Anoxic Oceans – *Biogeochemical hotspots and extreme modes of climate*

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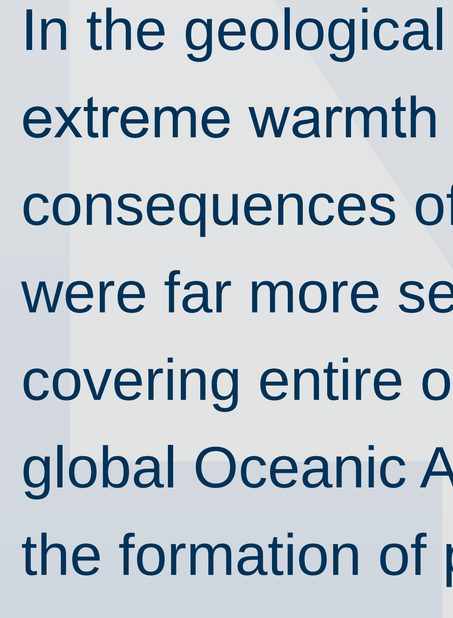
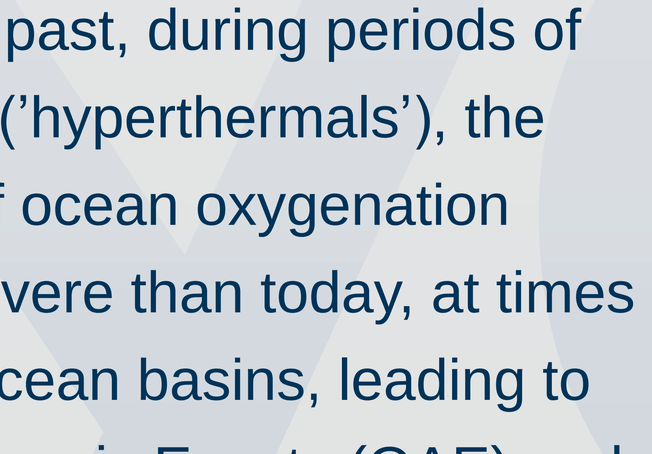
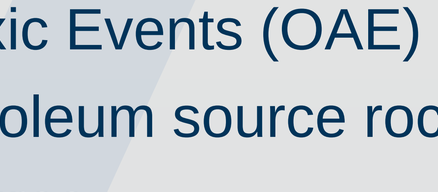
Anoxic oceans impose massive pressures on marine ecosystems and fundamentally influence carbon, nutrient and other key biogeochemical cycles.

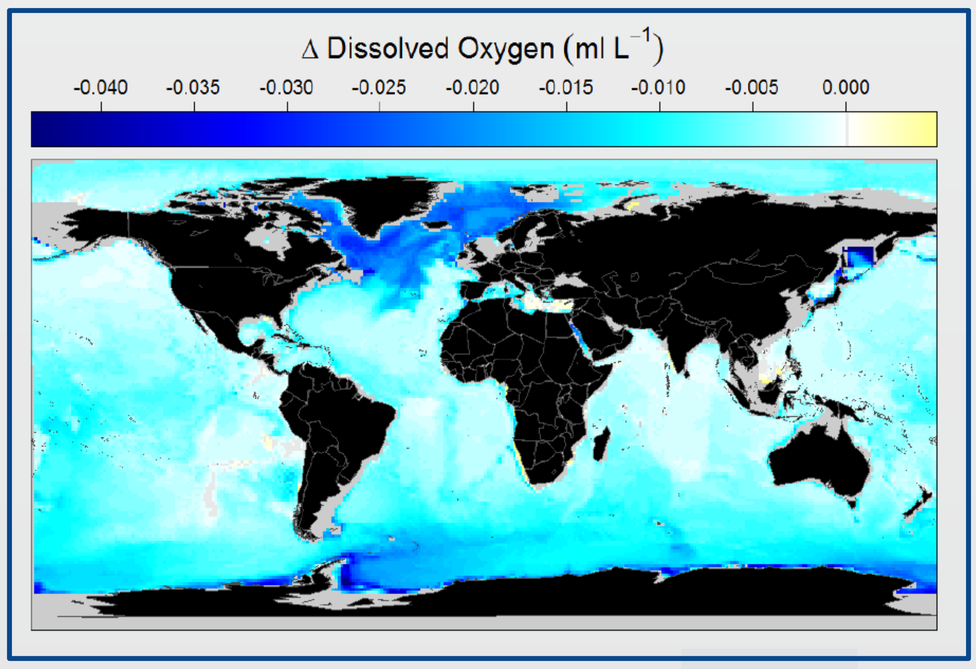
- These conditions develop at multiple scales, from seasonal to geological and local to global, and represent extreme environmental conditions where dissolved oxygen in seawater is strongly depleted or absent.

In the geological past, during periods of extreme warmth (’hyperthermals’), the consequences of ocean oxygenation were far more severe than today, at times covering entire ocean basins, leading to global Oceanic Anoxic Events (OAE) and the formation of petroleum source rocks, our main energy source.









deep (>200m) seafloor in 2090-2100 relative to current (Sweetman et al. (2016, in review)

Today, as response to climate change and human eutrophication, ‘dead zones’ and Oxygen Minimum Zones (OMZ) spread from coastal areas into the open ocean, creating severe pressures on fish stocks and other components of marine life.

Understanding the drivers, rates, duration and consequences that cause anoxic oceans at variable spatial and temporal scales is a focal point of environmental and climate research, joining oceanographers, geologists, biologists/ ecologists, geochemists and modellers.

- This theme directly combines environmental, (paleo)climate and energy research, providing large opportunities for merging expertise and capacities at HWU, BGS and its strong international network of partners.