Supplementary Information

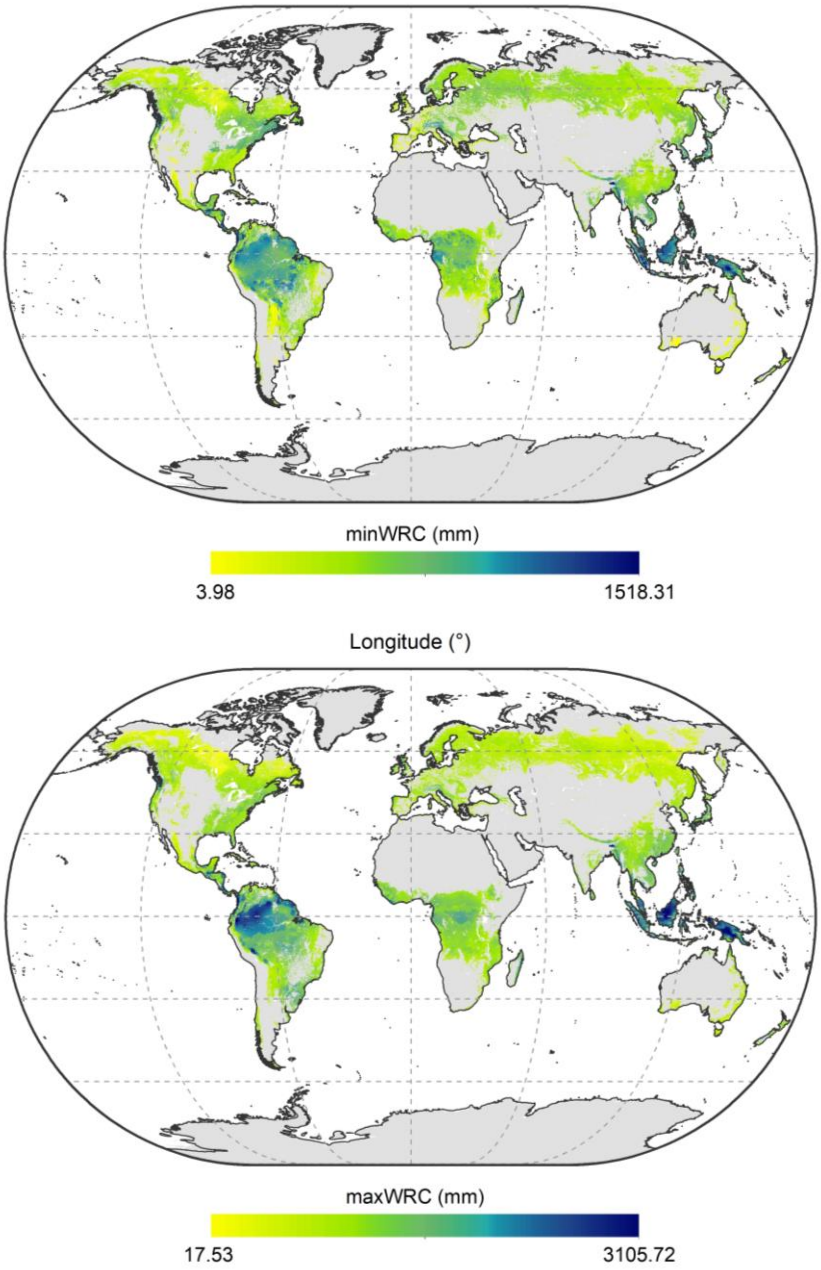
Global water retention in forest canopy, litter, and soil layers and its controlling factors

Includes:

