Long-term alkalinity trends in the Baltic Sea and their implications for CO2-induced acidification

Jens Müller1 | Bernd Schneider1 | Gregor Rehder1

1: Leibniz-Institute for Baltic Sea Research (IOW), Warnemünde, Germany

Introduction
Alkalinity (A) is a measure for the proton acceptors in seawater. Oceans currently take up 30% of the anthropogenic CO2, which causes Ocean Acidification. At higher A2:
• More protons produced from CO2 uptake can be neutralized
• More CO2 can be taken up by seawater

Current knowledge:
• Constant A levels in the open ocean (2)
• No reports from large estuaries available

Future scenarios:
• A increase in the open ocean will control atmospheric CO2 levels and recover ocean acidification on geological time-scales (3)

Material & Methods

Results

Acidification mitigation - Combined impact of simultaneous A2 and pCO2 increase

Discussion & Outlook

Potential drivers for the observed A2 trends:
• Changes in continental weathering driven by acid rain and increasing atmospheric CO2
• Intensified agricultural liming activities
• Quantitative attribution is limited by missing observations of A2-related parameters, e.g. Calcium concentrations, and holistic models taking land-sea interactions into account

Future trends:
• Only some of the potential drivers for A2 trends might have a positive feedback to atmospheric CO2 and can thus be expected to proceed in the course of future CO2 emissions
• No permanent protection against CO2-induced acidification can be concluded

References:

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