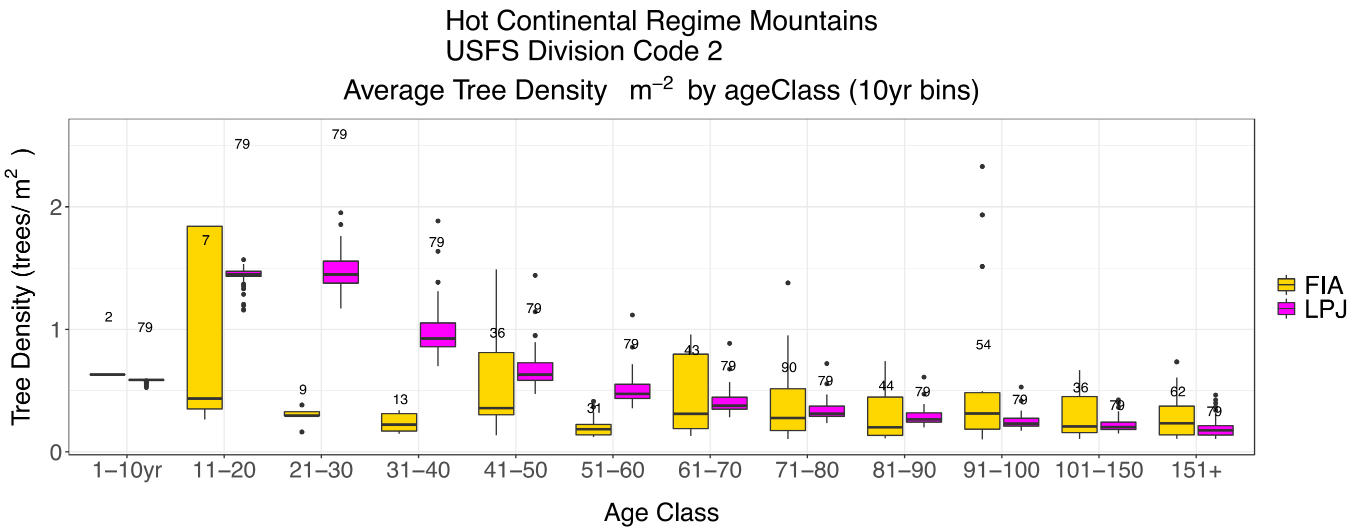

Figure S4. Average stem density (top) and tree height (bottom) by age-class for US Forest Inventory Analysis data and LPJ model simulations for the Hot Continental Regime Mountains Division (USFS Division code 2).

