

Variability of dissolved inorganic carbon in surface seawater along the 165°E line and 137°E line.

*Ono Hisashi¹, Masao Ishii¹, Chiho Tanizaki², Yosuke Iida², Kazutaka Enyo², Daisuke Sasano²

1. Meteorological Research Institute, 2. Japan Meteorological Agency

The ocean has absorbed approximately 30% of the anthropogenic CO₂ and played a role in mitigating global warming caused by the increasing atmospheric CO₂ concentration. Because uptake of CO₂ by the ocean leads to the increase of dissolved inorganic carbon (DIC) in seawater, the continuous monitoring of DIC is important for understanding the current state of CO₂ absorption in the ocean and for future prediction.

Based on the data of partial pressure of CO₂ in seawater ($p\text{CO}_2^{\text{sea}}$) along the 165°E, Tanizaki et al. (JpGU2019) determined the growth rates of DIC from subarctic to equatorial zone by means of a multiple regression analysis using sea surface temperature as an explanatory variable. In this study, we used $p\text{CO}_2^{\text{sea}}$ data taken by Japan Meteorological Agency (JMA) and the latest version of surface ocean CO₂ atlas (SOCAT v2019), and calculated DIC growth rates along the 165°E line in the same manner as above. In addition, we compared those with DIC growth rates along the 137°E line to investigate the characteristic of DIC variability at each latitude.

We found that DIC growth rates along the 165°E line and 137°E line from 1996 to 2018 were almost comparable in regard to the meridional distribution which indicates larger in the northern zone and significantly smaller than those expected from atmospheric CO₂ increases around 10°N. However, there were some differences between them that DIC growth rate at 33°N along 165°E is significantly larger than that expected from atmospheric CO₂ increase and that along 137°E as well as the uncertainties of DIC growth rates at 25°–30°N estimated from multiple regression analysis were greater than those along 137°E and in the surrounding zone along 165°E.

Keywords: 165°E line, 137°E line, Dissolved inorganic carbon, Growth rate

