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OxyNet: A network to examine ocean deoxygenation trends and impacts

Expanding marine hypoxia will likely have significant long-term impacts on ocean chemistry and ecology, and on coastal communities around the world. As the site of the world's most expansive natural oxygen minimum zone, the Pacific Ocean is particularly sensitive to on-going and future deoxygenation. Time-series observations from across the Pacific Basin, from British Columbia, to Hawaii, Japan, Chile and other regions, have revealed a complex pattern of decadal-scale oxygen changes across this ocean. The OxyNet project is a Canadian-based, international effort that aims to examine current spatial and temporal trends, future trajectories and potential impacts of deoxygenation across the Pacific Ocean, and in Canadian waters of the Arctic and Atlantic Oceans. In this presentation we will outline the overall strategies to tackle the objectives above, which include: 1) the compilation of existing time-series observations of oxygen and related variables across the Pacific Ocean, and Canadian waters of the Arctic and Atlantic Oceans; 2) calibration of autonomous oxygen measurements from moorings, profiling floats, and gliders for integration into other existing data archives; 3) assessment of current ocean deoxygenation drivers and future trajectories based on output from numerical simulations. We will couple our data analysis and modelling with resource economic analysis aimed at quantifying impacts of oxygen loss potential the value of British Columbia wild fisheries and aquaculture due to changes in the suitability of marine habitat for key fish species. OxyNet is an interdisciplinary project that involves collaborations with Chile, USA, Japan and across Canada, bringing together an international group of observational oceanographers, numerical modellers and economists, with key stakeholders from Fisheries and Oceans Canada and the British Columbia Salmon Farmers Association. We have also formed a partnership with the Vancouver Aquarium to develop high impact public outreach and educational materials, including new visual gallery displays.

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