



Trace gases (nitrous oxide, methane and dimethylsulfide) in the Indian Ocean

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Nitrous oxide (N₂O), methane (CH₄) and dimethylsulfide (DMS) are important trace gases which influence, directly and indirectly, the atmospheric chemistry and climate of the Earth. The oceans including its coastal zones are a major (N₂O, DMS) and a moderate (CH₄) source of these gases to the atmosphere. Over the last decades progress has been made in our ability to describe and model the oceanic pathways and emissions of nitrous oxide, methane and dimethylsulfide in the Indian Ocean. However, our understanding of the underlying biogeochemical pathways is still far from complete and in many respects rudimentary. This is caused by the fact that Indian Ocean is substantially under sampled for nitrous oxide, methane and DMS. Moreover, the biogeochemical cycles and ecosystems of the Indian Ocean appear to be particularly vulnerable to anthropogenic impacts (including climate change, eutrophication and aerosol load). Thus, the Indian Ocean is affected by the global stressors namely rising temperatures, acidification and deoxygenation which in turn will significantly affect the biogeochemical cycles and ecosystems and the associated trace gas production. Here we present an overview of the existing trace gas measurements and identify future research perspectives in light of the on-going environmental changes in the Indian Ocean.