

Research Highlights of GENUS SP5

Zooplankton distribution, key players and trophic levels

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Meso- and macrozooplankton dynamics in the southwest African Upwelling region: shelf sea - open ocean interactions

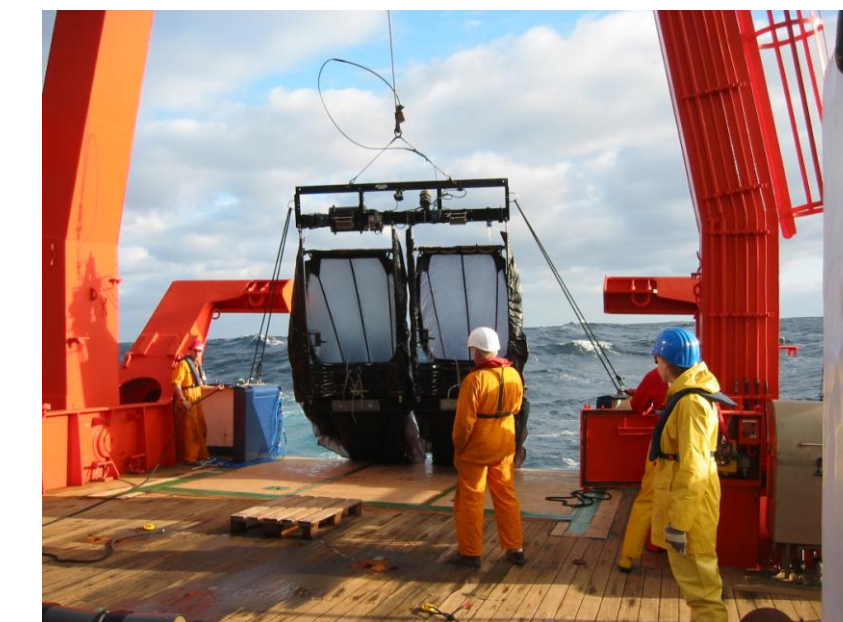
Main research goals were to examine the horizontal and vertical temporal distribution of bulk zooplankton and special groups to detect seasonal variations and possible onshore-offshore transports of material. These fine-scaled investigations will allow to detect possible future changes in the Benguela Upwelling System.

The food web structure in the upwelling system will be enlightened by using biochemical methods; stable carbon isotopes were used to identify different sources of food and stable nitrogen isotopes helped to identify the role of special groups like gelatinous organisms, chaetognaths, pteropods and crustaceans in the food web.

In cooperation with other GENUS SPs, ecological and biogeochemical processes will be synthesized and carbon as well as nitrogen budgets will be assessed.

In GENUS II the influence of special oceanographic features like upwelling filaments, fronts, boundary zones on the micro- and mesozooplankton will be investigated in addition to distribution patterns of the benthic and benthopelagic fauna.

Zooplankton sampling and analysis



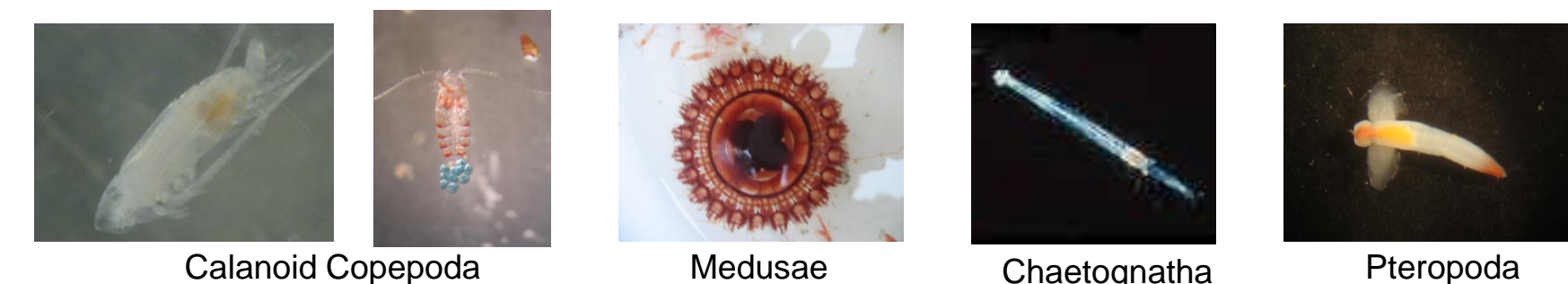
1m² Double-MOCNESS
18 nets, 333 µm mesh size

