



## **Global N<sub>2</sub>O emission from mangrove ecosystems: a likely upsurge under increasing nutrients from rivers**

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Nitrous oxide (N<sub>2</sub>O) is one of the major greenhouse gases that has 298 times the global warming potential of carbon dioxide (CO<sub>2</sub>). However, the global extent and trend of N<sub>2</sub>O emission from coastal areas, especially mangrove ecosystems, are still unclear. Based on a meta-analysis of two decades of published mangrove N<sub>2</sub>O emission studies, we estimate 0.023 Tg N y<sup>-1</sup> emissions from global mangrove ecosystems and reveal a significant correlation between N<sub>2</sub>O fluxes from mangrove ecosystems and sediment containing dissolved inorganic nitrogen (DIN). As this reactive nitrogen is transported from river catchments to coastal waters, it is captured by mangroves. Continuing agricultural intensification and excessive fertiliser use will appreciably increase DIN and consequent global N<sub>2</sub>O emission from mangroves, which have marked implications for global warming and destruction of stratospheric ozone. Based on Millennium Ecosystem Assessment scenarios of riverine nitrogen inputs into mangrove ecosystems coupled with our estimated emissions rate, we find N<sub>2</sub>O emission increases by 20 to 51% by 2030 and 27 to 74% by 2050 compared to estimated emission in 2000. These forecasts suggest improvement in catchment-scale nitrogen management strategies, but a detailed N<sub>2</sub>O flux global inventory is first needed to reduce predictive uncertainty.