Supplementary Figures 1-9

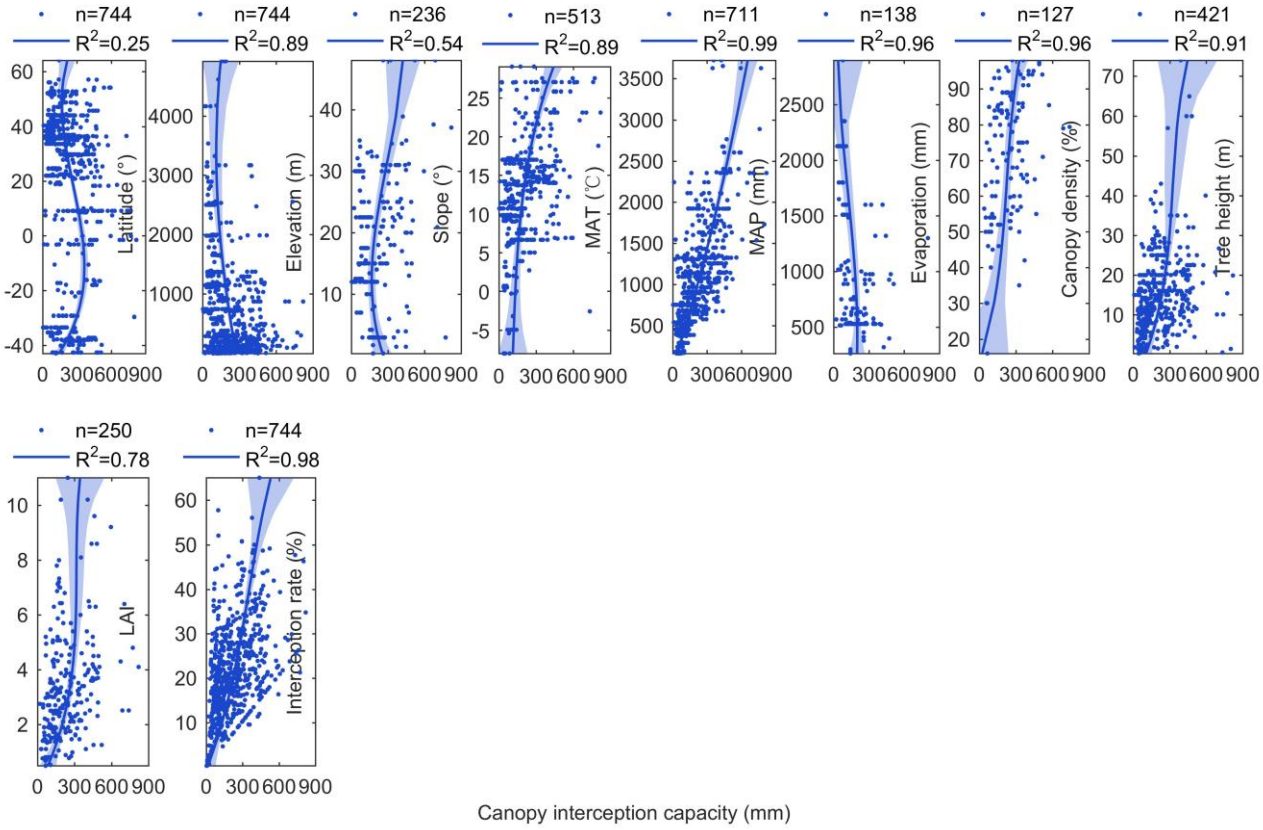
Supplementary Table 1

Supplementary Figure 1



