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Nitrogen removal in the Baltic Sea

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The Baltic Sea suffers from eutrophication by nitrogen inputs via river, atmospheric deposition, and nitrogen fixation. Nutrient concentrations have increased over the past decades but not as much as predicted from the sum of all inputs. It has therefore been suggested that most of the anthropogenic nitrogen is removed by denitrification and anammox in the sediments and water column. This assumption was tested in field studies where rates of denitrification and anammox were measured via isotope pairing in several sediments with different grain sizes, Corg contents, and nitrate concentrations in the overlying water.. First results showed N removal rates of up to 690μmol N2 m-2 d-1 via denitrification in the central Arkona basin where the sediments are muddy and have high Corg concentrations. Low rates were measured in sandy coastal sediments despite high nitrate concentrations. Anammox was not present. Although the denitrification rates seemed to correlate well with the Corg concentration in the sediments it was not possible to stimulate the bacteria with glucose additions. Upscaling of the nitrogen loss rates according to sediment type and Corg content will be the next step to realize a reliable estimate on the scale of the Baltic Sea.