



## **A process-based simulation of the marine nitrous oxide cycle**

P. Suntharalingam, E. Buitenhuis, C. LeQuere, and G. Forster

University of East Anglia, Environmental Sciences, Norwich, United Kingdom (P.Suntharalingam@uea.ac.uk)

Model formulations of the marine nitrous oxide cycle in the oxygenated open ocean commonly parameterize  $N_2O$  production during remineralization of organic matter using the widespread observed correlations between excess  $N_2O$  ( $\Delta N_2O$ ) and Apparent Oxygen Utilization (AOU). However, marine geochemical quantities such as  $\Delta N_2O$  and AOU also reflect the effects of water mass mixing and insufficient equilibration at the ocean surface. Parameterizations derived from present day observations, therefore, may be less effective in predictive modelling of the marine  $N_2O$  source under future scenarios of climate change. Here we present a process-based approach to simulation of the marine  $N_2O$  cycle. We base our representation on a model of the nitrogen cycle within the PlankTOM5 ocean biogeochemistry model and explicitly simulate  $N_2O$  production and consumption during processes of nitrification and denitrification. We will present initial model results, evaluation against observations from different biogeochemical provinces, and comparison with previous approaches to simulation of the marine  $N_2O$  cycle.