



## **On the controlling factors of inter-annual variability of ecosystem photosynthetic capacity in forest ecosystems at global scale**

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Gross primary productivity, GPP, the total uptake of carbon dioxide ( $\text{CO}_2$ ) by ecosystems via photosynthesis, is the largest flux in the global carbon cycle. The photosynthetic capacity is a fundamental functional property of an ecosystem and its interannual variability (IAV) is propagated to the net ecosystem exchange of  $\text{CO}_2$ . Understanding the causes of the year-to-year variations in ecosystem-atmosphere  $\text{CO}_2$  fluxes is important to improve our understanding of the global carbon cycle and its resilience to climate variability. In an earlier study, we tested the potential of multiple drivers to explain the magnitude of the maximum photosynthetic capacity and its IAV at 50 forest sites belonging to FLUXNET network. We found that, regardless of forest type, the IAV of photosynthetic capacity is controlled by climate but its magnitude depends on the forest structure: lower IAV in older and more diverse forests. In this contribution, we made use of global empirically up-scaled products of half hourly GPP, forest age, and species richness indicators. Based on these data we test the validity of our previous findings at global level. We will discuss the relationship between photosynthetic capacity at the global scale to both biotic and abiotic drivers. Finally, we also discuss advantage and limitations in the current estimates of photosynthetic capacity products and introduce alternative estimates based on satellite data for the extraction of ecosystem functional properties.