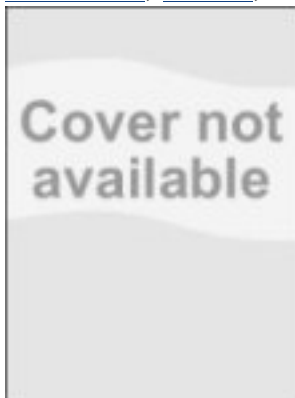


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Wind-induced long term increase and short term fluctuations of shallow water suspended matter and nutrient concentrations, Ringkøbing Fjord, Denmark

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Abstract

The terrestrial supply of nutrients to the shallow lagoon Ringkøbing Fjord has shown a significant downward tendency for phosphorus during the past 10 years. In spite of a decreasing supply, there is at the same time an increase in nutrient concentrations, especially for P, but also for the suspended matter content in the fjord- Analyses af wind data from nearby lighthouses show that the frequency of strong winds from the SW (equal to the longest fetch) has gone up in the same period of time and that both the nutrients and suspended matter concentrations in the water column are well correlated with available wind energy and hence, with the possibilities for wave-induced resuspension of material from the fjord bottom.

During a 6 month period, daily fluctuations of concentrations in the water column were measured in samples taken by automatic samplers at four stations with different exposures. Due to wave induced resuspension, the day to day variations were between 2-895 mg DW l⁻¹ of suspended matter, 0.2.-24.5 mg l⁻¹ of organic matter, 0.1-1.1 mg l⁻¹ of Total-N, and 0.01-0.18 mg l⁻¹ of Total-P.

Fortnightly measurements of erosion rates at station bottoms showed that as much as 3 cm of the sediment surface were resuspended during periods of hard wind conditions. The resuspended particles had mode sizes of 30-40µ, i.e. high sinking rates are assumed. The concentrations af suspended matter observed in the water column, however, were not below 40 mg DW l⁻¹ in 50% og the time, leading to a marked effect on light penetration in water. The Secchi-depth is on average reduced to 0.6 m in summer and 0.7 m in winter.

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