

Regional patterns and controlling factors on population structure of *Calanus glacialis* in the western Arctic Ocean during summers of 1991–2014

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In the Arctic Ocean, *Calanus glacialis* is the most dominant species in zooplankton biomass throughout the shelf region. While their importance, little information is available that what environmental parameters governing their population in the Arctic Ocean. In this study, we evaluated regional patterns and environmental factors controlling population structure of *C. glacialis* in the western Arctic Ocean based on the samples collected during summers (July–October) from 1991 to 2014. To evaluate regional patterns, environmental parameters (temperature, salinity and chlorophyll *a*) and parameters on *C. glacialis* (abundance, biomass, mean copepodid stage and mean lipid accumulation for C5) were divided into three latitudinal regions (R1 [65–69°N], R2 [69–71°N], R3 [71–79°N]). Common for all regions, chlorophyll *a* decreased, while mean copepodid stage of *C. glacialis* increased significantly along with the Julian day. These results suggest that phytoplankton bloom occurred at early timing of the sampling period, and *C. glacialis* performed growth during that period (July–October). From Structural Equation Model (SEM) analysis, the governing environmental factors on *C. glacialis* population were evidenced to be varied with region. However, more robust correlations were observed for between several parameters throughout the regions. Thus, positive correlations between abundance and biomass, sampling date and mean copepodid stage, temperature and mean copepodid stage, and negative correlation between abundance and mean copepodid stage. While slight regional patterns were detected, these general common patterns may be more important for governing *C. glacialis* population in the western Arctic Ocean during summer.

Keywords: *Calanus glacialis*, western Arctic Ocean, Structural Equation Model (SEM)

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