Supplementary Text 5: Pseudo-observations with constant wood density

Pseudo-observations were obtained by setting wood density at 0.6 g cm^{-3} for all trees while keeping all other tree data to their observed values. Analyses were then made on the set of pseudo-observations.

1 CORRELATION BETWEEN BIOMASS AND BASAL AREA

Pearson's correlation coefficient between biomass and basal area for pseudo-observations was 0.93 (Figure S1A). The correlation between modeled biomass and modeled basal area according to the exponential null model fitted to pseudo-observations was 0.97 (Figure S1B). The correlation between the deviations of biomass and basal area to the predictions equaled 0.31 and was significantly different from zero (p-value < 0.001). When excluding the data from the Oyan and Ngouha2 sites, the correlation between modeled biomass and basal area was 0.96. The correlation between the deviations of biomass and basal area to the exponential model then equaled 0.52 and was significantly different from zero (p-value < 0.01).

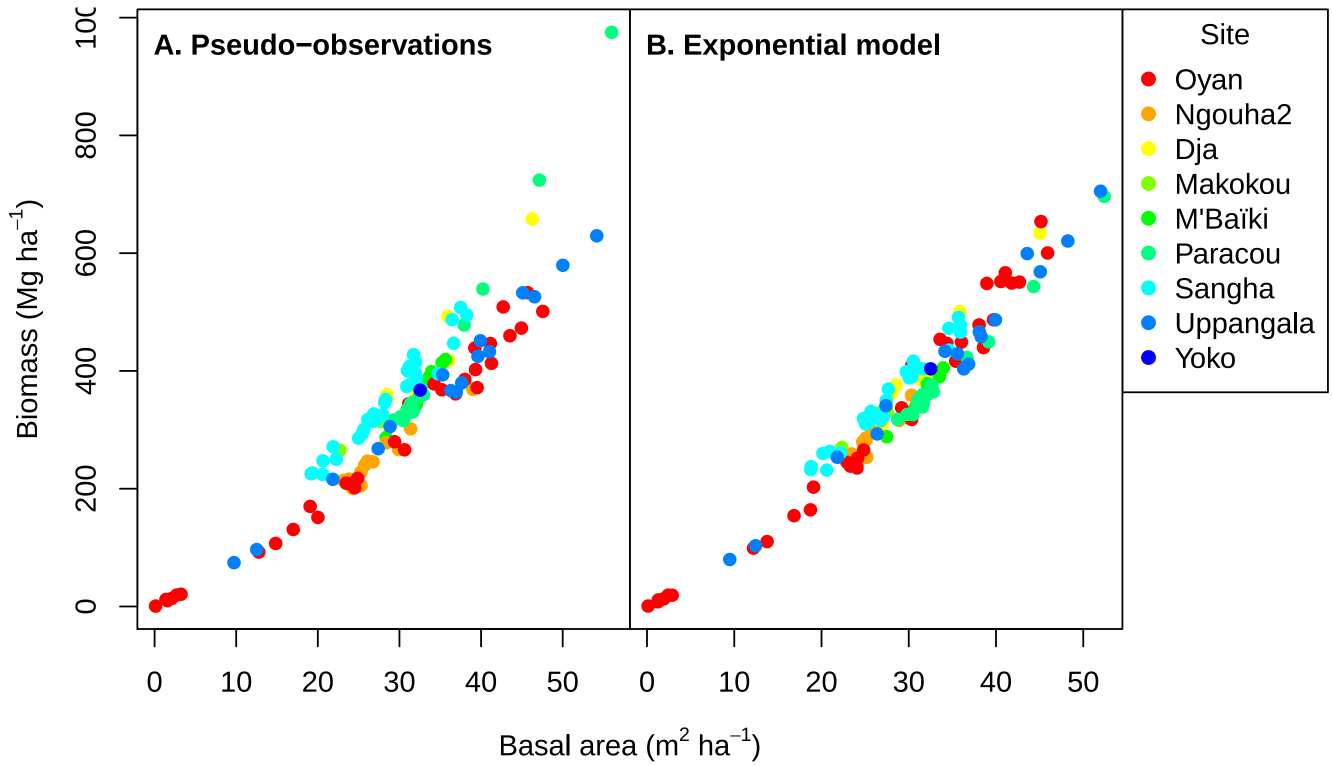

Figure S1. Aboveground biomass versus basal area for 133 forest stands at 9 sites as (A) obtained from pseudo-observations where all trees are assigned the same wood density, (B) modeled by the exponential null model fitted to these pseudo-oservations. The different colors correspond to the different sites as shown in the legend.

2 ORDINATION OF PLOTS BASED ON STRUCTURAL VARIABLES

The sum of the first two eigenvalues of the PCA was 7.6 for pseudo-observations, 8.7 for modeled data using the exponential model fitted to pseudo-observations, and 7.5 (with p-value < 0.01) for deviations to the exponential model (Figure S2).

