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Bacterial and archaeal dynamics in phylogeny and function in the North Atlantic deep waters

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The diversity and specific functional aspects linked to the N cycle of the bacterio- and archaeoplankton were investigated in the major deep water masses of the North Atlantic following the main driver of the thermohaline circulation, the North Atlantic Deep Water, from 65°N to 5°S. The phylogenetic composition of Bacteria and Archaea is not only depth-dependent but, specific water masses harbor specific prokaryotic communities. The specific composition of these communities in a particular water mass is maintained even over large distances. The distribution of archaeal and bacterial amoA genes were also determined. Archaeal amoA copy numbers decreased drastically with depth especially in the eastern subtropical Atlantic. This coincides with the lower nutrient concentration of the deep waters in the southern parts of the North Atlantic and the older age of the deep-water masses there. These data demonstrate that the diversity and potential nitrification activity are closely linked to the hydrology and chemical characteristics of the major water masses in the North Atlantic.