Figure 1. Map of sites included in this analysis. Symbols are colored according to the number of records at each site. Underlying map shows coverage of evergreen, deciduous, and mixed forests (from SYNMAP; Jung et al. 2006) and biomes. Distribution of sites, plots, and records among biomes is shown in the inset.

Figure 2. C cycle diagram for mature tropical broadleaf forests. Arrows indicate fluxes (Mg C ha yr); boxes indicate stocks (Mg C ha), with variables as defined in Table 1. Presented are mean ± std, where geographically distinct areas are treated as the unit of replication. Dashed shape outlines indicate variables with records from <7 distinct geographic areas, and dashed arrows indicate fluxes with no data. To illustrate the magnitude of different fluxes, arrow size is proportional to the square root of corresponding flux. Asterisk after variable name indicates lack of C cycle closure.

Figure 3. C cycle diagram for mature temperate broadleaf forests. Arrows indicate fluxes (Mg C ha yr); boxes indicate stocks (Mg C ha), with variables as defined in Table 1. Presented are mean ± std, where geographically distinct areas are treated as the unit of replication. Dashed shape outlines indicate variables with records from <7 distinct geographic areas, and dashed arrows indicate fluxes with no data. To illustrate the magnitude of different fluxes, arrow size is proportional to the square root of corresponding flux. Asterisk after variable name indicates lack of C cycle closure.

Figure 4. C cycle diagram for mature temperate conifer forests. Arrows indicate fluxes (Mg C ha yr); boxes indicate stocks (Mg C ha), with variables as defined in Table 1. Presented are mean ± std, where geographically distinct areas are treated as the unit of replication. Dashed shape outlines indicate variables with records from <7 distinct geographic areas, and dashed arrows indicate fluxes with no data. To illustrate the magnitude of different fluxes, arrow size is proportional to the square root of corresponding flux. Asterisk after variable name indicates lack of C cycle closure.

Figure 5. C cycle diagram for mature boreal conifer forests. Arrows indicate fluxes (Mg C ha yr); boxes indicate stocks (Mg C ha), with variables as defined in Table 1. Presented are mean ± std, where geographically distinct areas are treated as the unit of replication. Dashed shape outlines indicate variables with records from <7 distinct geographic areas, and dashed arrows indicate fluxes with no data. To illustrate the magnitude of different fluxes, arrow size is proportional to the square root of corresponding flux. Asterisk after variable name indicates lack of C cycle closure.

Figure 6. Age trends and biome differences in some of the major C fluxes: (a) , (b) , (c) , (d) , (e) , and (f) . Map shows data sources ( and indicate young and mature stands, respectively). In each panel, the left scatterplot shows age trends in forests up to 100 years old, as characterized by a linear mixed effects model with fixed effects of age and biome. The fitted line indicates the effect of age on flux (solid lines: significant at p<0.05, dashed lines: non-significant), and non-parallel lines indicate a significant age x biome interaction. The boxplot illustrates distribution across mature forests, with different letters indicating significant differences between biomes. Data from biomes that did not meet the sample size criteria (see Methods) are plotted, but lack regression lines (young forests) or test of differences across biomes (mature forests). Individual figures for each flux with sufficient data are given in the Supplement (Figs. S1-S15).

Figure 7. Age trends and biome differences in some of the major forest C stocks: (a) aboveground biomass, (b) foliage, (c) fine roots, (d) dead wood. Map shows data sources ( and indicate young and mature stands, respectively). In each panel, the left scatterplot shows age trends in forests up to 100 years old, as characterized by a linear mixed effects model with fixed effects of age and biome. The fitted line indicates the effect of age on flux (solid lines: significant at p<0.05, dashed lines: non-significant), and non-parallel lines indicate a significant age x biome interaction. The boxplot illustrates distribution across mature forests, with different letters indicating signifant differences between biomes. Data from biomes that did not meet the sample size criteria (see Methods) are plotted, but lack regression lines (young forests) or test of differences across biomes (mature forests). Individual figures for each stock with sufficient data are given in the Supplement (Figs. S16-S26).

Figure 8. C cycle diagram for young tropical broadleaf forests. Arrows indicate fluxes (Mg C ha yr); boxes indicate stocks (Mg C ha), with variables as defined in Table 1. Presented are observed ranges, where geographically distinct areas are treated as the unit of replication. All units are Mg C ha yr (fluxes) or Mg C ha (stocks). Dashed shape outlines indicate variables with records from <7 distinct geographic areas, and dashed arrows indicate fluxes with no data. To illustrate the magnitude of different fluxes, arrow size is proportional to the square root of corresponding flux.

Figure 9. C cycle diagram for young temperate broadleaf forests. Arrows indicate fluxes (Mg C ha yr); boxes indicate stocks (Mg C ha), with variables as defined in Table 1. Presented are observed ranges, where geographically distinct areas are treated as the unit of replication. All units are Mg C ha yr (fluxes) or Mg C ha (stocks). Dashed shape outlines indicate variables with records from <7 distinct geographic areas, and dashed arrows indicate fluxes with no data. To illustrate the magnitude of different fluxes, arrow size is proportional to the square root of corresponding flux.

Figure 10. C cycle diagram for young temperate conifer forests. Arrows indicate fluxes (Mg C ha yr); boxes indicate stocks (Mg C ha), with variables as defined in Table 1. Presented are observed ranges, where geographically distinct areas are treated as the unit of replication. All units are Mg C ha yr (fluxes) or Mg C ha (stocks). Dashed shape outlines indicate variables with records from <7 distinct geographic areas, and dashed arrows indicate fluxes with no data. To illustrate the magnitude of different fluxes, arrow size is proportional to the square root of corresponding flux.

Figure 11. C cycle diagram for young boreal conifer forests. Arrows indicate fluxes (Mg C ha yr); boxes indicate stocks (Mg C ha), with variables as defined in Table 1. Presented are observed ranges, where geographically distinct areas are treated as the unit of replication. All units are Mg C ha yr (fluxes) or Mg C ha (stocks). Dashed shape outlines indicate variables with records from <7 distinct geographic areas, and dashed arrows indicate fluxes with no data. To illustrate the magnitude of different fluxes, arrow size is proportional to the square root of corresponding flux.