



N₂O and CH₄ distribution and fluxes in the North Atlantic Ocean

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The world's oceans are a natural source of both N₂O and CH₄ contributing up to 30% and 10% of the global atmospheric emissions respectively. That said, marine sources are not well constrained owing to a paucity of observations. For both gases there are regional hotspots of production, often associated with upwelling areas and coastal environments, though the distribution of source and sink areas are often spatially and temporarily variable. Here we present data from the greater North Atlantic Ocean to examine factors affecting regional variability in the distribution of both gases and then provide an assessment of seasonal variability for the North East continental shelf region. The flux of gases between the ocean and atmosphere is described by the concentration gradient between the two phases and the gas transfer velocity, the determination of which is directly influenced by wind speed. The measurement of wind speed on ships at sea coincident with analyses of dissolved gases is prone to errors associated with the moving platform and turbulence associated with air masses at the sea surface. To address this problem we provide comparative estimates of the air-sea exchange of both gases determined by ship-based and remotely sensed measurements of wind speed and surface temperature.