



## **Seasonal variability of sea-air CO<sub>2</sub> fluxes in the northern East China Sea**

Dongseon Kim and SangHwa Choi  
Republic Of Korea (dkim@kordi.re.kr),

Temperature, salinity, chlorophyll a (Chl-a), nitrate, and sea-air differences of CO<sub>2</sub> partial pressure ( $\Delta p\text{CO}_2$ ) were extensively investigated in the northern East China Sea (ECS) during seven research cruises from 2003 to 2009. The  $\Delta p\text{CO}_2$  showed large intraseasonal variation in spring and summer. In spring, the areal mean  $\Delta p\text{CO}_2$  was almost two times lower in April 2008 than in May 2004, probably associated with differences in sea surface temperature (SST). In summer, the areal mean  $\Delta p\text{CO}_2$  in August 2003 was also twice as large as that in July 2006. In addition,  $\Delta p\text{CO}_2$  exhibited large seasonal variation with positive values in autumn and negative values in other seasons. The positive  $\Delta p\text{CO}_2$  in autumn was ascribed to vertical mixing with CO<sub>2</sub>-enriched subsurface waters and relatively high SST in this season. The annually integrated sea-air CO<sub>2</sub> flux in the northern ECS was  $-2.2 \pm 2.1 \text{ mol m}^{-2} \text{ yr}^{-1}$ , which was more than two times lower than a previous estimate reported for the same region. This large difference was presumably the result of underestimation of winter CO<sub>2</sub> influx and the large intraseasonal variation of CO<sub>2</sub> flux in spring and summer. The CO<sub>2</sub> influx in the ECS was twice that estimated for continental shelves worldwide, suggesting that the ECS acts as a strong sink of atmospheric CO<sub>2</sub> compared to other continental shelves.