

Contribution of particulate organic carbon of sea ice floes to arctic marine ecosystems

SANG H LEE^{1*}, BO KYUNG KIM¹, HUI-TAE JOO¹,
JUNG WOOK PARK¹, HYOUNG-MIN JOO²,
DOO BYOUL LEE², CHANG-KEUN KANG³ AND
SUNG-HO KANG²

The areal extent of arctic sea ice has rapidly decreased but areal extent of melt ponds within sea ice recently increased during the Arctic Ocean summer. Melt ponds in sea ice floes could be an important habitat for phytoplankton and higher trophic levels. However, the biological impacts of these changes on the arctic marine ecosystem have rarely been studied. Intensive works were executed at two different types of sea ice stations (ST 1 and ST 2) in the northern Chukchi Sea, 2011, to estimate contributions of particulate organic carbon (POC) as a potential food source in various environments on the arctic sea ice floes. The surface ice of melt ponds at ST 1 had the highest POC concentration with a mean of 148.0 mg C m⁻³, followed by sea ice cores at ST 2 (mean ± S.D. = 125.7 ± 128.2 mg C m⁻³). The POC concentrations in melt ponds ranged between 90.0 mg C m⁻³ and 103.9 mg C m⁻³ at ST 1 and ST 2, respectively. Major POC contributors for melt ponds were diatoms with a mean biovolume contribution of 48.7% (S.D. = ± 39.1%) which was strongly related to *in situ* salinity in melt ponds. The carbon contribution of sea ice floes could be important to higher trophic levels as sympagic meiofauna, under-ice amphipods, and small arctic cods because of the concentrated POC within sea ice floes, although the total POC concentration of entire sea ice floes relatively low (2.8 to 5.3%) compared with the euphotic water column.