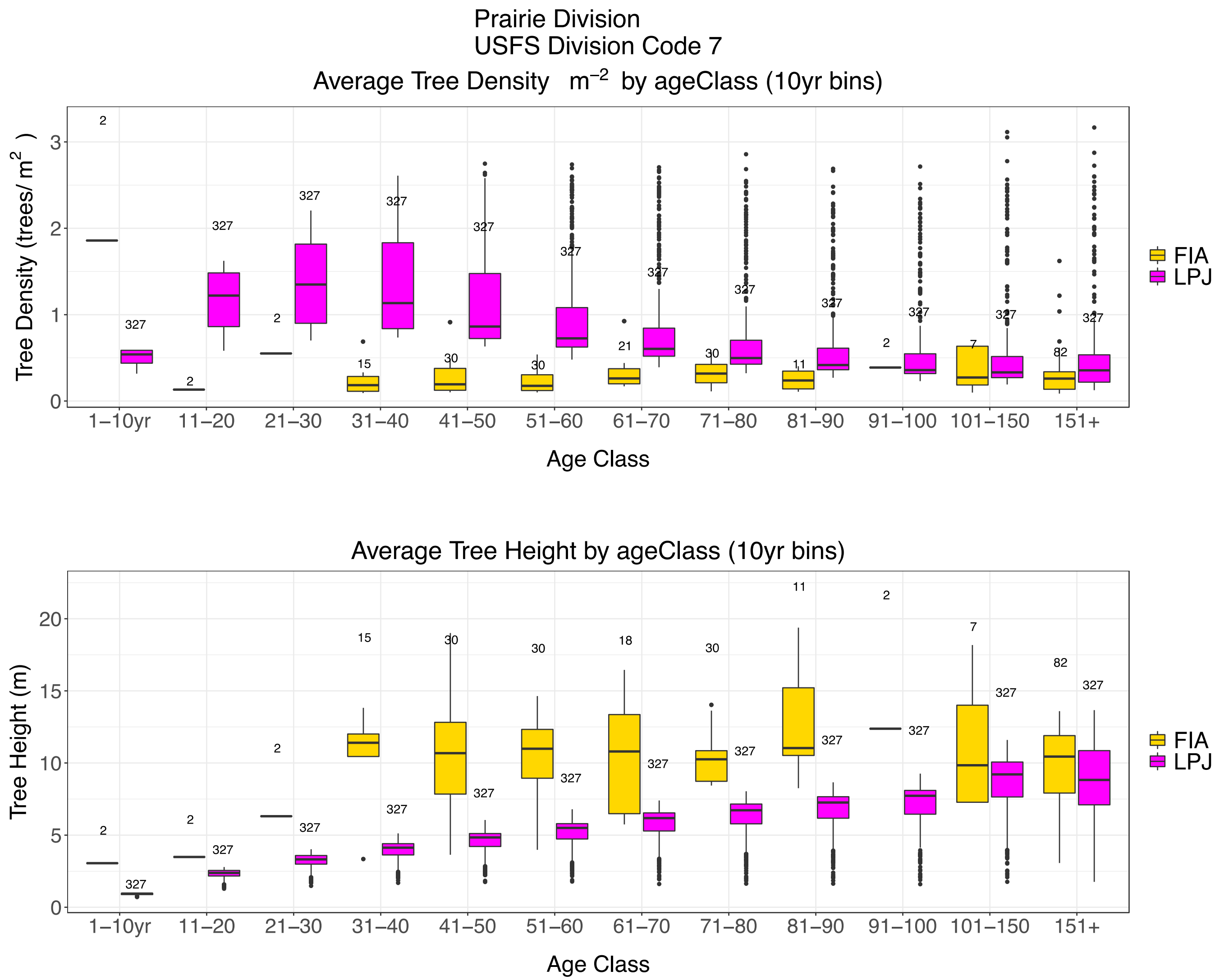

Figure S5. Average stem density (top) and tree height (bottom) by age-class for US Forest Inventory Analysis data and LPJ model simulations for the Prairie Division (USFS Division code 7).

