

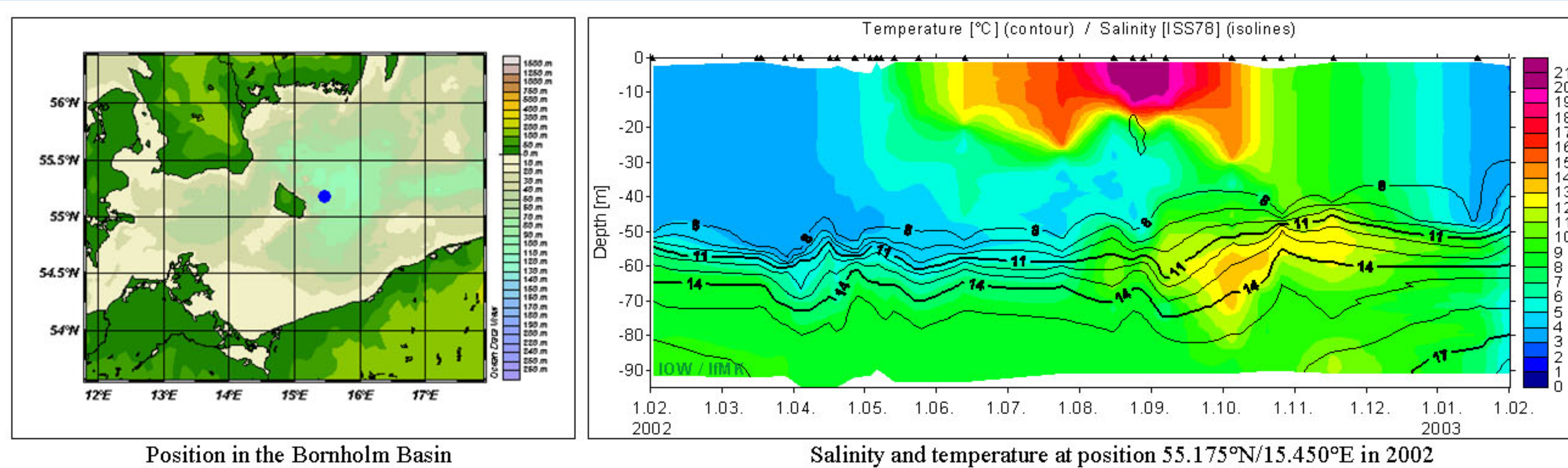


# Living in a highly stratified environment

## Relation of hydrographic