Dissolved inorganic carbon dynamics in the waters surrounding forested mangroves of the Ca Mau Province (Vietnam)

Y. J.M. Koné (1), A.V. Borges(1)

(1) Université de Liège, Belgium (alberto.borges@ulg.ac.be)

Dissolved inorganic carbon (DIC) and ancillary data were obtained during the dry and rainy seasons in the waters surrounding two mature (about 10 yr) forested mangrove sites (Tam Giang and Kiên Vàng) located in the Ca Mau Province (South-West Vietnam). During both seasons, the spatial variations of partial pressure of CO_2 (pCO_2) were marked, with values ranging from 704 ppm to 11481 ppm during the dry season, and from 1209 ppm to 8136 ppm during the rainy season. A combination of lower water volume and longer residence time most probably enhanced in the creek waters the enrichment in DIC, pCO_2 and total alkalinity (TAlk) compared to the adjacent main channels. Seasonal variations of the pCO_2 were more pronounced in the Kiên Vàng mangrove creeks than in the Tam Giang mangrove creeks. The air-water CO_2 fluxes were 5 times higher during the rainy season than during the dry season in the Kiên Vàng mangrove creeks. In the Tam Giang mangrove creeks, the air-water CO_2 fluxes were similar during both seasons. The air-water CO_2 fluxes ranged from 27.1 mmolC m^{-2} d^{-1} to 141.5 mmolC m^{-2} d^{-1} during the dry season, and from 81.3 mmol m^{-2} $d^{-1}$to 154.7 mmol m^{-2} d^{-1} during the rainy season. These values are within the range of values previously reported in other mangrove creeks and confirm that the emission of CO_2 from waters surrounding mangrove forests are significant for the CO_2 budgets for the coastal and global oceans at sub-tropical and tropical latitudes. The values of all variables were within the range of values reported for non-forested mangrove creeks.