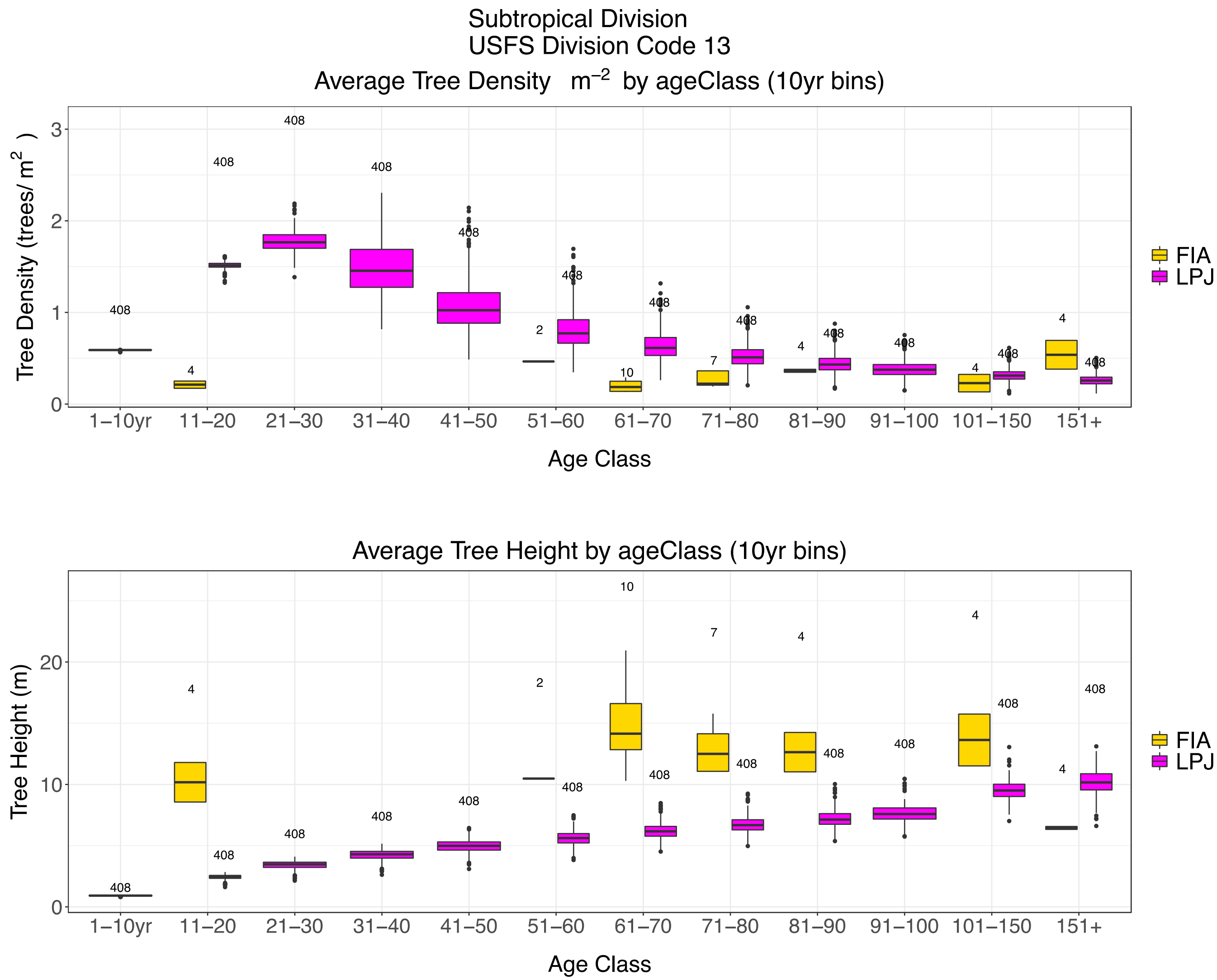

Figure S6. Average stem density (top) and tree height (bottom) by age-class for US Forest Inventory Analysis data and LPJ model simulations for the Subtropical Division (USFS Division code 13).