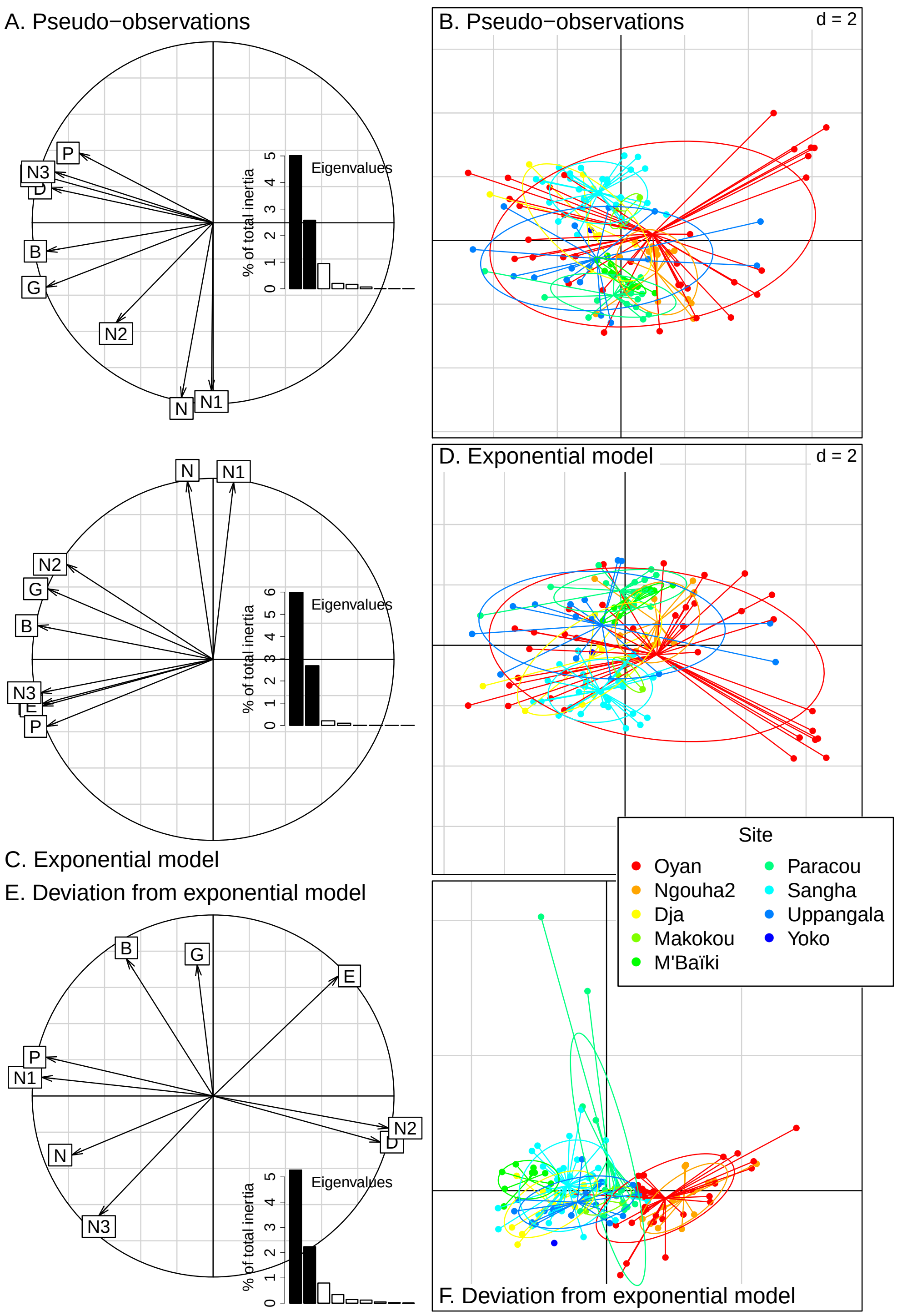

Figure S2. Principal component analysis (PCA) of pseudo-observations in 133 forest plots at 9 sites. Pseudo-observations were obtained by replacing the observed tree wood density by a constant value of 0.6 g cm^{-3}. The PCA is performed either on pseudo-observations (A, B), on the modeled data using the exponential model (C, D), or on the deviations to the predictions of the model (E, F). (A, C, E): correlation circle between the first two axes of the PCA and structural characteristics (N = density of trees, G = basal area, D = mean diameter, E = equivalent diameter, N_1 = density of trees with dbh < 30 cm, N_2 = density of trees with dbh in the range 30-60 cm, N_3 = density of trees with dbh ≥ 60, B = aboveground biomass, and P = proportion of biomass represented by trees with dbh ≥ 60 cm). The insets show the eigenvalues of the PCA. (B, D, F): projection of the forest plots on the first two axes of the PCA. Each dot corresponds to a plot with the color indicating the site. Lines and ellipses highlight the dispersion of the plots of each site.