



## **What the 20 yr record of NEE tells us about ecosystem-atmosphere CO<sub>2</sub> exchange at Mer Bleue Bog**

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Measurements of peatland-atmosphere CO<sub>2</sub> exchange at the Mer Bleue bog have been ongoing for 20+ years. Here we examine the long-term record of net ecosystem exchange (NEE) to investigate the factors that determine annual NEE. Despite a small warming trend in air temperature over the 20 yr period, there was no trend in annual NEE, which ranged from a large uptake of -150 g C-CO<sub>2</sub> m<sup>-2</sup> year<sup>-1</sup> to a near balance between growing season CO<sub>2</sub> gains and winter losses and was punctuated by several drought events. Annual NEE was weakly correlated with several bioclimate variables, but the explained variance in annual NEE was always <50%. There were no significant carry-over effects between summer and winter NEE and bioclimate variables. Annual NEE was most strongly related to later-summer NEE, which explained >80% of the variation in annual NEE. Late summer NEE was also correlated with spring NEE, suggesting that productive springs 'prime' the ecosystem for large CO<sub>2</sub> uptake in summer, but climate conditions (temperature and wetness) modulate this relationship. We argue that this long-term record reveals an ecosystem that is a resilient and consistent CO<sub>2</sub> sink, however, the determination of the annual NEE is a complex mix of climate and internal ecosystem processes.