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Nitrous oxide and hydroxylamine in the tropical NE Atlantic Ocean

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Atmospheric and dissolved nitrous oxide (N_2O) as well as dissolved hydroxylamine (NH_2OH) were measured in the tropical NE Atlantic Ocean during the Meteor cruise M68/3 (Jul/Aug 2006). M68/3 was a pilot study for SOPRAN (Surface Ocean PRocesses in the ANthropocene), which is the German contribution to SOLAS. The cruise track consisted of a West-to-East transect along 18N and a grid of stations along the coast of Mauritania. Enhanced nitrous oxide surface saturations (up to 180%) were found close to the Mauritanian coast, where weak upwelling was still present. Nitrous oxide surface saturations in the open Atlantic Ocean were only slightly supersaturated (1-2%). We conclude that the tropical NE Atlantic Ocean is a strong source for atmospheric nitrous oxide even during times of weak upwelling. The water column profiles of hydroxylamine, a potential precursor of nitrous oxide during microbial nitrification, showed maximum concentrations in the oxygen minimum zone where maximum nitrous oxide concentrations occurred as well. The relationship between nitrous oxide and hydroxylamine will be discussed.