Fine-spaced sample intervals from down to 3000 m to the surface

Wet weight determination

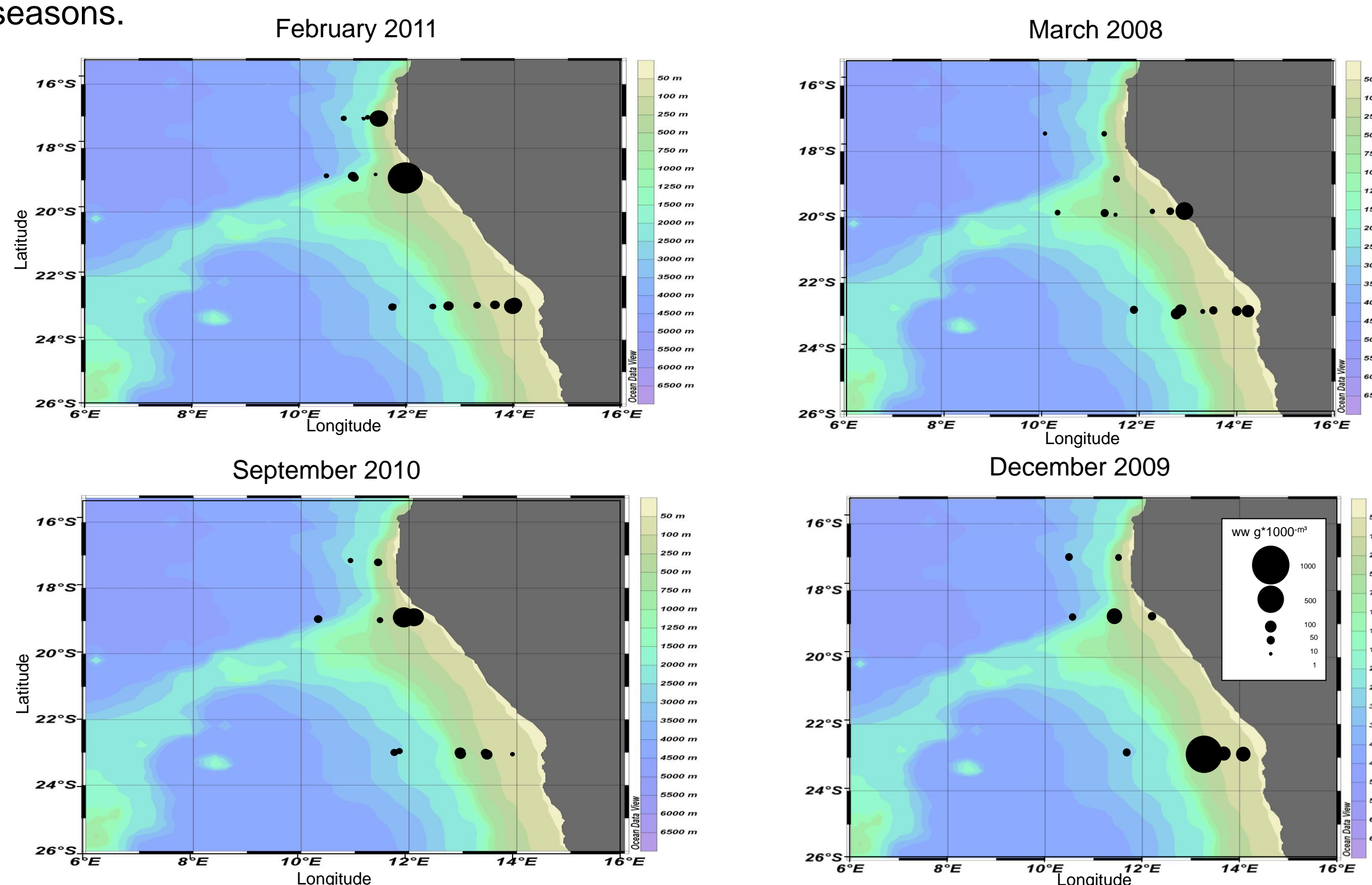
Taxonomic analyses

$\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values of mixed zooplankton and special taxa as a measure of the trophic level and the source of the diet