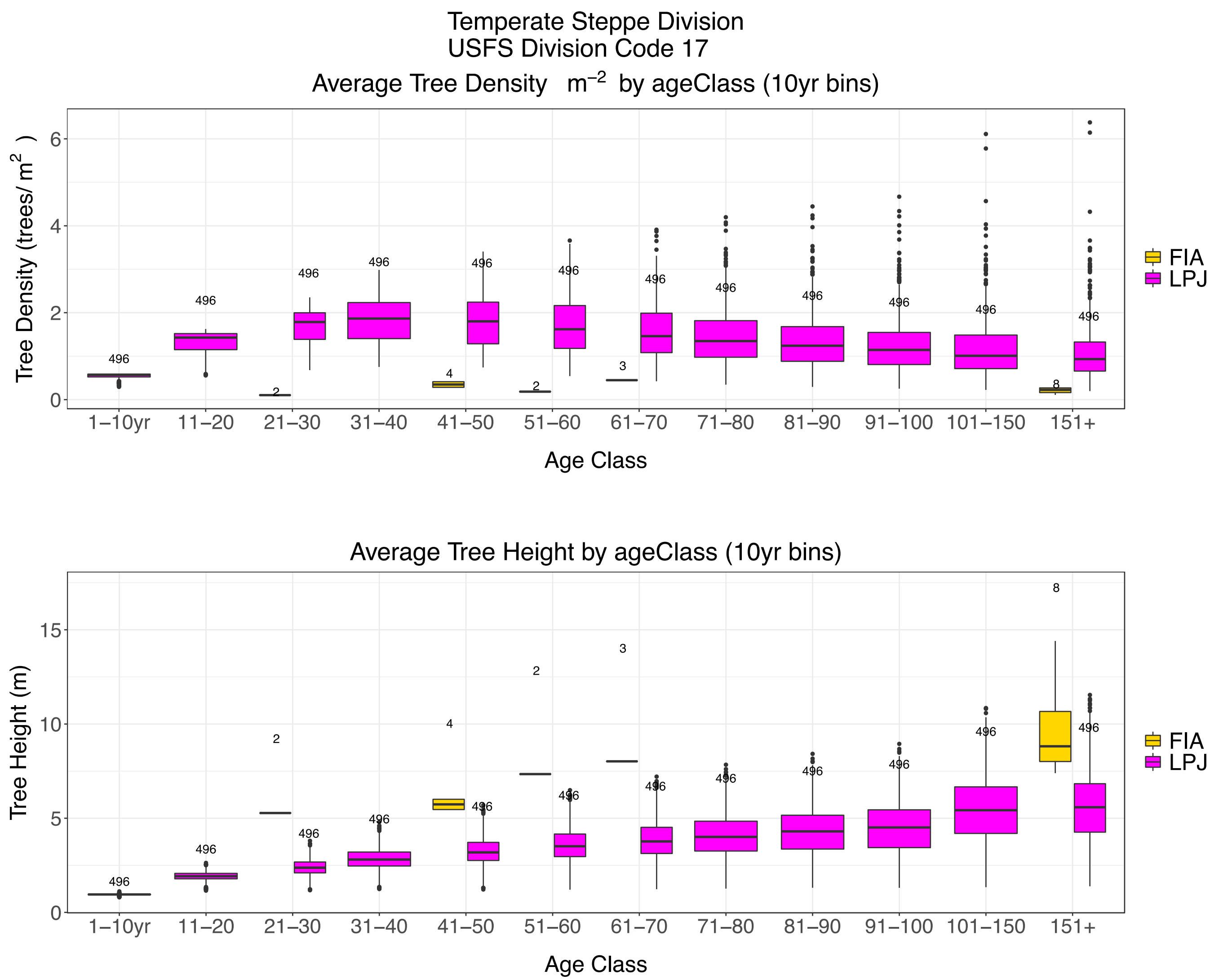

Figure S7. Average stem density (top) and tree height (bottom) by age-class for US Forest Inventory Analysis data and LPJ model simulations for the Temperate Steppe Division (USFS Division code 17).

