

Physicochemical Parameters of Surface Seawater in Malaysia Exclusive Economic Zones Off the Coast of Sarawak

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ABSTRACT

Physicochemical characteristics of seawater play crucial role for productive marine ecosystem and fisheries activities. The limited information of Sarawak surface seawaters provide objective to determine the physicochemical characteristics in Malaysia Exclusive Economic Zone off the Coast of Sarawak. A total of 38 samples were collected using Van Dorn Waals Sampler and the physicochemical characteristics were measured using physicochemical parameter probes. Ranges for dissolved oxygen (DO) was 3.73-6.83 mg/l, temperature was 27.03-30.13°C, pH was 7.63-7.82, salinity was 33.77-36.77 ppt, turbidity was 0.01-1.01 NTU, chlorophyll-*a* concentration was 0.01-4.52 mg/l, nitrate was 0.01–0.08 mg/l, nitrite was 0.001–0.012 mg/l and phosphate was 0.01–5.95 mg/l. There was positive correlation between chlorophyll-*a* and nutrients that indicated the biological uptake by biota (e.g. phytoplankton). In conclusion, the present study shows that the Malaysia Exclusive Economic Zone off the Coast of Sarawak had minimal pollution based on Malaysia Marine Water Quality Criteria. An update for physicochemical characteristics of surface seawaters in the coverage areas is required as future work.

Keywords: Physicochemical parameters, seawater, surface water, South China Sea

INTRODUCTION

The occurrence of advection associated with the planktons, biological scavenging, dilution of oceanic waters, food chain relationships and also the transport of nutrients and other particles via atmosphere and land into the water, is known to commonly happened in the surface seawater (Ho *et al.*, 2009; Sundarambal *et al.*, 2010). The productivity of phytoplankton in surface seawater is promoted by the sunlight exposure rates and buoyancy of seawater which is crucial as the base of food-chain (Iverson, 1990; Sigman & Hain, 2012). The primary production from plankton and biomass may varies according to different places and nutrient availability. Nutrient limitation is differing in aquatic systems; both N and P are limited in marine environment (Redfield, 1958; Hecky & Kilham, 1988; Wang *et al.*, 2003). The productivity fluctuation in surface water is a result from the fluxes flow of nutrients that possibly originates from both natural and anthropogenic origins as well as changes of physicochemical water properties which can subsequently change the water quality. Therefore, it could also influence the composition and availability of aquatic

organisms as well as affecting the natural process in ecosystem such as coral reef habitats and seagrass habitats that are susceptible to change in environmental conditions (Yap *et al.*, 2011; Sigman & Hain, 2012; Velsamy *et al.*, 2013).

South China Sea (SCS) is a part of the Pacific Ocean as semi-enclosed marginal sea, which has been known as the most productive fishing zones in the world. This is due to diverse marine habitats, hence becoming the most frequent fisheries zones that are crucial for food security due to high demand despite facing overfishing, alteration or destruction (Morton & Blackmore, 2001; Ali & Katoh, 2014; Witter *et al.*, 2015). For example, study by Teh and Teh (2014) showed the reconstructed data of fisheries catch in Malaysia EEZ from 1950 to 2010 indicated that Peninsular Malaysia obtained 58.4 million tonnes, Sarawak obtained 6.4 million tonnes and Sabah obtained 15.8 million tonnes. Such productive areas that have efficiency to sustain aquatic life are depending on the biomass of phytoplankton. The biomass growth of phytoplankton and diversity of marine species (Sigman & Hain, 2012) are influenced by the