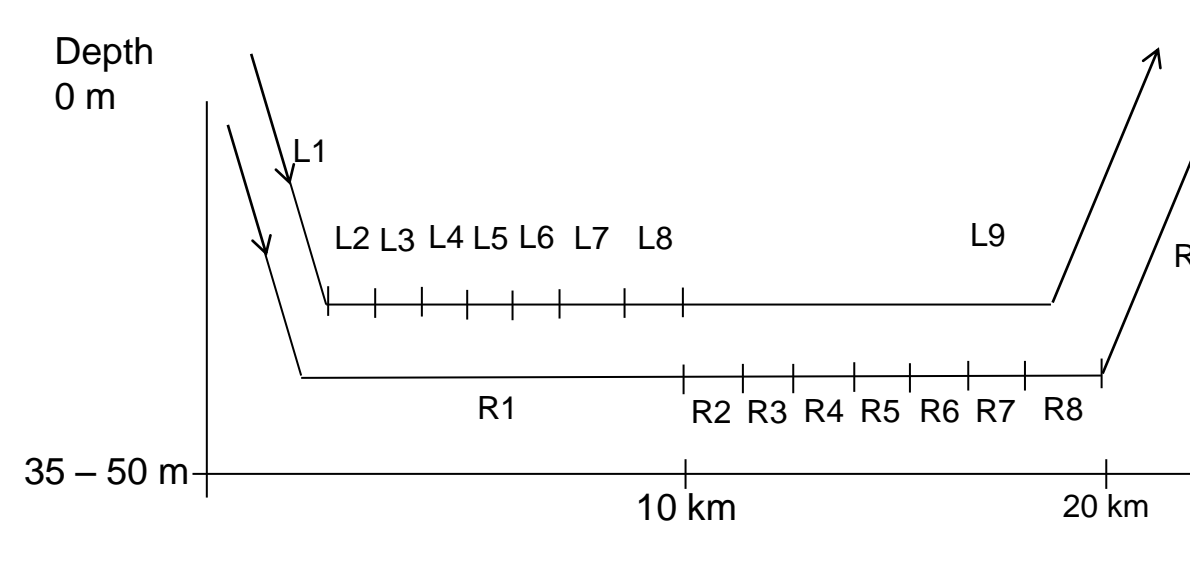
Zooplankton biomass in the upper 200 m off Namibia

A synoptic inventory between 2008 and 2011 revealed a high mesozooplankton biomass during southern summer (December 2009 and February 2011) on the Walvis Bay and Rocky Point transects at the shelf stations. Offshore biomass values were constant over the years and seasons.