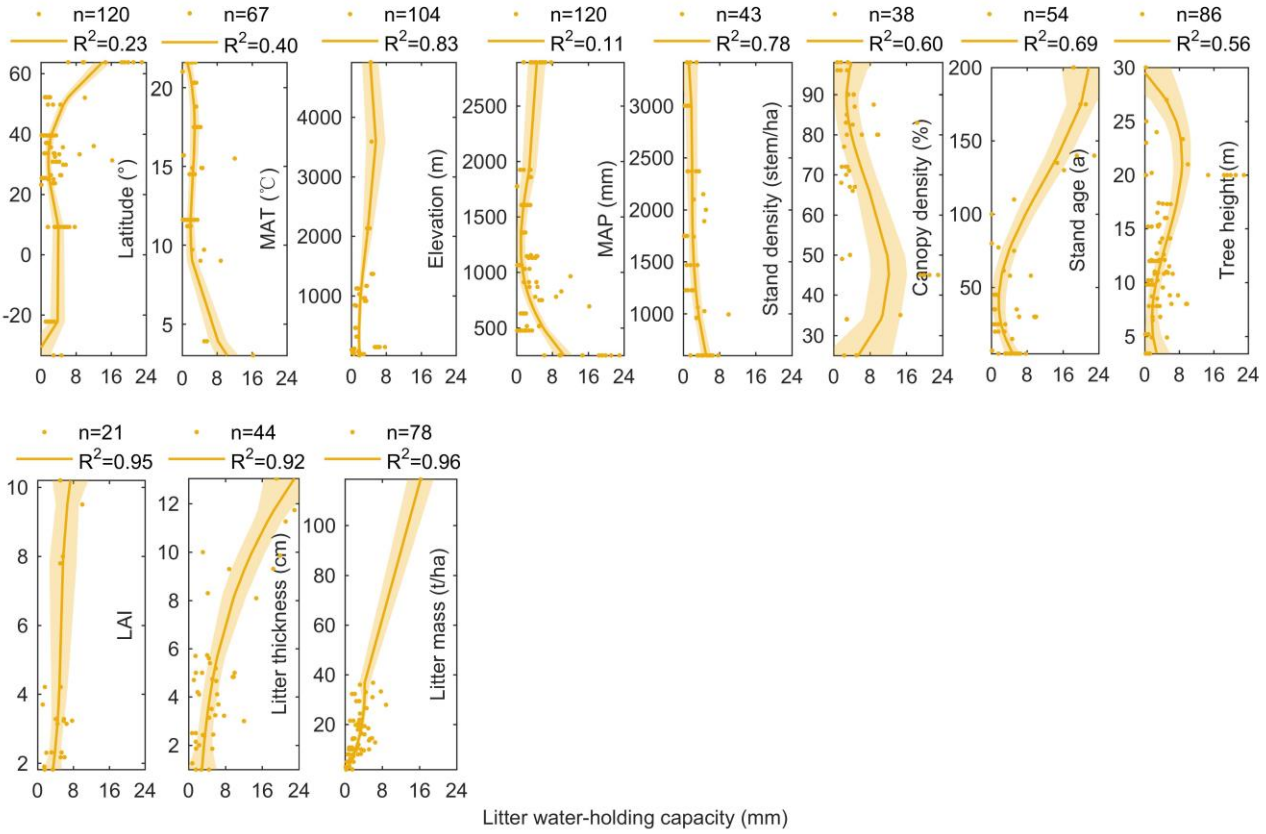
Supplementary Figure 1. Uncertainty in the global WRC distribution.

