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Supplement of

Global vegetation variability and its response to elevated CO_2, global warming, and climate variability – a study using the offline SSiB4/TRIFFID model and satellite data

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GPP calculation in SSiB4/TRIFFID

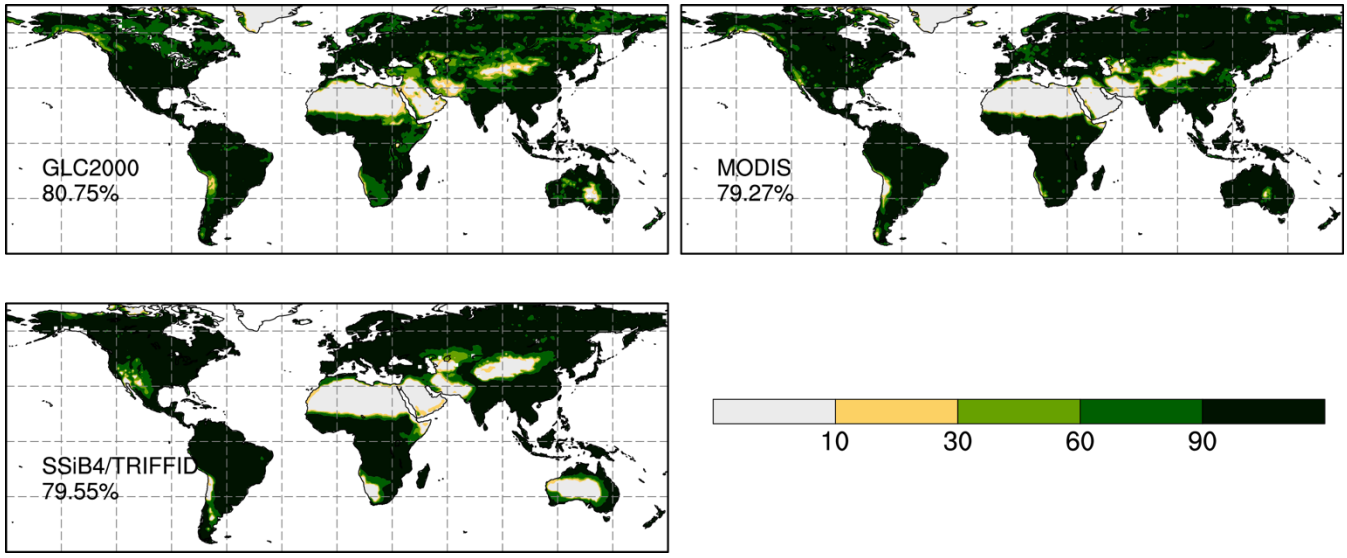
SSiB uses Collatz et al model to calculate photosynthesis process (Zhan et al, 2003) which is given the following equations:

$$A_n = \frac{g_b}{1.4}\frac{C_a - C_s}{p}$$

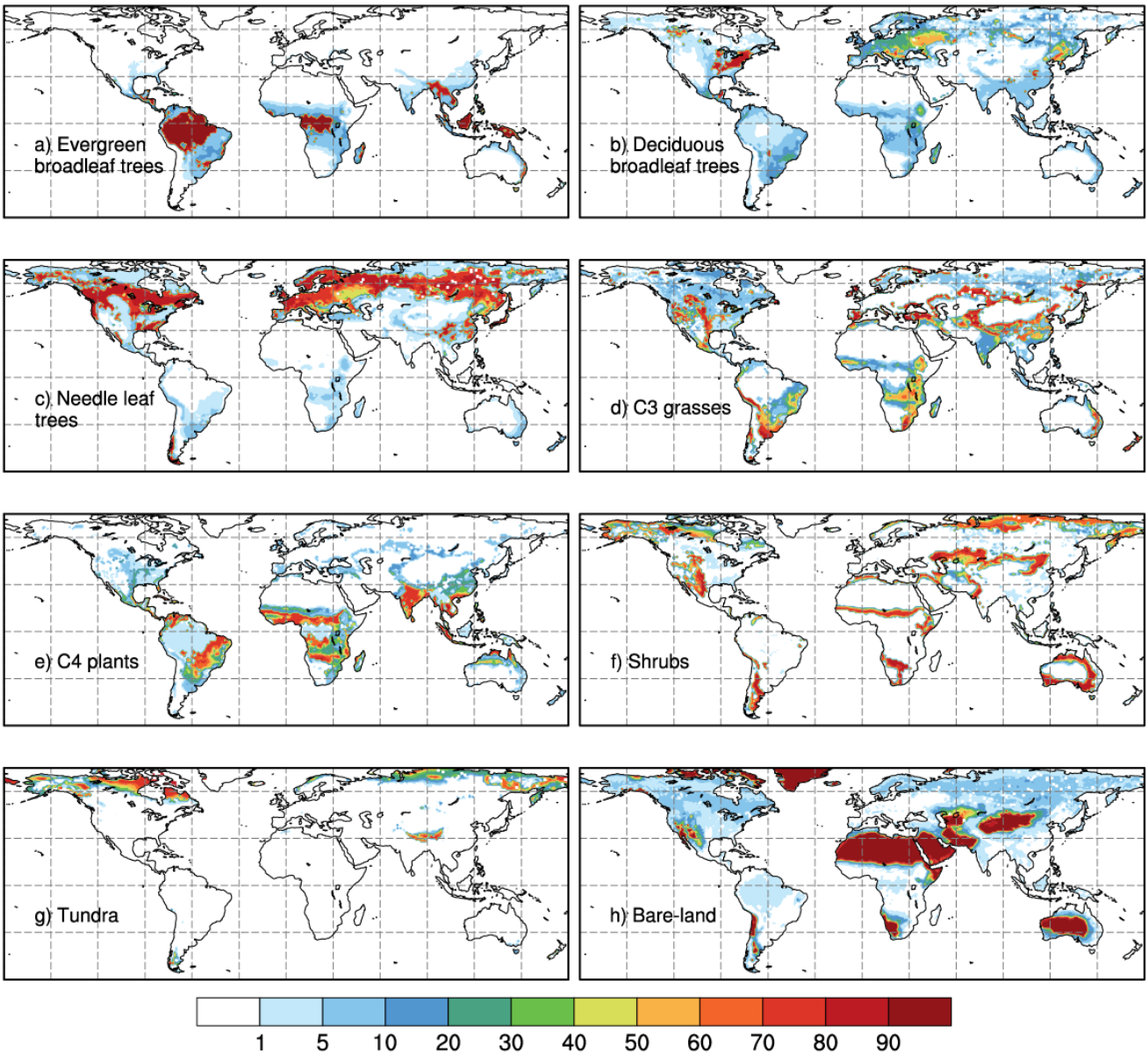
$$GPP = A_n + R_d$$

where A_n is the net CO_2 assimilation, g_b is stomatal conductance to latent and sensible heat transfer, C_a is the atmospheric CO_2 concentration, C_s is the CO_2 concentration at leaf surface, p is the air pressure, and is R_d the dark respiration rate of the canopy. Based on above equations, increase in C_a leads to a larger A_n, then a larger GPP.

Zhan, X., Xue, Y., and Collatz, G. J.: An analytical approach for estimating CO_2 and heat fluxes over the Amazonian region, Ecological Modelling, 162, 97-117, 2003.



Supplemental Figure 1. Global vegetated areas



Supplemental Figure 2. 1998-2007 average vegetation fractional coverage distribution for different land cover types