

## **Workshop S-7**

### **Deoxygenation in Coastal and Oceanic Waters in the Western Pacific Region**

**Facilitators: Gil Jacinto, Kirsten Isensee, and Denise Breitburg**

#### **Overview**

Deoxygenation, the decline in oxygen concentrations, is an ongoing process in the coastal and open ocean resulting from two anthropogenic stressors CO<sub>2</sub>-induced warming which affects the entire globe, and increasing nutrient loads resulting from human activities, including finfish aquaculture and land-based agriculture. In addition, upwelling can bring deep water that is low in oxygen but high in nutrients towards nearshore areas.

The number of open ocean and coastal areas (including water bodies like estuaries, semi-enclosed seas, and coastal lagoons) reporting low oxygen conditions has risen exponentially since the mid-20th century. However, areas of low oxygen conditions in the WESTPAC region are fewer than would be expected in regions of dense human populations, and are likely, under-reported.

There is an urgent need, therefore, to extend the observation of oxygen in the marine environment in both the coastal and open ocean low oxygen areas, particularly in the WESTPAC region, to provide data to improve simulations of the future ocean, to develop effective management strategies and to document the effectiveness of management efforts.

The workshop will: 1) introduce participants to the Global Ocean Oxygen Network (GO<sub>2</sub>NE), a new IOC working group seeking to facilitate interactions and communication among researchers studying various aspects of deoxygenation, and help inform policymakers on the issue of declining oxygen concentrations in the open ocean and coastal waters; 2) provide an initial review of deoxygenation studies conducted and published in the WESTPAC region; 3) identify locations and causes of deoxygenation in the region, and their possible impacts to people and marine ecosystems; and, 4) discuss the possible formation of a regional hub of GO<sub>2</sub>NE in the WESTPAC region.

In order to facilitate the discussions during the workshop please think about the following questions:

1. Are you already investigating the causes and consequences of declining oxygen in the ocean in your country/region?
2. What are the main challenges you are facing in investigating the decrease of oxygen in open ocean and coastal areas?
3. What are your expectations with regard to a regional and global ocean oxygen network?

Please feel free to send us your answers prior to the workshop.

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## **Draft Agenda**

**(Allotted time: 3 hours)**

### 1. Overview of Deoxygenation and GO2NE (Kirsten & Denise) 30 minutes

- The global network, its goals, planned ongoing activities, current members, plans and how scientists in the WESTPAC regions could benefit from the network, but also how the network could benefit from their experiences, contributions.
- This introduction could then be followed by a presentation done by you, showcasing your work and a group discussion

### 2. Deoxygenation in the Philippines and in WESTPAC (Gil) – 15 minutes

### 3. Introduction into the purpose of the workshop – its goals and possible outcomes.

- Workshop (2 hours):
  - a) Deoxygenation in WESTPAC (participants)
    - Identifying the locations and causes of low oxygen areas in the region, and any changes people have observed (solicited feedback from participants from China, Indonesia, Japan, Malaysia, Thailand, Vietnam, etc.)
    - Consequences of deoxygenation
  - b) Determining and monitoring Deoxygenation
    - Sampling strategies and programs
    - Methods to use, choice of sensors, core oceanographic variables
  - c) Capacity Building – Regional Needs and Possibilities
    - Role of IOC and the broader GO2NE
  - d) How do we promote integration of existing data into a larger database in order to answer important questions (e.g., spatial extent and variability of hypoxia, how it evolves?)
  - e) Forming a Working Group - GO2NE @ WESTPAC

### 4. Next steps (15 minutes)