ABSTRACT

AFDAL. Air-Sea CO₂ Gas Exchange In Coastal Waters: A Case Study In Nasik Strait, Belitung and Donan Estuary, Cilacap. Under supervised by RICHARDUS F. KASWADJI, ALAN F. KOROPITAN.

Marine carbonate system plays an important role in the air-sea CO₂ gas exchange. Aim of the present study is to investigate the air-sea flux of CO₂ in Nasik Strait, Belitung and Donan Estuary, Cilacap. Field observation was carried out during April and June, 2010, where the observed parameters consisted of temperature, salinity, pH, dissolved inorganic carbon (DIC), total alkalinity (TA), primary productivity of phytoplankton and nutrients (phosphate and silicate). Particularly the partial pressure of CO₂ (pCO₂) in sea surface, it was calculated using ABIOTIC model of the ocean carbon cycle model intercomparison project phase-2. Analysis results of the marine carbonate system showed that generally Nasik Strait waters and Donan Estuary act as a source (release) of CO₂ to the atmosphere. The CO₂ flux in Donan Estuary, mangrove waters, coral reef waters and coastal waters (non mangrove and coral reef) vary between 6.76–7.72, 3.06–3.19, 0.96–1.45 and 2.77–2.98 mmolC.m⁻².d⁻¹, respectively. The present study found that the CO₂ uptake by phytoplankton (photosynthesis) is not significantly affect the CO₂ flux. In this case, the decomposition of particulate organic carbon tends to give significant contribution to the CO₂ flux.

Keywords: CO₂ flux, pCO₂, DIC, phytoplankton, photosynthesis, decomposition