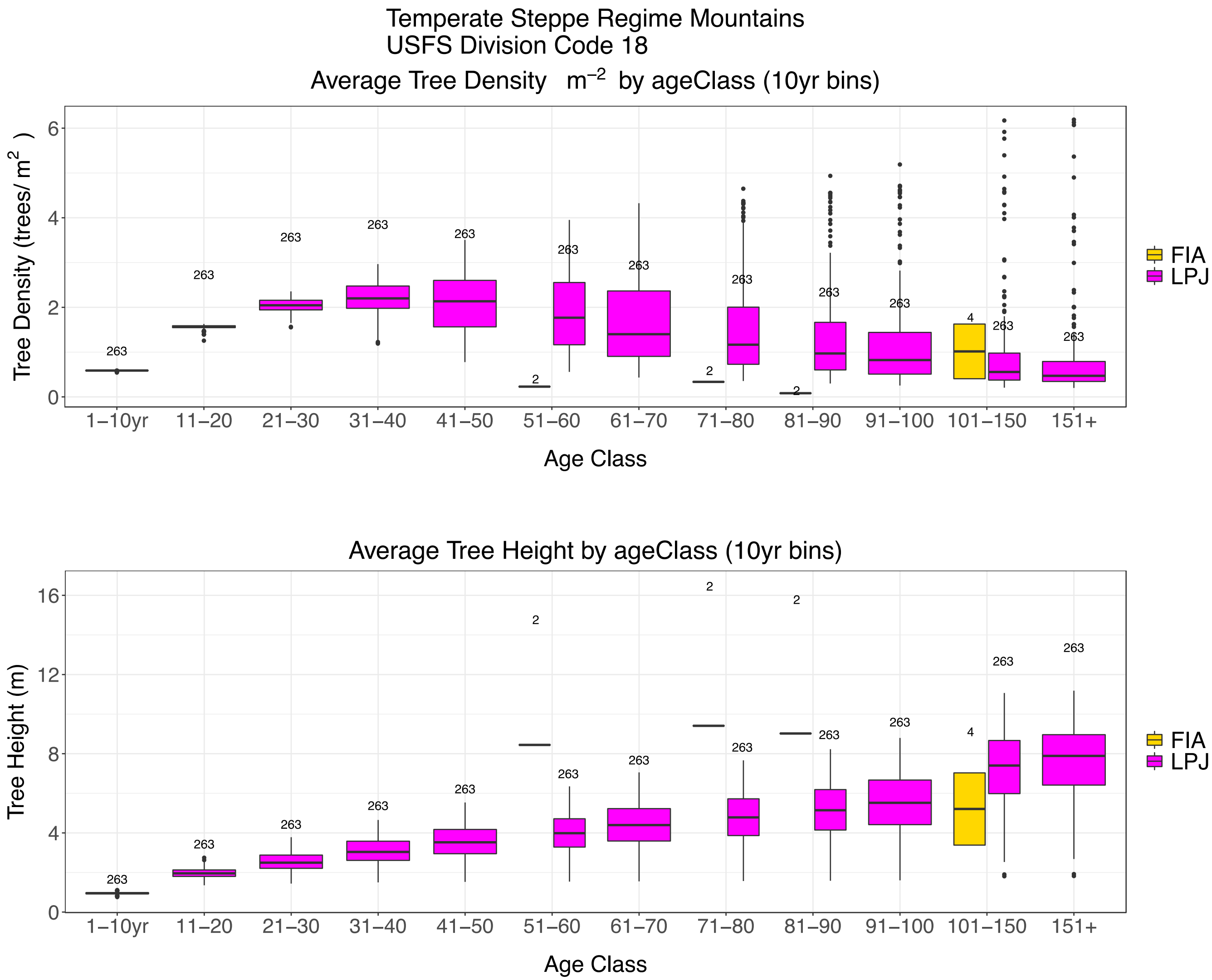

Figure S8. Average stem density (top) and tree height (bottom) by age-class for US Forest Inventory Analysis data and LPJ model simulations for the Temperate Steppe Regime Mountains Division (USFS Division code 18).

