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Seasonal variability of total Alkalinity in the North Sea

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The North Sea is a semi-enclosed shelf sea, located at the NW European shelf. The North Sea is amongst the best-studied coastal areas world-wide with respect to its physical, chemical and biological conditions, since it has been subject to detailed investigations for many decades. These investigations have recently been complemented by detailed studies of the carbon cycling within the North Sea. We rely on a field data set, which comprises carbon cycle and related parameters for all 4 seasons with high spatial resolution. Evidence has been provided that the North Sea is divided in two major biogeochemical provinces: a rather oceanic, deeper northern part, which reveals seasonal stratification, and a permanently mixed shallow southern part that receives most of the freshwater inputs. In the present study we investigate the seasonal variability of total Alkalinity and pH. We provide evidence that the southern part receives large amounts of total Alkalinity from rivers and the Wadden Sea, being in similar order of magnitude. We evaluate the consequences of the Alkalinity inputs on the CO2 fluxes on regional and basin-wide scales.