Supplementary Figure 2



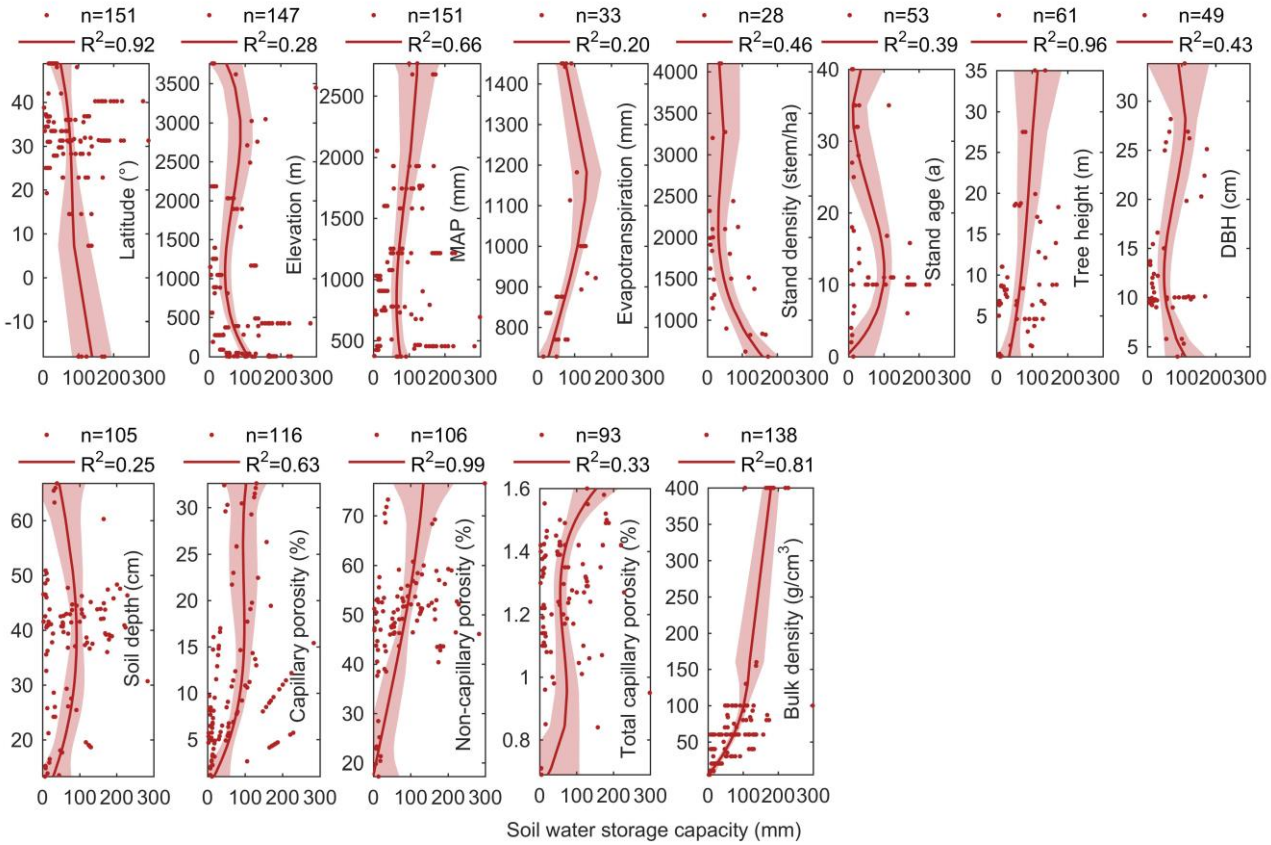
Supplementary Figure 2. Fitting curves between canopy interception capacity (CIC) and various factors. Shaded bands are 95% confidence intervals.