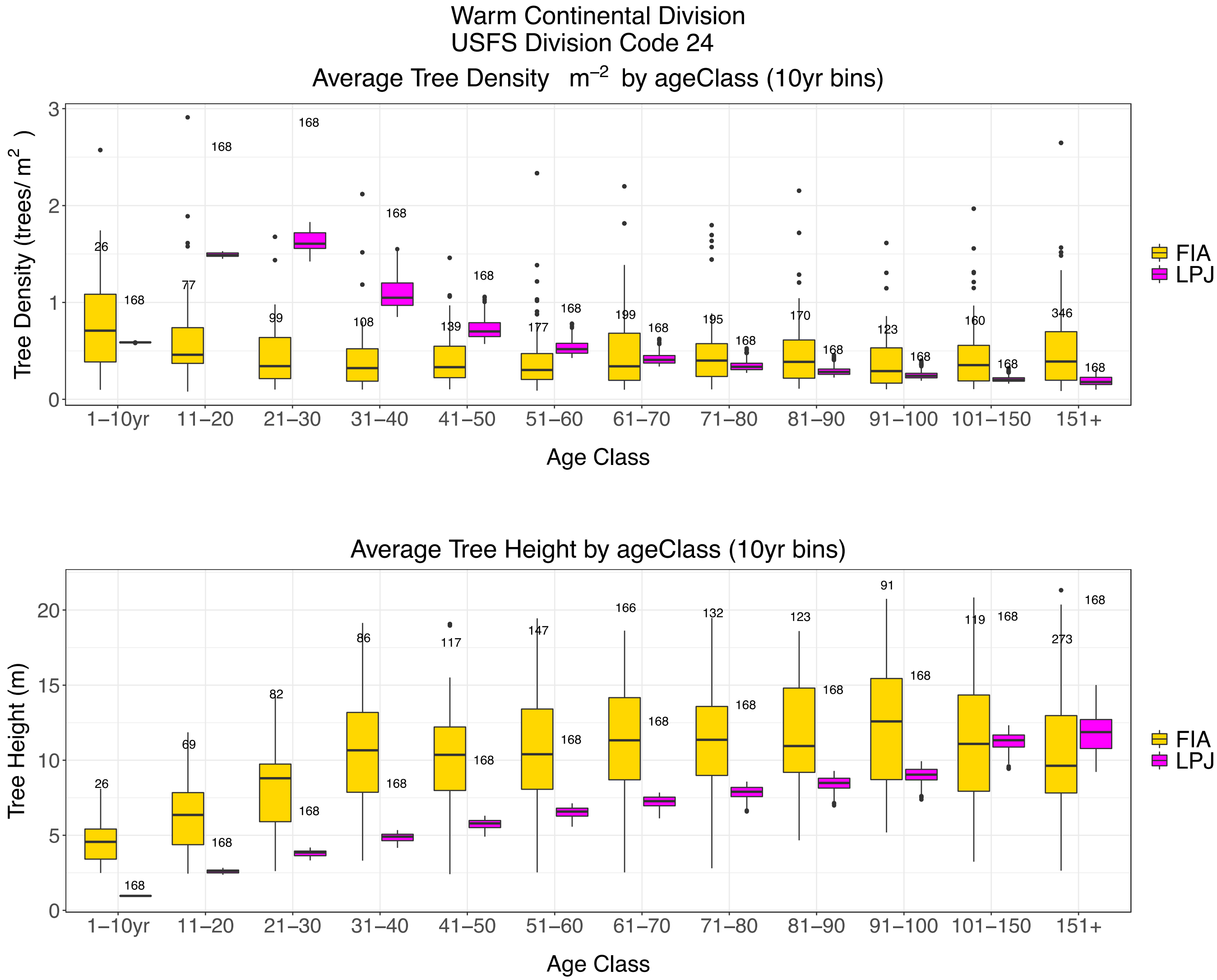

Figure S9. Average stem density (top) and tree height (bottom) by age-class for US Forest Inventory Analysis data and LPJ model simulations for the Warm Continental Division (USFS Division code 24).

