北西太平洋外洋域における沈降粒子試料中の元素状炭素フラックス変動
Elemental carbon flux changes in sinking particles in the western North Pacific during 1997-2000

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Elemental carbon (EC) is one of aerosols and is generated by incomplete combustion of organic matter. Compared to organic carbon (OC), EC has high vaporization temperature and is inactive, so it tends to remain in sediment for a long time. In this study, we aimed to clarify seasonal flux changes in elemental carbon transported through the atmosphere to North Pacific Ocean using sediment trap samples. Sinking particle samples were collected by time-series sediment traps deployed at two stations in the northwest Pacific Ocean: Station 50N (50 degree N, 165 degree E; 5546 m bottom water depth; 3000 m mooring water depth; mooring period from 1 December 1997 to 18 May 2000) and station 40 N (40 degree N , 165 degree E; 5476 m bottom water depth; 3000 m mooring water depth; mooring period from 1 December 1997 to 30 January 2000). EC contents were measured by thermal separation method using semi-continuous OC-EC Field Analyzer (Sunset Laboratory Inc.). Thermal separation method is one of the carbon component analyses, which distinguish between EC and OC based on volatility. EC flux at Station 40N showed large seasonal fluctuation and the maximum EC flux (374 μg m^{-2} day^{-1}) was observed in August 1998. On the other hand, seasonal fluctuation of EC flux at 50N was very small in 1998 at Station 50N and the maximum EC flux (205 μg m^{-2} d^{-1}) was observed in July 1999. Patterns of EC fluxes at stations 40N and 50N were correlated with the pattern of biogenic opal fluxes. This indicates a close relationship of sinking process between EC and biogenic opal. Because single EC particle is too small to sink by itself, biogenic opal particles such as diatom frustules play a substantial role in the sinking process of EC adsorbed to marine snow.