Supplementary Figure 3



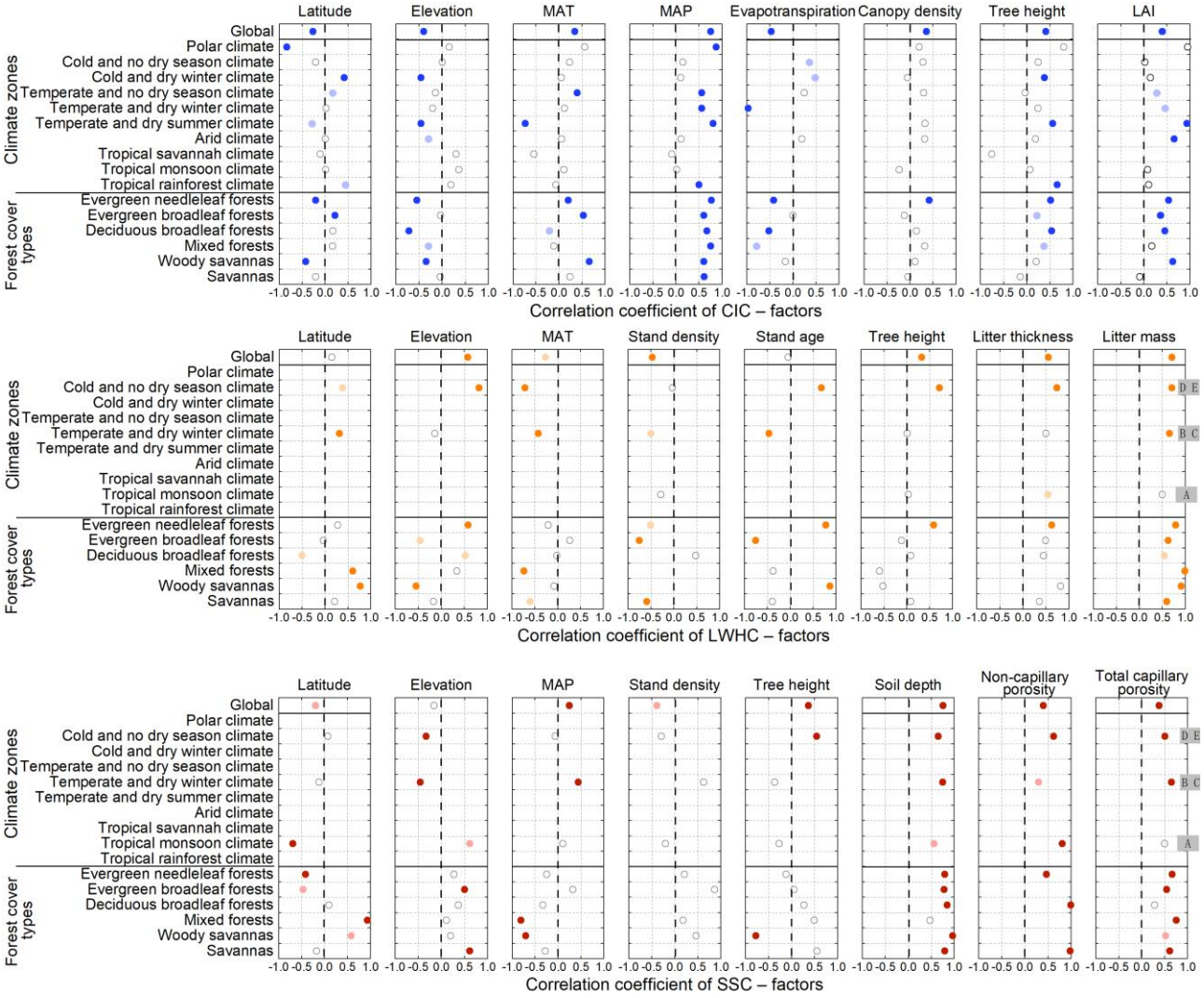
Supplementary Figure 3. Fitting curves between litter water-holding capacity (LWHC) and various factors. Shaded bands are 95% confidence intervals.

