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# Synergy of rising Nitrogen Depositions and atmospheric $CO_2$ on Land Carbon Uptake offsets Global Warming

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Increased carbon uptake of land in response to elevated atmospheric $CO_2$ concentration and nitrogen deposition could slow down the rate of $CO_2$increase and reduce climate warming. Using a coupled model of climate, ocean, and land biogeochemistry, we show that changes in climate, atmospheric nitrogen deposition and atmospheric $CO_2$ have a strong synergistic effect on the carbon uptake of land. Neither increasing nitrogen deposition nor the physiological effect of $CO_2$ alone can enhance global carbon uptake to the same degree. We demonstrate that the synergistic effect has a potential to reduce atmospheric $CO_2$ concentration up to 40 ppmv by 2030. The strength of the synergy depends largely on the co-occurrence of nitrogen deposition with non-agricultural ecosystems. Our study suggests that reforestation and sensible ecosystem management in industrialized regions may have larger potential for climate change mitigation than anticipated.