

Spatial distribution and variation of air-sea CO₂ fluxes in the Seto Inland Sea and adjacent regions

*Mitsuru Hayashi¹, Masahiro Fujita², Eiji Yamashita³, Soichi Hirokawa⁴

1. Research Center for Inland Seas, Kobe University, 2. Faculty of Maritime Sciences, Kobe University, 3. Okayama University of Science, 4. The Graduate School of Maritime Sciences, Kobe University

It is important to understand the behavior of carbon dioxide (CO₂) in the sea, especially in terms of its relation to climate change in coastal seas, blue carbon, ocean acidification, etc. The partial pressure of CO₂ in seawater (pCO₂) and atmospheric CO₂ concentration (PCO₂) in the Seto Inland Sea and adjacent regions were measured onboard in summer and in early spring over a period of 16 years. CO₂ fluxes each bay and strait were calculated, and variable factors of CO₂ fluxes were estimated based on measurement data and the calculation theoretical formula. CO₂ was absorbed into the ocean in all in spring. It seems that the absorption flux was in the straits smaller than that in the adjacent bays. In summer, CO₂ was released from the ocean in narrow straits and bays in the Seto Inland Sea except Osaka Bay. It was absorbed in Osaka Bay, Bungo and Kii Channels and the open ocean. It seems that the release flux was in the straits larger than that in the adjacent bays. Contribution of pCO₂ in the flux was the biggest. The contribution ratio of pCO₂ to the flux in summer was around 60%. The contribution ratio of pCO₂ in spring was 50% or less, and it of the water temperature was 10% or more.

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