

Variation in size and shape of bryozoan zooids on continental shelf and slope of southern Iceland

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Introduction

Body size is one of the most important biological characters as it defines many aspects of organism functioning at the individual (e.g. metabolic rates, energy assimilation) and community (e.g. trophic interactions) level. Recognition of the environmental factors which are responsible for size shift will give the base for understanding mechanism of the natural body size variability, and prediction of future changes driven by climate warming. In this study we investigated bathymetric variability in zooid's size and shape in aquatic colonial animals Bryozoa. Although the response of bryozoan zooid size to temperature or food concentration was experimentally proved, the effects of natural environmental variability on marine bryozoan populations has been much less explored

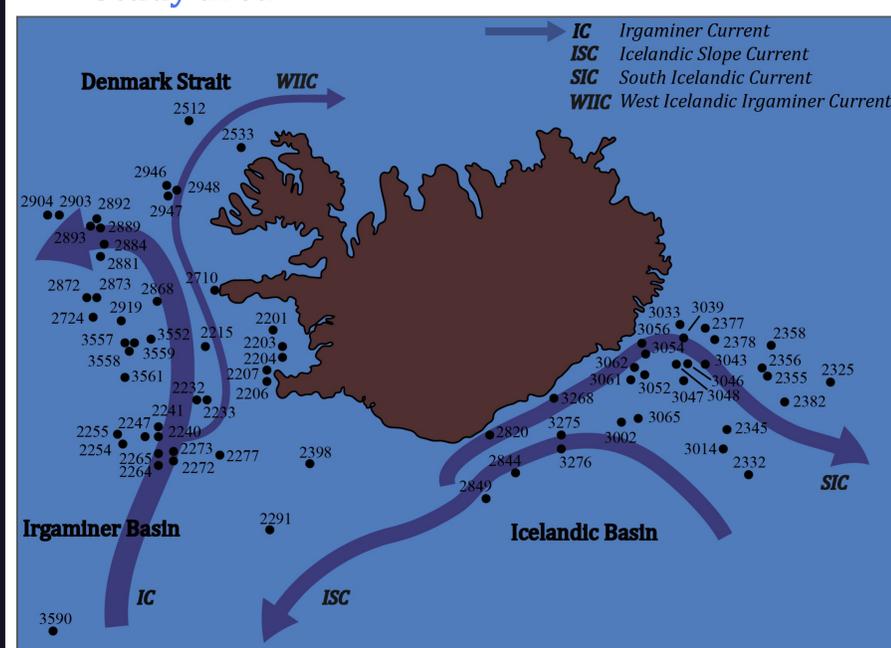
Methods

The study is based on materials that were selected from the BioIce project collection, stored in Icelandic Institute of Natural History. A subset of 78 samples that included colonies of 11 bryozoan species was analyzed. Only samples in which at least four colonies per species were found were used for the analysis. Selected species represented two different colony forms: encrusting and flexible. Colonies were photographed and from the pictures 20 autozooids per colony were randomly chosen for measurements



Zooids morphometric characteristics: length, area and index of shape (length/width) were calculated. Relationships between depth and mean zooid length, area and index of shape (average values for colonies) were explored for studied species using Spearman correlation analysis.

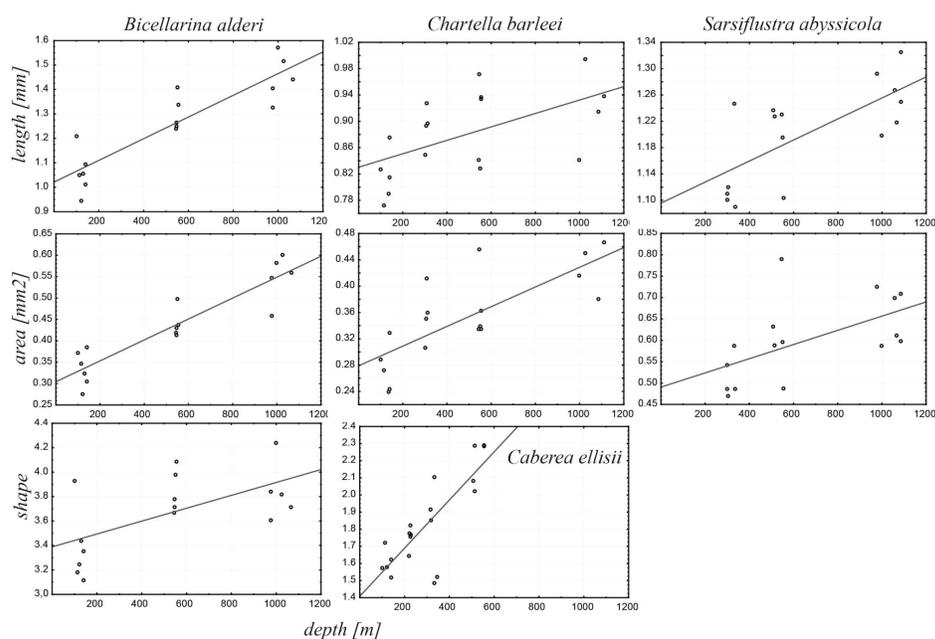
Study area



The study area covers Icelandic and Irgaminer Basins. Investigation were conducted in wide bathymetric gradient (50-1000m) that is associated with strong drop of temperature (by about 5-6°C). Organic matter content in the sediments of Icelandic deep sea basin is relatively high. Organic matter is pushed off by the strong current from ridges to the deeper part of the basin. Salinity vary with depth very slightly, it ranges from 34.7 to 35.2.

Results & Conclusions

Plot of correlation between length, area and depth for species with significant relationships ($P < 0.05$).



	Spearman correlation R			depth range [m]	temperature range [°C]	colony form
	length	area	shape			
<i>Bicellarina alderi</i>	0.35	0.92	0.51	100-1066	7.39-4.21	F
<i>Caberea ellisii</i>	0.38	-0.04	0.69	100-554	7.31-6.28	F
<i>Chartella barleei</i>	0.41	0.81	-0.46	100-1111	7.64-4.18	F
<i>Dendrobeatia decorata</i>	0.40	0.24	0.37	100-554	7.36-5.59	F
<i>Dendrobeatia fruticosa</i>	4.76	0.40	0.32	121-228	7.69-6.41	F
<i>Escharella abyssicola</i>	0.36	0.26	0.41	114-356	7.66-5.54	E
<i>Escharina boreale</i>	-0.09	0.04	-0.24	140-549	7.76-6.07	E
<i>Porella struma</i>	0.50	0.31	0.40	219-550	6.44-6.34	E
<i>Ramphonotus minax</i>	-0.36	-0.29	-0.05	130-998	7.84-3.78	E
<i>Sarsiflustra abyssicola</i>	0.61	0.63	-0.08	300-1085	7.13-4.44	F
<i>Tricellaria ternata</i>	4.5 ²	-0.04	0.31	227-554	6.44-6.29	F

Presented study did not reveal any consistent pattern of change in bryozoan zooid length, area or shape along the investigated depth range. We recorded statistically significant increase in zooid size and shape characteristics in four species. As the difference in temperature were the most evident, we assumed that temperature should be the most influential for the size of zooids in bathymetric gradient yet this was not fully exhibited by obtained data. Large involvement of biological control in regulation of zooid size needs to be emphasised. Investigated species were from various families, had different morphological forms therefore their life strategy could be assumed to vary