The impact of induced redox transitions on nutrient diagenesis in coastal marine sediments (Gulf of Trieste, northern Adriatic Sea)

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Mots-clés	Gulf of Trieste [6], modelling [7], Nutrients [8], Redox changes [9], Sediments [10]
Résumé en anglais	Purpose Sequential nutrient regeneration and organic matter (OM) degradation were studied in surface coastal sediments of the Gulf of Trieste (northern Adriatic Sea). Materials and methods In situ benthic chambers were used under normoxic, anoxic and reoxic conditions. Diffusive benthic fluxes were calculated from pore water modelling using a diffusion-advection-reaction model. Results and discussion Intensive NH_4^+ and PO_4^{3-} anoxic regeneration was subsequently slower in prolonged anoxia. NH_4^+ production was probably also a consequence of dissimilatory nitrate reduction to NH_4^+. The presence of laterally pumping of oxygenated water by benthic infauna can explain the presence of NO_3^- in anoxia. Anoxic phases were characterized by enhanced dissolution of biogenic Si. Reoxygenation was characterized by enhanced bioturbation. Nitrification caused NH_4^+ decrease. P precipitated quickly as carbonate fluorapatite and $FePO_4$ and adsorption of P onto Fe-hydroxides could also occur. Diffusive fluxes at the sediment-water interface (SWI) revealed high anoxic NH_4^+ effluxes, while PO_4^{3-} fluxes were very low. High NH_4^+/PO_4^{3-} flux ratios in anoxic and reoxic phases suggested an excess of benthic inorganic N. Conclusions Nutrient budgets at the sediment-water interface of this sandy coastal sediment showed intensive anoxic recycling of inorganic N, but low P and Si cycling in all redox phases.

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