Supplementary Figure 4



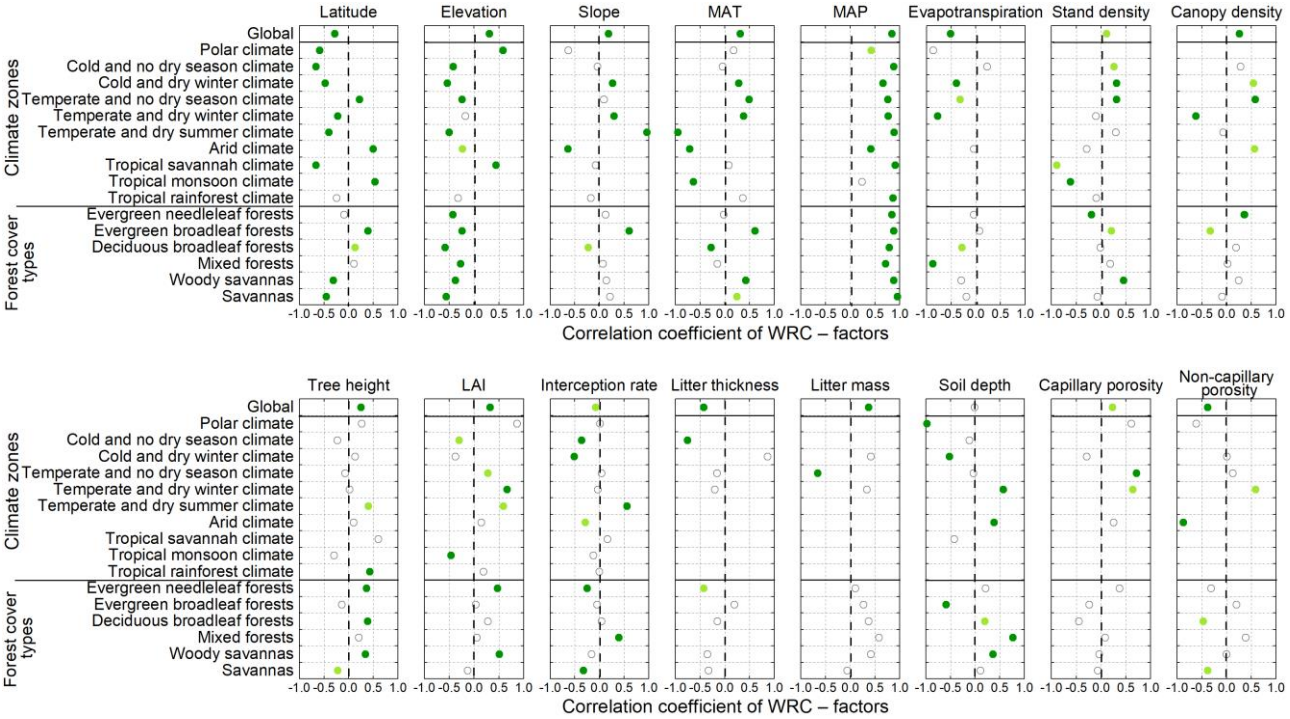
Supplementary Figure 4. Fitting curves between soil water storage capacity (SSC) and various factors. Shaded bands are 95% confidence intervals.

Supplementary Figure 5



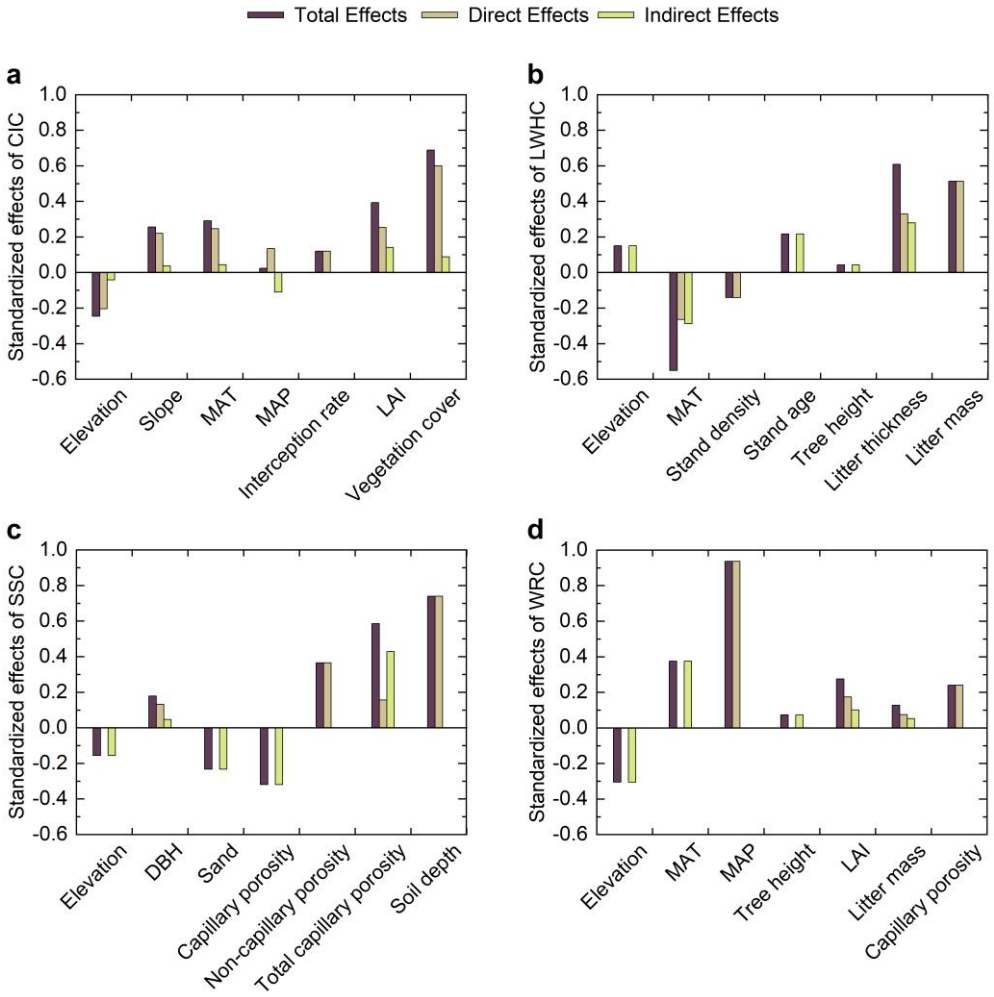
Supplementary Figure 5. Correlations between canopy interception capacity (CIC), litter water-holding capacity (LWHC), soil water storage capacity (SSC), and various factors in different climate zones and forest cover types. The dark dots indicate a significant correlation at $P < 0.01$, the light dots indicate a significant correlation at $P < 0.05$, and hollow circles indicate no significant correlation. Due to the lack of data for the litter and soil layers, climate zones are combined into tropical (A), arid and temperate (BC), and cold and polar (DE) climate zones on the right side.

