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Microbial mitigation of OMZ expansion

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Oxygen (O_2) plays a critical role for life on Earth, but over the last 50 years, O_2 concentrations in the Ocean have decreased massively as a consequence of human activity. These activities include greenhouse gas emissions and nutrient discharge to coastal waters, with major impacts on Ocean biogeochemistry and ecology. This effect is particularly intense in O_2 depleted tropical Ocean areas, also referred to as oxygen minimum zones (OMZ). These are sensitive areas as OMZs are connected to nutrient-rich coastal upwelling systems and support some of the world's most prolific fisheries. While continuous OMZ expansion would lead to a decreasing habitat for fish and other organisms, feedback mechanisms which counteract O_2 depletion and stabilize the system's ecological functionality may however explain and sustain high productivity.
Microbes are essential to regulating ocean biogeochemistry, oxygen and nutrient turnover and may those hold the key to stabilizing the oxygen budget to a certain extent. In this presentation, I will discuss the potential of microbes involved in the nitrogen cycle to mitigate Ocean oxygen depletion via three different feedback cycles from an integrated molecular, biogeochemical, and modeling perspective.