深層水の鉛直渦動拡散係数の見積もり

角皆静男

An Estimate of the Vertical Diffusivity of the Deep Water

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Abstract: A simple advection-diffusion model is applied to the deep water of the North Pacific Ocean. The physical mixing parameter, i.e., the ratio of vertical advection velocity (W) to vertical eddy diffusivity (D), is obtained from the vertical distribution of a conservative property such as salinity. The rate of decomposition of organic matter is estimated from the oxygen consumption rate which is obtained from dissolved oxygen content. The calcium carbonate flux in the deep water is obtained from alkalinity. Using these values and the vertical distribution of a radioisotope, $^{14}C$ or $^{226}$Ra, the vertical eddy diffusivity and the upwelling velocity are found to be 1.2 cm$^2$/sec and 1.4×10$^{-4}$ cm/sec, respectively, at the Geosecs 1969 station. The oxygen consumption rate at 3 km depth of the station is found to be 1.4×10$^{-11}$ ml/l/yr.