Annual monitoring on lateral advection of shelf materials off the Barrow Canyon, western Arctic Ocean

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Lateral transportation of heat and materials from shelf to basin is important keys to understand ecosystem and biogeochemical cycles in the southwestern Canada Basin. The physical oceanographic model suggested that the westward advection of oceanic eddies from off the Barrow Canyon contributed to the temporal increase of high settling particle flux at Station NAP in the southern Northwind Abyssal Plain (75˚ N 165˚W). In order to monitor the shelf-basin interaction in upper stream area of Station NAP, annual bottom-tethered mooring with sediment trap and hydrographic sensors were deployed off the Barrow Canyon (Station NBC15t, 72.47˚N 155.41˚W) from October 2015 to September 2016. The trapped particles contained abundant lithogenic matters which were derived from continental shelf. Total mass flux at ~243 m depth where sediment trap was deployed at NBC15t ranged from 14.6 to 3413.9 mg m^{-2} d^{-1} before the trap clogged in June 2016. The maximum of total mass flux was one order higher than that at Station NAP. The maxima of total mass flux were observed in the periods of 5-18 October 2015 and 12-24 May 2016. In addition, the underwater camera mounted on sediment trap recorded an image with abundant particles in September 2016. The comparison with hydrographic sensor data and the video record of underwater camera suggests that shelf material component of trapped particles in October 2015 and September 2016 were supplied by intensified lateral water current in subsurface layer shallower than the deployment depth of sediment trap. The high particle flux in May 2016 is explained by intensified water current containing abundant particulate matters in limited subsurface layer between the ADCP (~125m depth) and sediment trap depths.

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