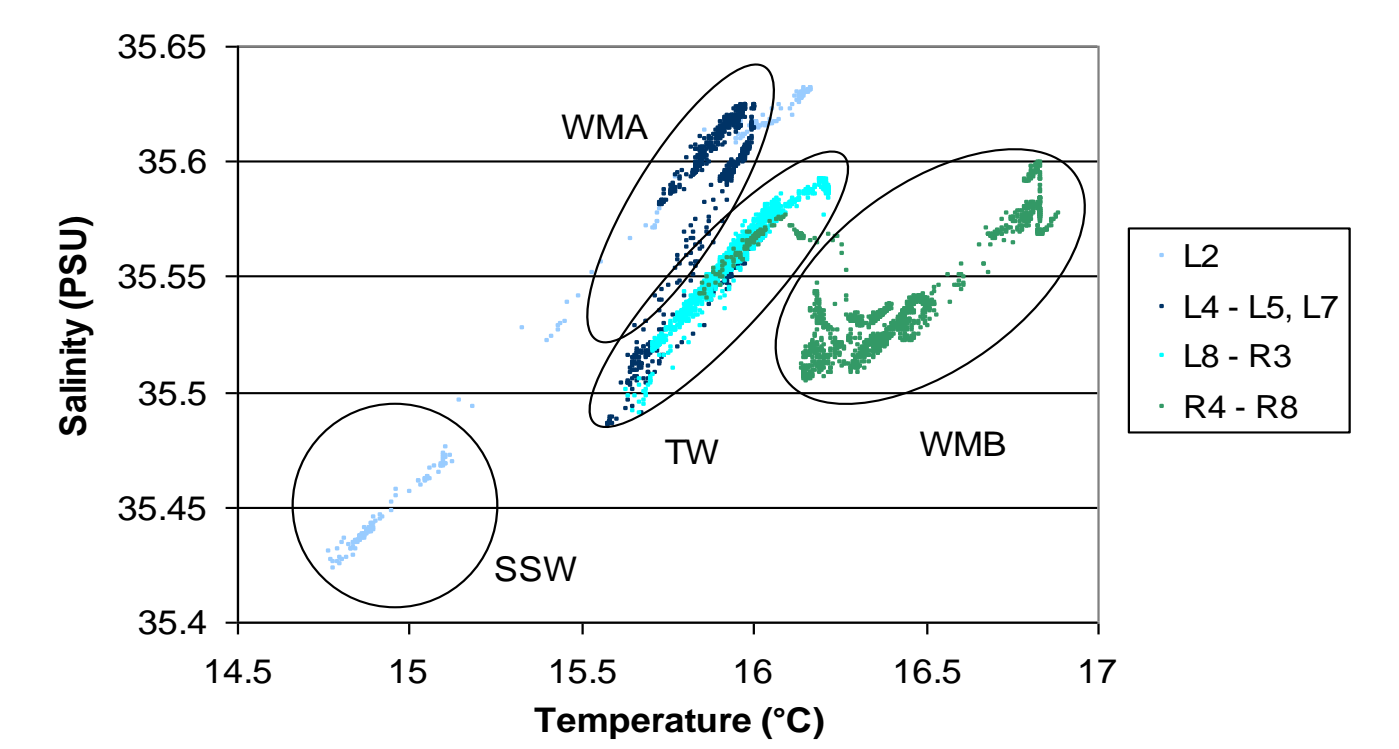


Study of an upwelling filament

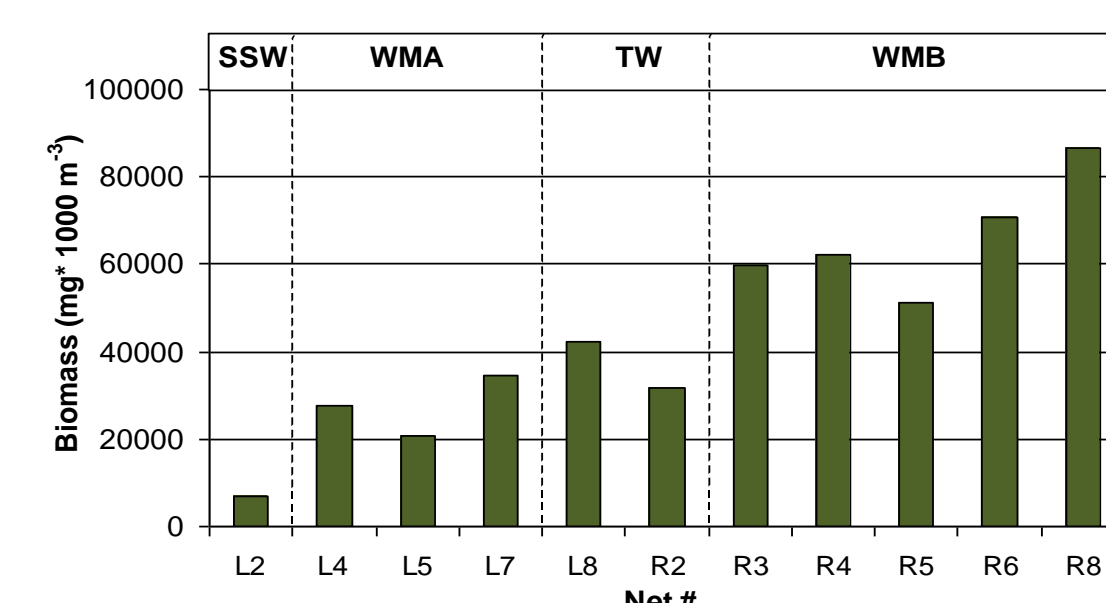
B.Sc. thesis Sarah Fitzek



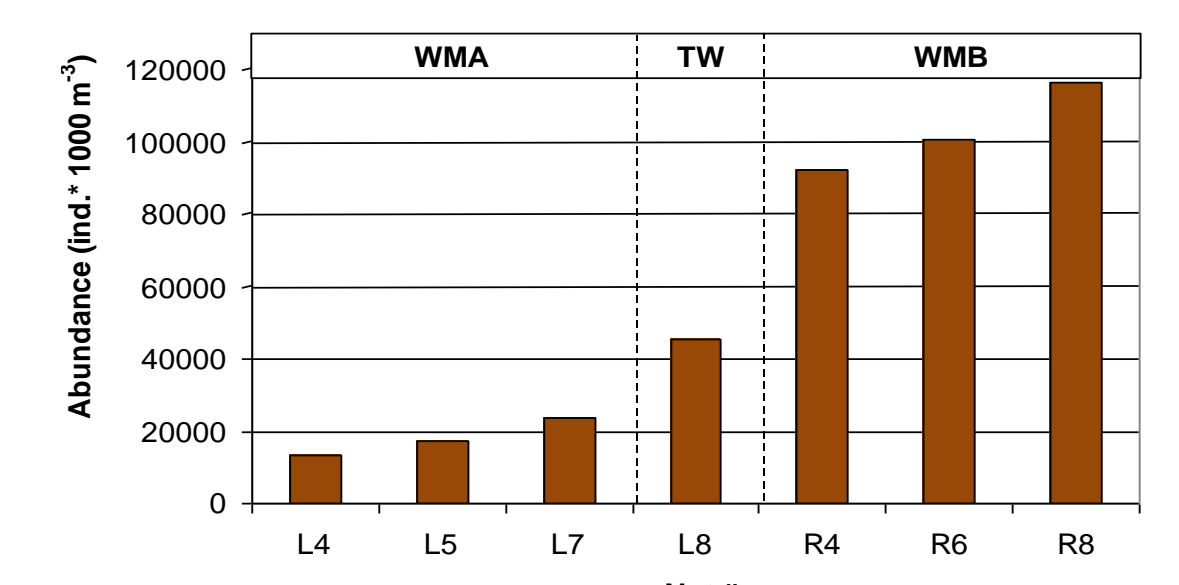
Sampling strategy of the MOCNESS haul.
L = Left nets, R = right nets



