**Environmental trends in total N:**

Reich & Oleksyn 2004:

In essence, because leaf N and P regulate rates of C acquisition and use and because the kinetics of N- and P-regulated processes are temperature-sensitive, changes in N and P can compensate for altered temperature. Regardless of the mechanisms involved, such physiological acclimation could lead to higher leaf N and P in situ in colder, rather than warmer, climates.

Our results demonstrate that leaf N and P decrease and the N/P ratio increases with increasing environmental temperature and with nearness to the equator (see also ref. 46).

Overall, the data support the idea that the combination of temperature-related physiology and rainfall- and substrate- related biogeochemical constraints collectively result in the observed N and P patterns that were consistent among all plant groups.

*JL: This said, this is purely an observed response to temperature at the moment. There’s no discussion of why plants would necessarily adjust for ambient temperature to maintain a certain level of C acquisition, rather than just taking advantage of faster enzyme kinetic to increase C acquisition.*

*Also, these are %N data, not N per leaf area…*

Elser et al 2010 - Biological stoichiometry of plant production: Metabolism, scaling and ecological response to global change

Leaf N temperature response might be understood using Biological Stoichiometry Theory (BST)?? Not sure how though…

Maire et al 2015 - Global effects of soil and climate on leaf photosynthetic traits and rates

Joint effects of soil and climate dominated over their unique effects on Narea and Parea

Narea was mostly influenced by aridity

Leaf nitrogen content (as % dry weight) appears to be somewhat influenced by mean annual temperature (Reich & Oleksyn 2004, but see Elser et al. 2004). This effect may be driven by general temperature dependency of biochemical reaction rates, which in turn mediates the nitrogen cost associated with a given rate of carbon acquisition. It is unclear however why plants might adjust leaf N to maintain a certain rate of carbon acquisition, rather than taking advantage of faster enzyme kinetic to increase C acquisition.

Our results are in Narea – Maire et al found Narea interacted substantially with soil properties as well as climate, with no independent trends in Narea along temperature gradients.

Narea incorporates canopy optimisation and architecture – i.e. decisions re: how much N to invest per leaf for a given light income