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Nutrient dynamics in the East Frisian Wadden Sea

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In the year 2003, small scale cross-shore gradients of dissolved nutrient concentrations have been observed in the East Frisian Wadden Sea. The surveys have been done along cross-shore transects from north of the East Frisian islands Langeoog, Baltrum and Norderney through the back barrier Wadden Sea close to the mainland. A two- to tenfold increase in the concentration of dissolved inorganic nitrogen (DIN) was found in virtually all cases, dependent on the season.

This increase is only in winter comparable to similar findings in the North Frisian or Western Dutch Wadden Sea where permanent nutrient loaded freshwater sources (river Elbe and IJsselmeer runoff, resp.) create persistent nutrient gradients. During summer, no major freshwater source exists in the East Frisian Wadden Sea. DIN-salinity plots do not indicate a freshwater influence as a source of the enhanced DIN concentrations. Water depth dependence of phytoplankton mortality and decreasing turbulent diffusion is suggested as the cause for the measured gradients.