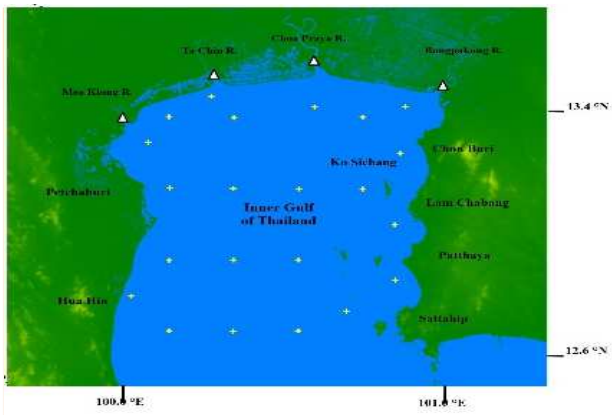
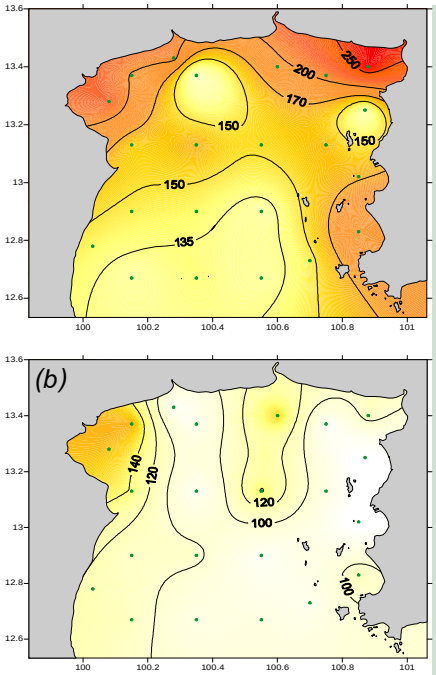
# Dynamics of $CO_2$ and Net Ecosystem Metabolism in the Upper Gulf of Thailand



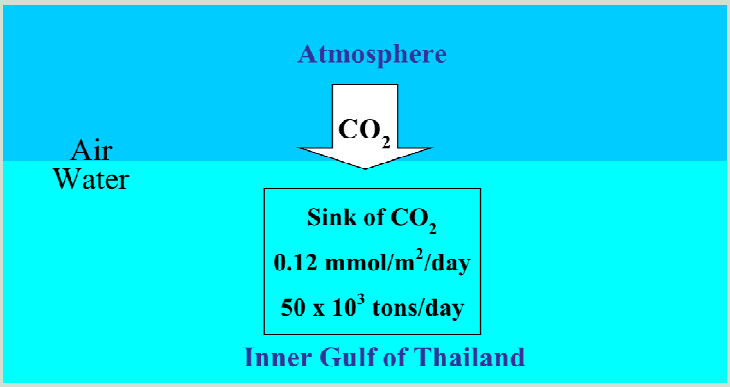

*Variations of partial pressure of $CO_2$ ($pCO_2$) and net ecosystem metabolism (NEM) in the inner Gulf of Thailand were investigated by taking water samples from 22 stations during the wet (August 2009 and September 2010) and dry (March 2010, 2011) seasons.*

## Dynamic of $CO_2$

*Variations of partial pressure of $CO_2$ ($pCO_2$) and net ecosystem metabolism (NEM)in the inner Gulf of Thailand were investigated by taking water samples from 22 stations during the wet (August 2009 and September 2010) and the dry (March 2010, 2011) seasons. Sea surface $pCO_2$ in the dry season varied from 103.7 to 270.3 µatm while those values of the wet season showed wider range from 49.2 to 166.9 µatm. The values of $pCO_2$ were higher (149.8±53.8 µatm) in nearshore and rivermouth stations than those in offshore stations (129.8±33.6 µatm). It can be concluded that the Inner Gulf of Thailand serves as a sink for atmospheric $CO_2$ as an ocean uptake of 49.65x10$^3$ tons of carbon per year (0.12 mol/m$^2$/year).*




*Variations of pCO2 (µatm) in surface water of the Inner Gulf of Thailand during (a) the dry and (b) wet seasons*




*The net air – sea $CO_2$ flux in the Inner Gulf of Thailand*

## Net Ecosystem Metabolism (NEM)

*Water, salt and nutrients budgets showed seasonal variations. Exports of water and salt from the inner Gulf of Thailand were accounted 83% larger in the wet season than in the dry season. Results of nutrient budgets showed the Gulf acts as a net source for DIP whereas DIN was a net sink. The values of NEM (p-r) and Net Nitrogen Production (nfix-denit) in the inner Gulf of Thailand were negative (-24.3±9.4 mmol Cm$^{-2}$d$^{-1}$ and -7.3±0.6 mmol N m$^{-2}$ d$^{-1}$) indicating that this Gulf was not only a heterotrophic system as respiration exceeds photosynthesis (p-r<0) but also a net denitrifying. This indicates that the Gulf received large amount of nitrogen loads and this area was very active in breaking down organic input.*