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THE OCEAN IS LOSING ITS BREATH: DECLINING OXYGEN IN THE WORLD'S OCEAN AND COASTAL WATERS

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Although it is known that oxygen is critical to the biology, ecology and biogeochemical cycling of the oceans, and to the influence of the oceans on the earth's climate, major uncertainties remain – especially in our ability to scale up from small spatial scales and short time periods to fish stocks, global oxygen patterns and future times. Continued research, observation analysis and community engagement are required to not only detect the spatial and temporal extent of ocean deoxygenation, but also to advance the understanding of underlying processes to develop adaptation and mitigation strategies. The ingredients needed to make those advances – data, modelling and experiments – are in hand or are being developed.

Through the participation of concerned scientists from across the world, the IOC expert group, the Global Ocean Oxygen Network GO2NE, established in 2016, is committed to providing a global and multidisciplinary view on deoxygenation, with a focus on understanding its various aspects and impacts. The network offers scientific advice to policy makers and stakeholders to counter alarming deoxygenation, and to preserve marine resources in the presence of declining oxygen levels

Besides its scientific work and outreach activities, the network aims to facilitate communication with other established networks and working groups (e.g. IOCCP, GOOS, IGMETS, GOA-ON, GlobalHAB, WESTPAC-O2NE), improving observations systems, identifying and filling knowledge gaps, as well as developing deoxygenation-related capacity development activities in order to fill these gaps.

And though specific steps to slow and reverse deoxygenation vary among locations depending on the cause of the problem, co-occurring stressors and locally specific capacities and demands, there are action which will help to restore the ocean's oxygen and minimize the impacts of deoxygenation:

- Reduction of greenhouse gas emissions that cause atmospheric and ocean warming;
- Reduction of nutrient inputs that exacerbate oxygen loss in coastal waters and semi-enclosed seas;
- Inclusion of climate change effects in development OF nutrient reduction strategies;
- Alleviation of anthropogenic stressors that threaten resilience and increase vulnerability of marine ecosystems to deoxygenation;
- Adoption of marine spatial planning and fisheries management strategies addressing deoxygenation vulnerabilities and the protection of affected species and habitats;
- Recognition of ocean deoxygenation as one of multiple climate stressors; and
- Working to to unify research, management and policy actions in the coastal and open ocean across biology, geochemistry and physics, across problems of warming, acidification and deoxygenation, and across academic, industry, government and regulatory sectors.

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