P9

Seasonal and interannual variations of particle fluxes in eastern Bransfield Strait, Antarctica

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Time-series sediment traps were deployed to investigate the temporal evolution of particle fluxes in eastern Bransfield Strait over three years, from December 1998 to December 2001. Particle fluxes showed large seasonal and interannual variations. In 1999 and 2000, a seasonal trend of mass fluxes was characterized by highly elevated mass fluxes over 300 mg m^{-2} d^{-1} during the summer season, of which summer fluxes were two orders of magnitude higher than winter mass fluxes, but such high summer fluxes were not observed in 2001, and seasonality was significantly reduced. The large interannual variation in particle fluxes is closely related with related with year to year changes in sea ice cover in eastern Bransfield Strait, which seems to act to limit the phytoplankton productivity in the surface waters. There is a lag of about one month between the surface water productivity and the export production in eastern Bransfield Strait. An average biogenic silica:organic carbon (Si:C) ratio of 1.5 is obtained at the trap material collected at a depth of 678 – 1034 m, of which ratio is lower than the results obtained in the marginal winter sea ice zone of the Atlantic section and the Antarctic zone of the Pacific section, but is similar to those observed in the Antarctic Polar Frontal zone of the both section. A three-year mean of annual organic carbon fluxes measured in eastern Bransfield Strait is 4.21 ± 3.16 gC m^{-2}, which is about two times higher than that (2.84 ± 3.33 gC m^{-2}) in central Bransfield Strait and a order of magnitude higher than that (0.35 gC m^{-2}) in western Bransfield Strait.