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Winning ways with hydrogen sulphide on the Namibian shelf

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The ancient shelf upwelling system of the northern Benguela off Namibia has long operated under hypoxic pressure, likely close to biological tipping points, balancing always the abundance of particulate food against oxygen limitation and hydrogen sulphide toxification. The shelf sediments off Namibia are some of the most unusual and extreme marine habitats, containing high hydrogen sulphide concentrations. Surface productivity provides benthic life with so much carbon that benthic processes must rely on innovative mechanisms to cope with perennial anoxia and toxic hydrogen sulphide. Bottom dwelling communities are forced to adapt lifestyles to deal physically, physiologically and behaviourally with these stressful conditions. The upside of hydrogen sulphide is that it fuels extensive mats of large sulphide-oxidizing bacteria on the seabed, which create detoxified habitat niches and food for the animals living there, whilst the threat of hypoxic stress exacerbated by hydrogen sulphide in the water column is largely overcome by microbes that detoxify sulphide, allowing animals in the upper water layers to thrive. The bearded goby *Sufflogobius bibarbatus* is a cornerstone species that successfully couples the stressful benthic environment with the pelagic. Whilst community-scale benthic studies have not yet been characterized, these have the potential to uncover biotic adaptations to toxic sulphide with novel industrial, biomedical, biomaterial, or other applications.

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