



Small scale assessment of copepod epibionts with the LOKI (Lightframe On-sight Keyspecies Investigation) system in the Norwegian Sognefjord



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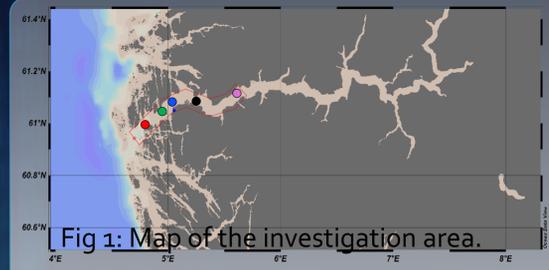


Fig 1: Map of the investigation area.

Investigation

During an expedition with RV Heincke in October 2014 five stations in the Norwegian Sognefjord were sampled using the Lightframe On-sight Keyspecies Investigation system (LOKI, Schulz et al. 2010). This in-situ optical sampling device allows assigning ambient environmental parameters with simultaneously taken high quality images on scales of a few centimetres. Thus, hydrographic parameters in the direct vicinity are available for each object and specimen.

Investigating these data for general copepod distribution patterns it was found, that copepods infested with epibionts (see bottom row for examples) are not evenly distributed throughout the water column. Here we show hydrographic distribution patterns of such specimen occurrences and demonstrate the possibilities of such in-situ optical sampling devices. The fine-scale resolution can support ecological investigations and foster processing of scientific questions at hand and beyond method-borne integration of net samplings.