parameters to vertical distribution of dominant copepods in the Baltic Sea

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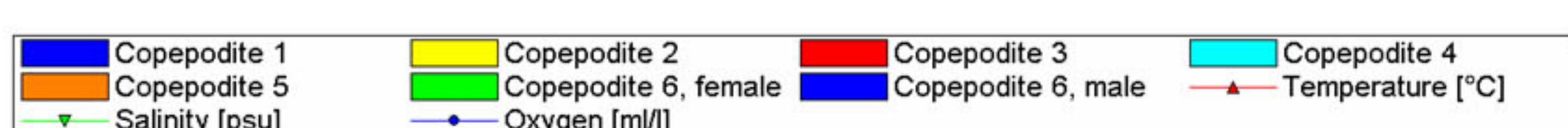
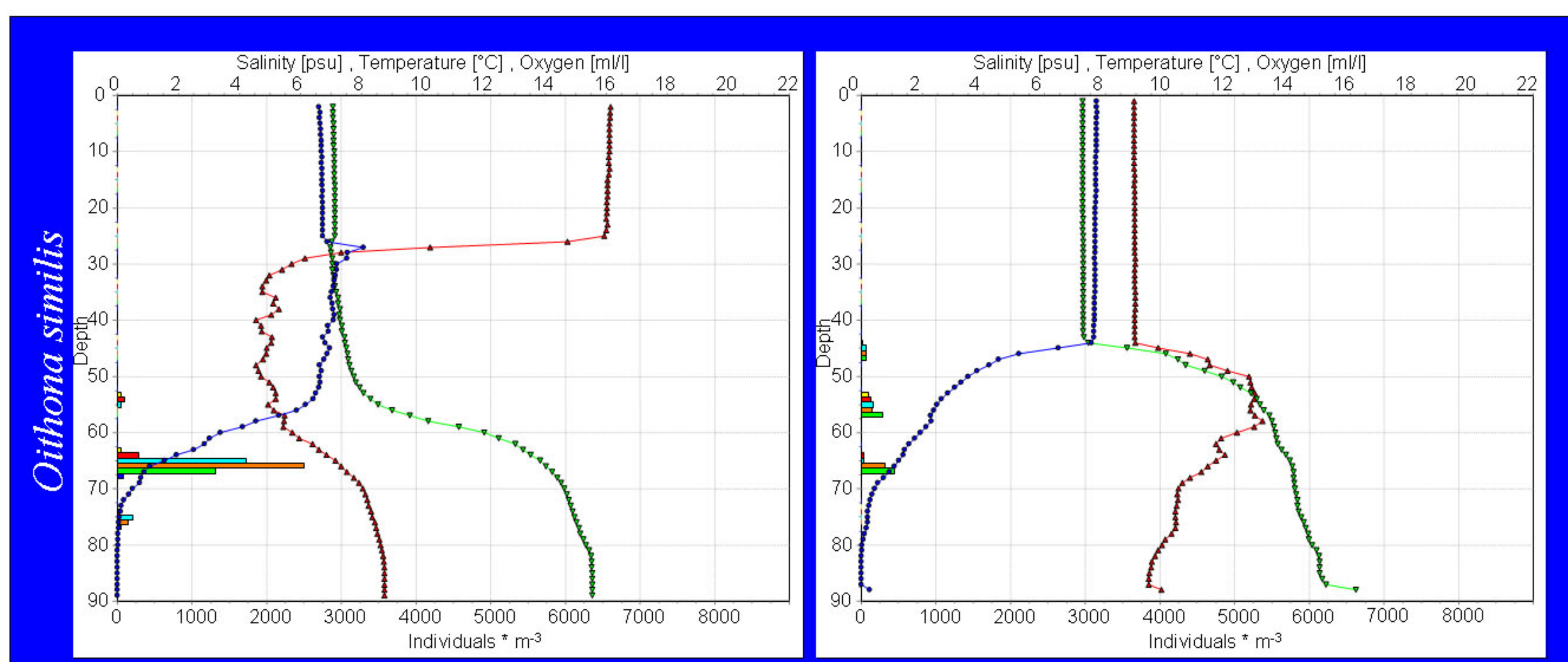
