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PELAGIC METABOLISM OF THE SCHELDT ESTUARY MEASURED BY THE OXYGEN METHOD ON AN ANNUAL SCALE

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Pelagic gross primary production (GPP), community respiration (CR) and nitrification were measured in the turbid Scheldt Estuary by the oxygen Winkler method from January to December 2003 at monthly intervals (EUROTROPH EU project). Five stations along the estuary were investigated, corresponding to a salinity (S) range of 0-25. Water was sampled and incubated until sunset in 60 ml glass bottles stored in a 5 compartment incubator kept at *in situ* temperature by flowing water. Irradiance was controlled in each compartment by filters having a shading capacity ranging from 0 to 100%. In order to estimate the oxygen consumption due to the respiration and nitrification processes, samples were incubated, in the dark compartment, with and without addition of nitrification inhibitors.

Net community production (NCP) was most of the time negative in the estuary with values ranging from -275 to +31 mmol O₂.m⁻².d⁻¹ and the lowest values were found near Antwerp (S = 2). Strong pelagic GPP and positive NCP rates were observed in the freshwater part during summer with a maximal value in June (+373 mmol O₂.m⁻².d⁻¹), corresponding to an increase of the O₂ concentration and a decrease of the partial pressure of CO₂ (pCO₂) in the water column during this period. Nitrification contributes 5 to 60% of the oxygen consumption in the water column with highest values measured in the inner part of the estuary due to high ammonium and suspended matter concentrations. Assuming a C/O₂ molar ratio of 0.07, we estimated that nitrification represents on an annual scale 35% of organic matter production at salinity 2 which is consistent with previous estimates. NCP rates measured in 2003 are among the lowest reported in the literature and confirm the strong heterotrophic status of the Scheldt Estuary.