Supplementary Figure 6



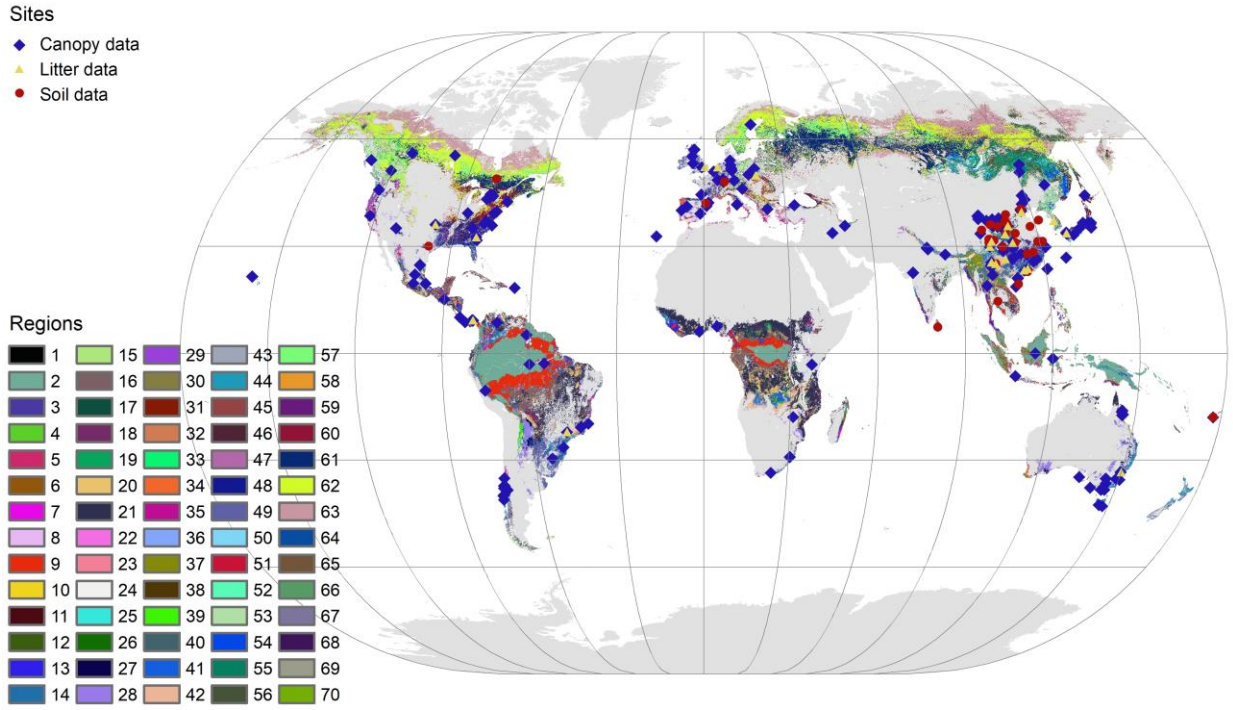
Supplementary Figure 6. Correlations between forest water retention capacity (WRC) and various factors in different climate zones and forest cover types. The dark green dots indicate a significant correlation at $P < 0.01$, light green dots indicate a significant correlation at $P < 0.05$, and white hollow circles indicate no significant correlation.