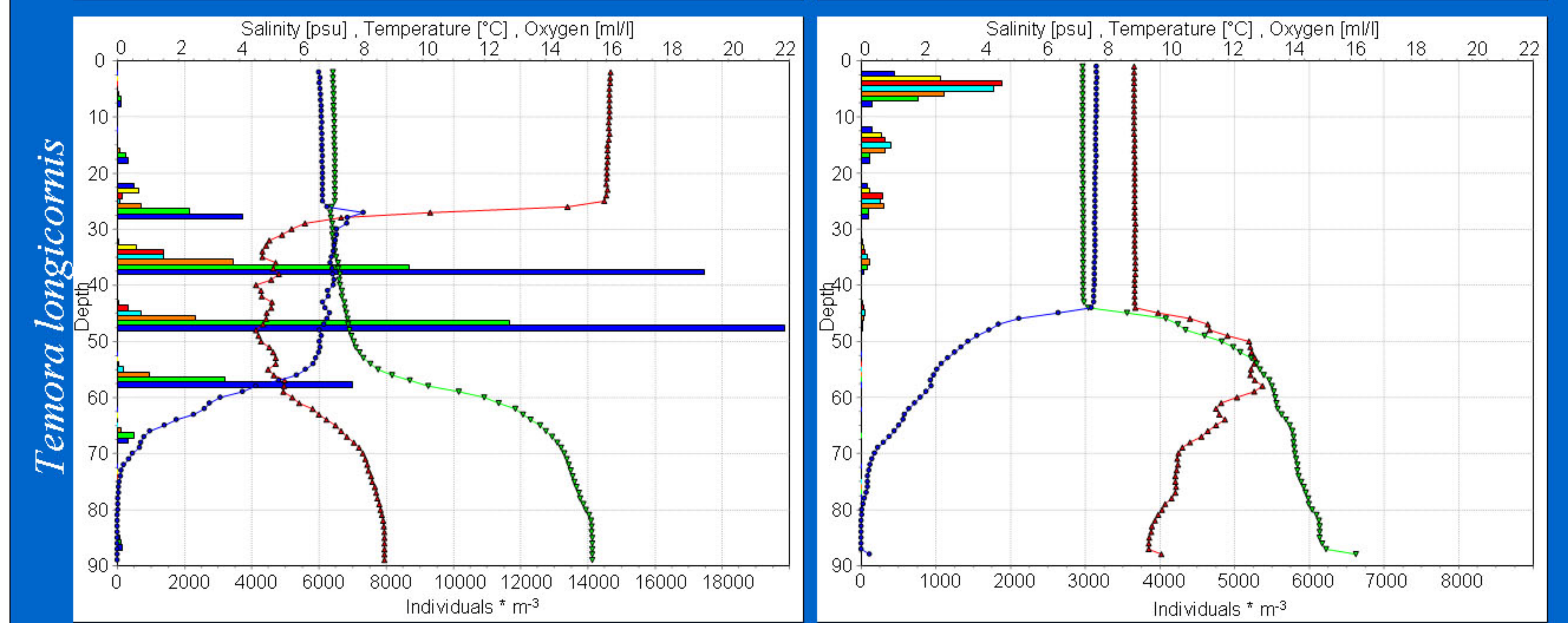
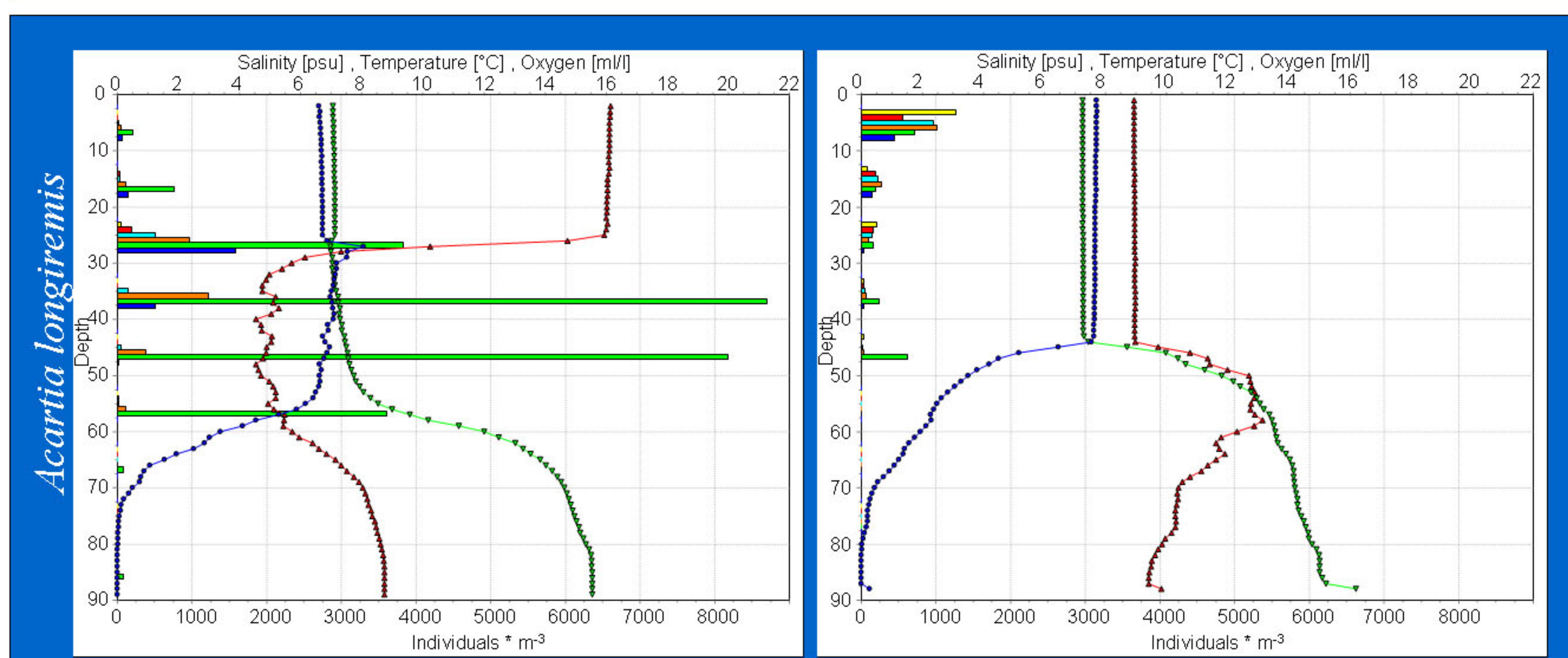
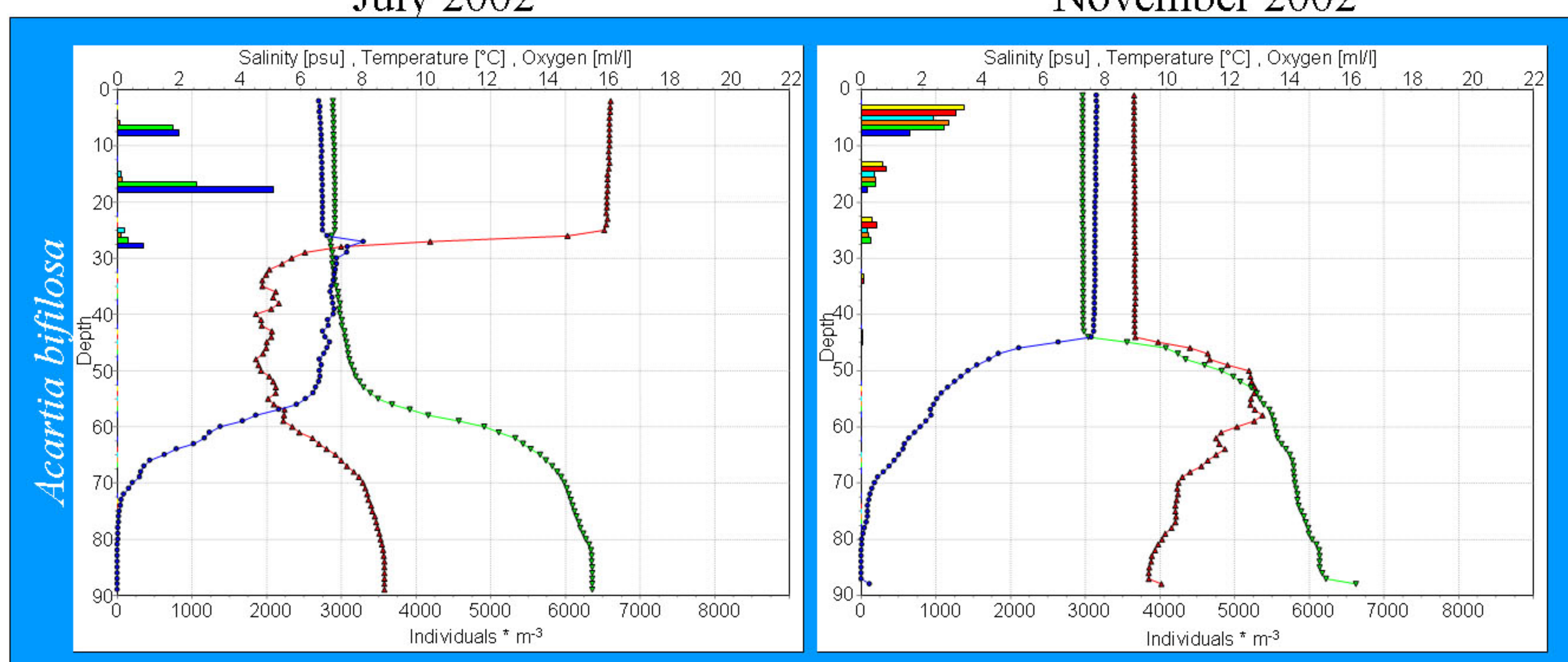


