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Carbon transfer and food web relationships of Arctic zooplankton organisms revealed by fatty acid and stable isotope analyses.

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Zooplankton organisms in Arctic marine ecosystems, in particular larger calanoid Calanus spp., are the key link for the nutritional energy flux from primary producers to higher trophic levels. The ongoing reduction in sea ice thickness and extent will significantly change the underwater light climate and thus the timing, quantity and quality of the primary producers in the Arctic with possible consequences for the grazers. Therefore the understanding of the carbon and energy flux through the pelagic ecosystem is of major importance. The analysis of fatty acid trophic markers (FATM) provides information on the nutritional quality of the particulate organic matter (POM) produced by algae, and enables differentiation of dietary input on a broader taxon level. Stable isotope analysis of bulk (BSIA) material and individual compounds (CSIA) permit to distinguish largely on a species level, since primary producers have distinct carbon stable isotope compositions with significant higher 13C enrichment in POM produced by sea ice algae (I-POM) relative to pelagic POM (P-POM). By using lipid, fatty acid and stable isotope biomarker analyses, we aim to:

-reveal on dietary sources of major Arctic zooplankton species from fatty acid trophic markers
-present bulk and compound- specific differences in Arctic zooplankton organisms occupying different trophic levels
-calculate relative contributions of I-POM versus P-POM produced carbon in Arctic zooplankton key species.
-provide information about the carbon turnover in lipids of distinct Arctic zooplankton species using gas chromatography-IRMS technique (CSIA).

Keywords: Arctic, zooplankton, fatty acids, BSIA, CSIA

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