

Ocean Deoxygenation

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What is Deoxygenation?

- It is the expansion of oxygen minimum zones in the world's oceans as a consequence of anthropogenic emissions of carbon dioxide.
- It is one of the most pernicious, yet under-reported side-effects of human-induced climate change.

What are the causes of Deoxygenation?

- **Eutrophication (increased nutrient run-off from land and sewage pollution)**
- **Nitrogen deposition** from the burning of fossil fuels, coupled with the widespread impacts from ocean warming
- **Ocean warming-driven deoxygenation:** Warmer ocean water holds less oxygen and is more buoyant than cooler water. This leads to reduced mixing of oxygenated water near the surface with deeper waters, which naturally contain less oxygen. Warmer water also raises oxygen demand from living organisms. As a result, less oxygen is available for marine life.



Impact of Deoxygenation

- Oxygen decline will impact marine ecosystems and the dependent human population.
- Even the smallest fall in oxygen levels, when near already existing thresholds, can create significant issues with far-reaching and complex biological and biogeochemical implications.
- Consequences of ocean oxygen decline include **decreased biodiversity**, shifts in species distributions, displacement or reduction in fishery resources and

expanding algal blooms.



- Ocean deoxygenation threatens to **disrupt the ocean's food provisioning ecosystem services**