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Methane in the South China Sea and the Western Philippine Sea

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Abstract

Approximately 700 water samples from the South China Sea (SCS) and 300 water samples from the western Philippine Sea (wPS) were collected during eight cruises from August 2003 to July 2007 to determine methane (CH₄) distributions from the surface to a depth of 4250 m. The surface CH₄ concentrations exceeded atmospheric equilibrium, both in the SCS and the wPS, and the concentrations were 4.5±3.6 and 3.0±1.2 nmol L⁻¹, respectively. The sea-to-air fluxes were calculated, and the SCS and the wPS were found to emit CH₄ to the atmosphere at 8.6±6.4 μmol m⁻² d⁻¹ and 4.9±4.9 μmol m⁻² d⁻¹, respectively. In the SCS, CH₄ emissions were higher over the continental shelf (11.0±7.4 μmol m⁻² d⁻¹) than over the deep ocean (6.1±6.0 μmol m⁻² d⁻¹), owing to greater biological productivity and closer coupling with the sediments on the continental shelf. The SCS emitted 30.1×10⁶ mol d⁻¹ CH₄ to the atmosphere and exported 1.82×10⁶ mol d⁻¹

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