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TITLE: Multidisciplinary Observing in the World Ocean?s Oxygen Minimum Zone Regions: From Climate to Fish ? The VOICE Initiative

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ABSTRACT:

Multidisciplinary ocean observing activities provide critical ocean information to satisfy ever-changing socio-economic needs, and require coordinated implementation. The upper oxycline (transition between high and low oxygenated waters) is fundamentally important for the ecosystem structure and can be a useful proxy for multiple observing objectives connected to Oxygen Minimum Zones (OMZs). The VOICE (Variability of the Oxycline and its ImpaCt on the Ecosystem) initiative demonstrates how societal benefits drive the need for integration and optimization of physical, biogeochemical and biological components of regional ocean observing. In liaison with the Global Ocean Oxygen Network, VOICE creates a roadmap towards observation-model syntheses for a comprehensive understanding of selected oxycline dependent objectives. Local to global effects, such as habitat compression or deoxygenation trends, prompt for comprehensive observing of the oxycline on various space and time scales, and for an increased awareness of its impact on ecosystem services. Building on the Framework for Ocean Observing (FOO), we initiated readiness level (RL) assessments for ocean observing of the oxycline in highly productive and economically important OMZ waters. VOICE determines ocean observing design based on scientific and monitoring activities in selected OMZs, namely the California Current System (US West Coast, the Southern California Current system off Mexico), the Equatorial Eastern Pacific off Ecuador, the Peru-Chile Current system, West Africa off Senegal and Cape Verde Islands, the northern Benguela off Namibia and in the Northern Indian Ocean (Bay of Bengal, Arabian Sea). Regional champions aided in assessing FOO design elements for the respective OMZ, namely: requirements processes, coordination of observational elements, and data management and information products. The RL for FOO elements is derived for each region and points at system bottlenecks which prevent delivering information and products for end users with a goal of motivating consistency across regions. We found that fisheries and ecosystem management are a societal requirement for all regions, but maturity levels of observational elements and data management and information products differ. Identification of relevant stakeholders, developing strategies for RL improvements, and building and sustaining infrastructure capacity to implement these strategies are fundamental milestones for VOICE initiative over the next 2-5 years and beyond.

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