



On the Temperature Sensitivity of Respiration at Ecosystem Level

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The release of carbon dioxide (CO₂) from the land surface via different respiratory processes is a major flux in the global carbon cycle, antipodal to CO₂ uptake via photosynthesis. Understanding the sensitivity of respiratory processes to temperature is central for quantifying the climate–carbon cycle feedback.

In a recent study we approximated the sensitivity of terrestrial ecosystem respiration to air temperature (Q₁₀) across 60 FLUXNET sites. For this objective, we developed a novel methodology that circumvents seasonally confounding effects. Contrary to previous findings, our results suggest that Q₁₀ is independent of mean annual temperature, does not differ among biomes, and is confined to values around 1.4 ± 0.1 . However, the shape of the strong relation between photosynthesis and respiration is highly variable among sites. The results may partly explain a less pronounced climate–carbon cycle feedback than suggested by current carbon cycle climate models. In the talk we put our findings into context with other recent results and critically discuss their potential for evaluating temperature sensitivity of respiration in terrestrial biosphere models and parameterizing future land surface schemes.