Results

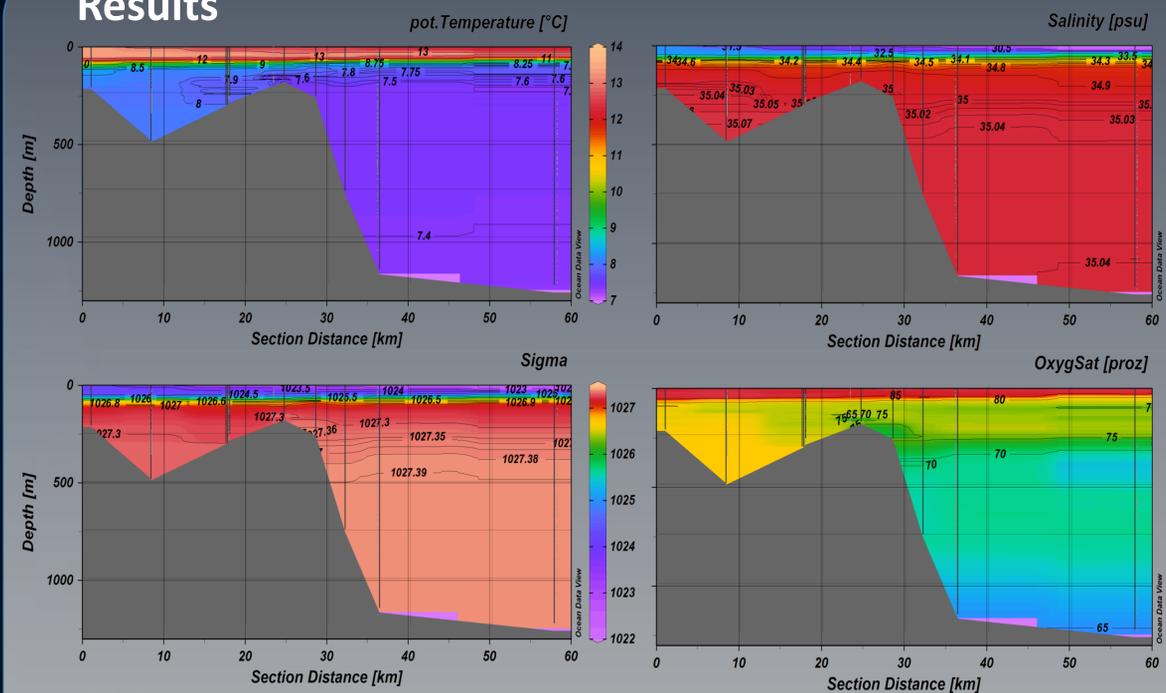


Fig. 2: Sectional plot of the hydrography during sampling. Behind the sill, in the trough of the fjord a probably stagnant, cool, higher saline and low oxygenised water body is found. On top of the system the fresh water outflow from the fjord is seen. Individual appearance of copepods with epibionts is shown by grey dots in the overlay. The majority of these specimens are found below the strong fresh water/haline cline and a minimum within this zone.

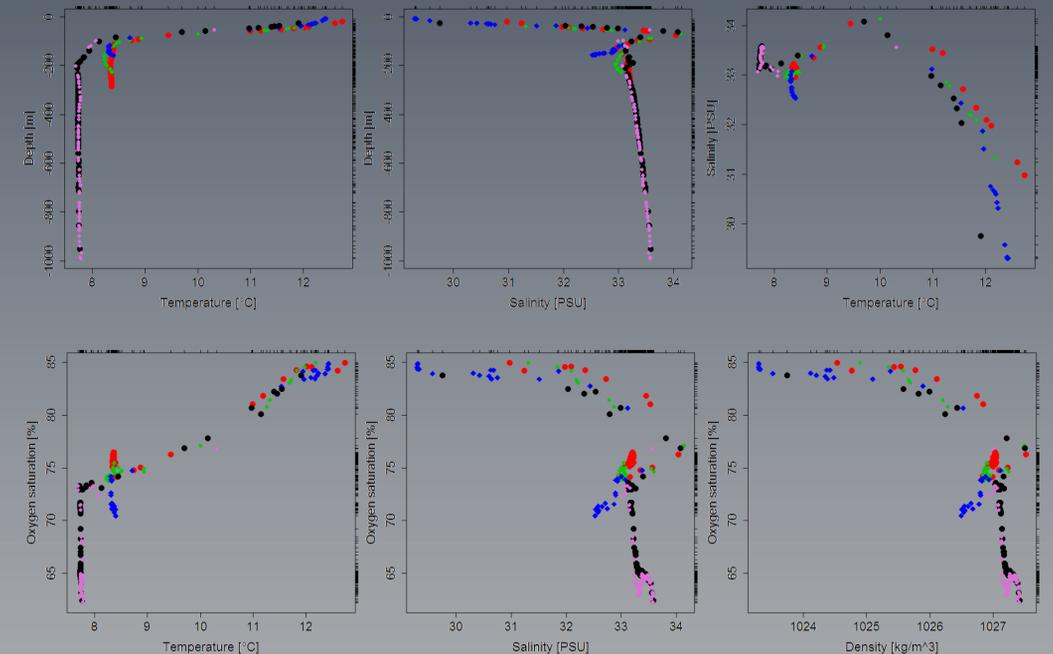


Fig. 3: Plot of individual specimen appearance in relation to ambient hydrography. Colours refer to different stations, according to the upper left map encoding. The majority of specimens is found below the outflowing surface waters, regardless of the oxygen concentration. Within gradients appearance is much lower, being more pronounced towards deeper stations in the fjord. Colours represent stations from Fig 1.

Summary

- Copepods infested with epibionts are found throughout the water column
- The majority of appearance is bound to the deeper layers below the pycnocline
- A minimum of infested copepods is found within the pycnocline
- Epibiont infestation was observed over the entire range from 60-85 % O₂ saturation
- The majority of infestations was found at hydrographic conditions below 9°C, a salinity above 32.5 and an O₂ saturation below 75%

For the first time the spatial distribution of Sognefjord copepods being infested with epibionts was shown in relation to the ambient hydrography. For such investigations optical plankton sampling tools are a powerful auxiliary tool for high resolution investigations in relation to the ambient hydrography and support abundance and biomass estimations from classical net samplings.