Supplementary Figure 7



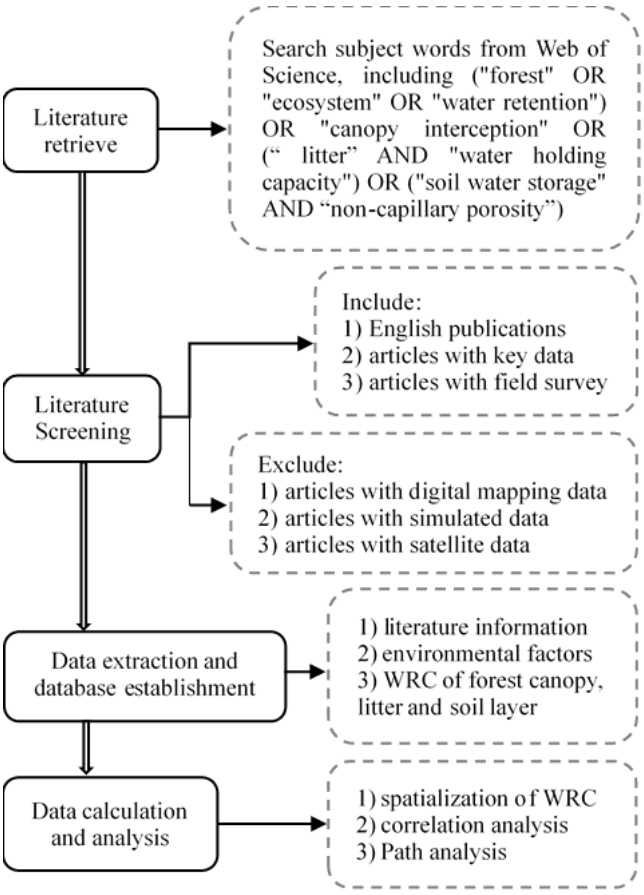
Supplementary Figure 7. Standardized effects based on the structural equation modeling (SEM) of the **a** forest canopy layer, **b** forest litter layer, **c** forest soil layer, and **d** all three layers.

Supplementary Figure 8



Supplementary Figure 8. According to the climate zones and forest cover types, 70 regions were identified for the spatial analysis of water retention.

Supplementary Figure 9



Supplementary Figure 9. Meta-analysis process used to select and analyze literature data.

Supplementary Table 1. Water retention in Malaysia, Amazon, and Zaire basins.

Statistical areas	Min WRC (mm)	Max WRC (mm)	Mean WRC (mm)	Area (10^4 km^2)	Forest Water storage (km^3)
Intact forest areas in Malaysia, Amazon, and Zaire basins (proportion)	176.81	1657.31	670.24	512.20 (11.08)	3433.00 (16.26)
All forested areas	42.15	2104.40	456.71	4622.01	21109.20