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Total alkalinity production in a mangrove ecosystem reveals an overlooked Blue Carbon component

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Mangroves have the capacity to sequester organic carbon (C_{org}) in their sediments permanently. However, the carbon budget of mangroves is also affected by the total alkalinity (TA) budget. Principally, TA emitted from carbonate sediment dissolution is a perennial sink of atmospheric CO_2. The assessment of the TA budget of mangrove carbonate sediments in the Red Sea revealed a large TA emission of 403±17 mmol m^{-2} d^{-1}, independent of light, seasons, or the presence of pneumatophores, compared to -36±10 mmol m^{-2} d^{-1} in lagoon sediment. We estimate the TA emission from carbonate dissolution in Red Sea mangroves supported a CO_2 uptake of 345±15 gC m^{-2} yr^{-1}, 23-fold the C_{org} burial rate of 15 gC m^{-2} yr^{-1}. The focus on C_{org} burial in sediments may substantially underestimate the role of mangroves in CO_2 removal. Quantifying the role of mangroves in climate change mitigation requires carbonate dissolution to be included in assessments.