

Introduction

Food-web structure and trophic dynamics are critical to our understanding of ecosystem functioning and stability and can be used as indicators of natural or anthropogenic changes. As climatic changes become more dramatic in Arctic marine ecosystems, it is imperative to acquire baseline knowledge of these systems. In contrast to the better studied Chukchi Sea¹, food-web dynamics the Beaufort Sea have only been studied in the coastal environments^{2,3}. This warrants an in-depth study of benthic trophic dynamics on the Beaufort Sea shelf. The purpose of this study is to evaluate benthic food-webs on the Alaskan Beaufort Sea shelf as a baseline for future comparison.

Methods

Sample collection: 22 Aug- 3 Sep 2011 (*BeauFish 2011*)

Regions defined *a priori* by depth and longitudinal boundaries (Fig. 1)

POM samples from CTD rosette , ~10 m (n=3 per station)

Sediments from top 1 cm of van Veen grabs (n=1 per station)

Invertebrates collected from plump-staff

beaEast Shallow regions. The Central Deep region was distinct as several taxa occupied TL5. High variability of food source isotope signatures and environmental conditions within and among regions, however, suggests that food sources and environment do not directly predict food-web structure on the Beaufort Sea shelf.

POM and surface sediment ¹³C and ¹⁵N ratios did not differ among most regions, except that POM ¹³C ratios were more enriched in CS and ES and remained high in sediments in ES (Fig. 3) Total isotopic spread was 11‰ for ¹³C and 14‰ for ¹⁵N (Fig. 4) Food web length ranged from 4.1 (CS) to 5.2 (CD) (Fig. 5) Proportions of trophic levels were similar between WD and WS and between CS and ES, while CD had a higher proportion of TL 3 (Fig. 5)

Surface T decreased from west to east , and were overall lower at bottom depths and salinity was lower in surface than bottom waters (Fig. 6)

Conclusions

Overall, the western regions were similar in trophic structure, food source characteristics and environmental conditions that are reflective of the influence of Chukchi shelf waters⁴.

The CS and ES regions were very similar in trophic structure but differed in characteristics of the food sources and in temperature. This may indicate that food source characteristics or environmental conditions alone are not a reliable predictor of trophic structure.

The CD region was distinct in terms of TL structure, and mostly intermediate between western and eastern environmental and food source characteristics.

The stable isotope and hydrographic data reflect the complexity of water masses on the Beaufort shelf.

A more detailed environmental analysis and of taxa within the regional food webs will possibly better define the drivers of food web structure on the complex Beaufort Sea shelf

Literature Cited

1. Iken K, Bluhm BA, Dunton KH (2010) Benthic food-web structure under differing water mass properties in the southern Chukchi Sea. Deep-Sea Res II 57, 71-85
2. Dunton KH, Weingartner TJ, Carmack EC (2006) The nearshore western Beaufort

Results