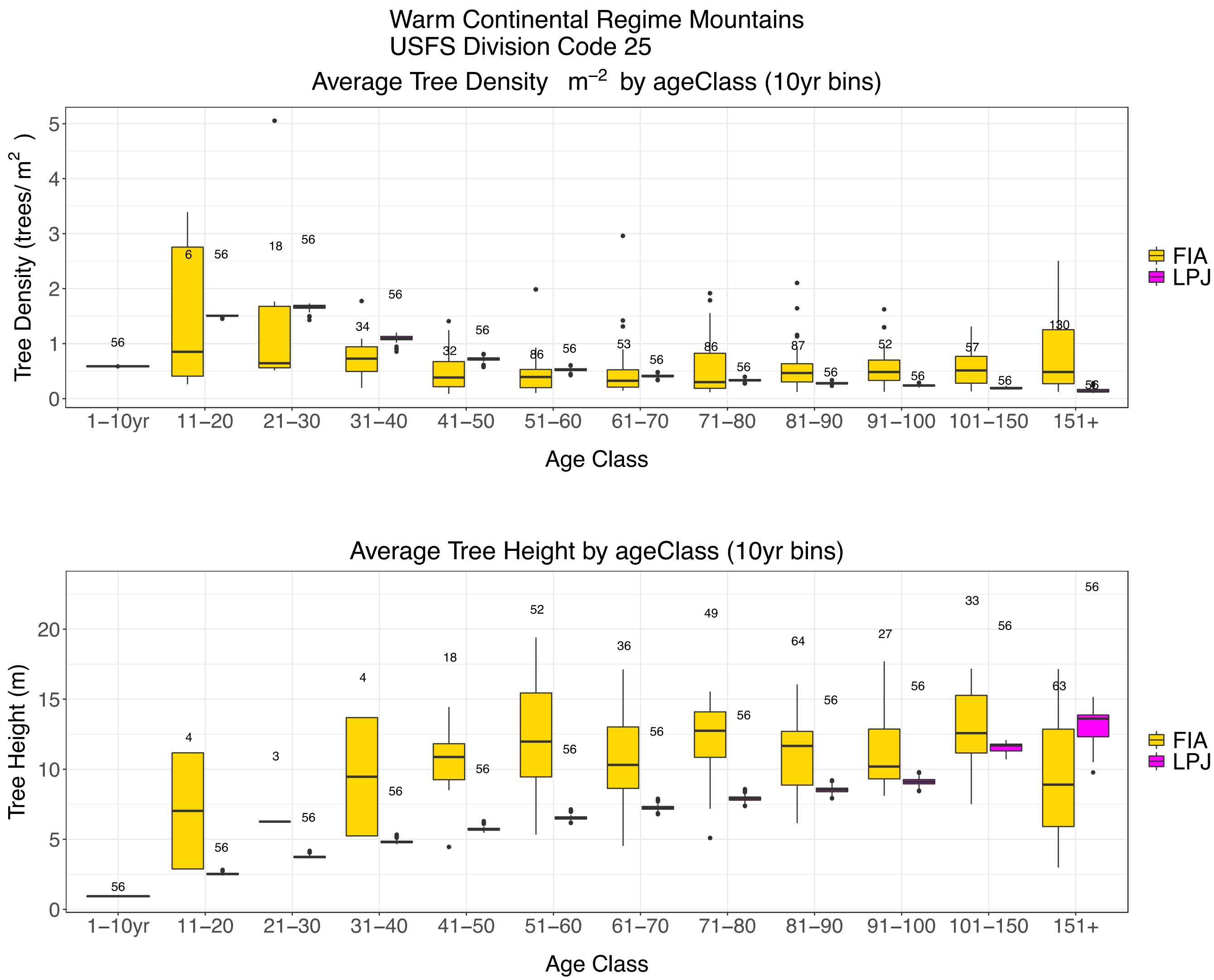

Figure S10. Average stem density (top) and tree height (bottom) by age-class for US Forest Inventory Analysis data and LPJ model simulations for the Warm Continental Regime Mountains Division (USFS Division code 25).

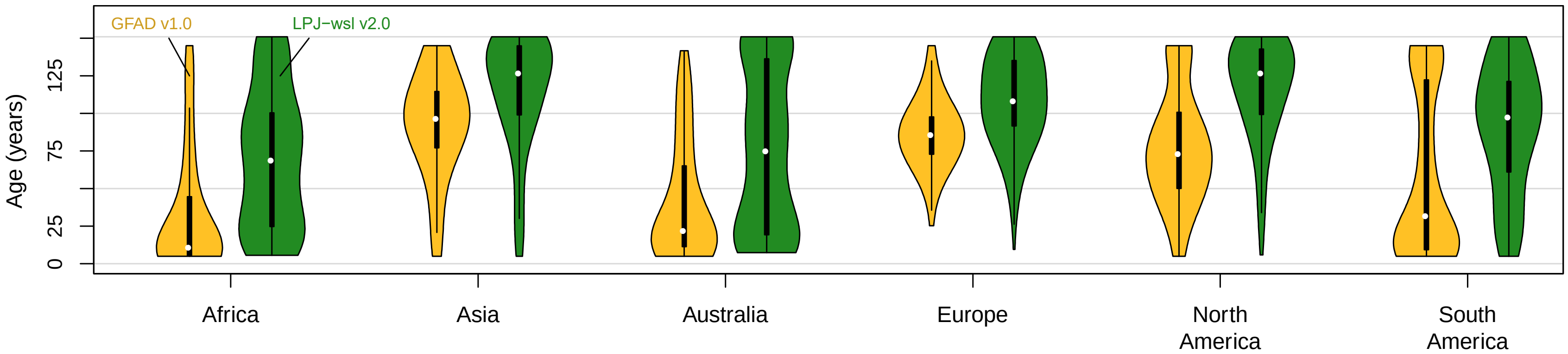

Figure S11. Stand age distribution by continent for the Global Forest Age Dataset (GFAD v1.0, Poulter et al. 2018) and LPJ-wsl v2.0.