Position in the Bornholm Basin

Salinity and temperature at position 55.175°N/15.450°E in 2002

July 2002

November 2002



### Introduction

The Baltic Sea, as a marginal and highly stratified sea, represents a unique environment, where the vertical distribution of zooplankton is strongly controlled by physical parameters. The depth preferences of different zooplankton species impact ecological behaviour, predator-prey-relationships and thus trophic interactions. The data presented here are based on two cruises in July and November 2002. Daytime multinet hauls (50 µm mesh size) were taken in 10 meter steps from bottom to surface at position 55,175°N / 15,450°E.

### Results

Based on their seasonal depth distributions, the four copepod species can be assigned to one of three different patterns.

*Acartia biflosa* – During summer the adults are above the thermocline in the upper 30m. In winter the highest abundances can be found in the upper 10m.

*Temora longicornis* and *Acartia longiremis* – In summer, individuals preferred regions of intermediate water with low salinity and temperature and high oxygen content. After the breakdown of the summer stratification, the copepodites were only abundant in the upper 50m of the mixed water column. In this upper layer, highest abundances were found in the upper 10m and decreased with increasing depth.

*Oithona similis* – All copepodite stages preferred the deeper layers all year round. The vertical distribution appeared to be less determined by temperature, than by a minimum salinity threshold of 7.6 psu. The depth distribution of individuals was limited to a vertical layer of approximately 25m between the halocline (top) and oxycline (bottom). Younger stages of *O.similis* were concentrated in the halocline.

### Conclusions

Physico-chemical parameters such as temperature, salinity and oxygen play an important role in the vertical distribution of copepods.

Most brackish water tolerant copepods are accumulated in the upper water column in winter. While *Temora longicornis* and *Acartia longiremis* prefer the intermediate water body in summer, they prefer the same layer as *Acartia biflosa* during the winter. *Oithona similis* dwells permanently in the deeper layers with higher salinities.

The data indicate that the thermocline itself could represent a habitat for several younger copepodite stages of *A. longiremis* and *T. longicornis* during the summer stratification.

### Further perspectives

Future analyses will correlate the vertical, stage-resolved abundance of copepods and fish to provide a detailed analysis of trophic interactions. Data on potential cannibalism effects and stage tracking throughout the year will be obtained. The clines constitute an important habitat for the young developmental stages of various copepod species. The examination of small-scale distribution patterns in these habitats by a high resolution Video-Plankton-Recorder system is in progress. These evaluations will provide an important contribution to the understanding of how physical parameters influence patterns of biological distribution.

SP 1

SP 2

SP 3

SP 4

SP 5

SP 6

SP 7

SP 8

SP 9

SP 10

SP 11