



Seasonal changes of dissolved and particulate organic C and N in the North Sea

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Although the distributions of the inorganic nutrients in the marine environment have been widely studied, little is known about the corresponding dissolved and particulate organic C and N cycles, especially in the North Sea. Processes controlling organic C and N production and consumption and consequently the cycling are still poorly understood. Here we present results of dissolved ($<0.7 \mu\text{m}$) organic C and N (DOC and DON) and particulate organic C and N (POC and PON) distributions obtained during several cruises in the central North Sea covering both seasonally stratified and well mixed waters to allow us to investigate the seasonal cycle of those parameters as well as the spatial distribution in the surface and vertical profiles. Information on the size distribution of the DON pool will also be presented. The cruises were conducted from autumn 2004 to summer 2005. DOC and DON were analysed using widely accepted high temperature catalytic oxidation method. POC and PON analyses were made using an elemental analyser. Although concentrations were spatially variable, there was no general pattern of high and low concentrations of these organic nutrients between the coastal and offshore waters. In surface waters, DOC and DON ranged between 68 to 318 μM and from 2.6 to 11.2 μM , respectively. The ranges of POC and PON concentrations were 1.9-38.4 μM and 0.3-5.6 μM . In all seasons, DON represented the major reservoir of fixed N in the water column. The seasonality of DON was much less than seen for dissolved inorganic N (nitrate+nitrite+ammonium) and PON. The vertical profiles of dissolved and particulate organic C and N followed the chlorophyll-a concentrations. The overall distributions of DOC and DON were also strongly correlated with chlorophyll-a during autumn and spring suggesting extracel-

lular release from phytoplankton was an important process controlling DOC and DON distributions.