Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.29659

Bacterial mats in near-shore coastal sediments play a crucial role in moderating phosphate fluxes from anoxic sediments

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Shallow water sediments often host communities of mat-forming, filamentous bacteria, including sulfide oxidizers like *Beggiatoa* spp., and phototrophic cyanobacteria such as *Nodularia* or *Lyngbya* spp. These bacteria are characterized by their ability to store large amounts of phosphate as polyphosphate, facilitated by their relatively large cell sizes. Recent experiments have focused on the phosphate uptake rates by natural *Lyngbya*-dominated sediments in a flooded fan along the Southern Baltic Sea coast. Additionally, we have explored polyphosphate accumulation dynamics in both a *Lyngbya* culture from this location and a marine *Beggiatoa* strain culture.

Our findings indicate that natural *Lyngbya* mats significantly reduce or even prevent phosphate flux from anoxic sediment layers to overlying water bodies. This effect persists even under stressful conditions, such as elevated temperatures or in environments devoid of oxygen and light. Studies on both cultures have shown remarkably fast phosphate uptake rates, underscoring the pivotal role these mat-forming bacteria play in controlling sedimentary phosphate dynamics.

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