Defined water masses during the MOCNESS haul: subsurface water (SSW), water mass 'A' (WMA), transition water (TW), and water mass 'B' (WMB).



Biomass concentrations for the MOCNESS nets (sum of size fractions ≤ 5 mm) in the different water masses.



Abundances of zooplankton in the MOCNESS nets (sum of size fractions ≤ 5 mm) in the different water masses

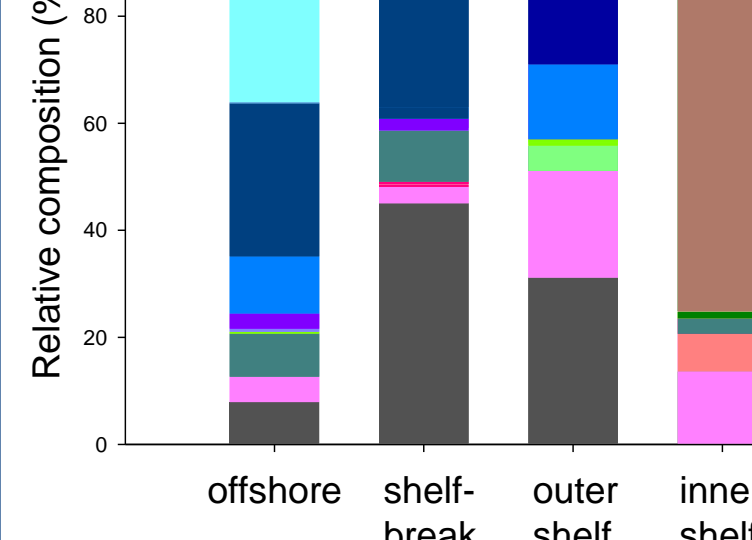
Abundance and trophic position of gelatinous and half-gelatinous organisms



Trawl catch on R.V. Africana 2009

No. 1000 m⁻³

205 294 478 222

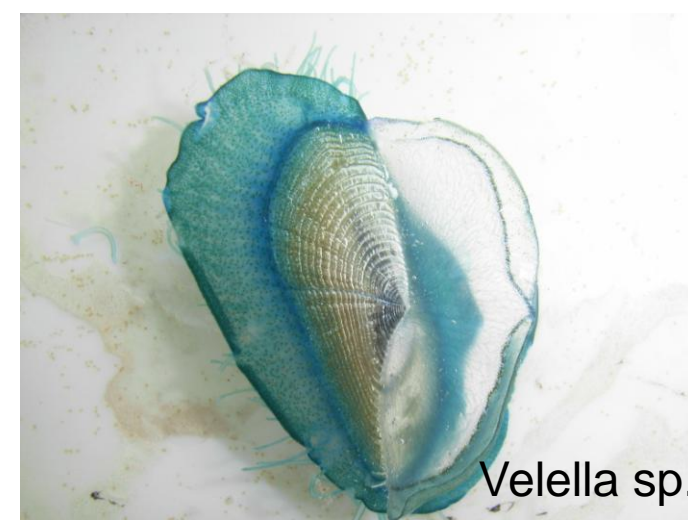


The relative composition of Medusae at different stations shows a decrease in diversity from offshore to onshore stations.

Since the 1970's the abundance of gelatinous zooplankton increased in the northern Benguela Current System, possibly due to overfishing. In a M.Sc. study, the distribution, taxonomical composition and trophic position of gelatinous and half-gelatinous zooplankton in the region has been investigated



Chrysaora sp.

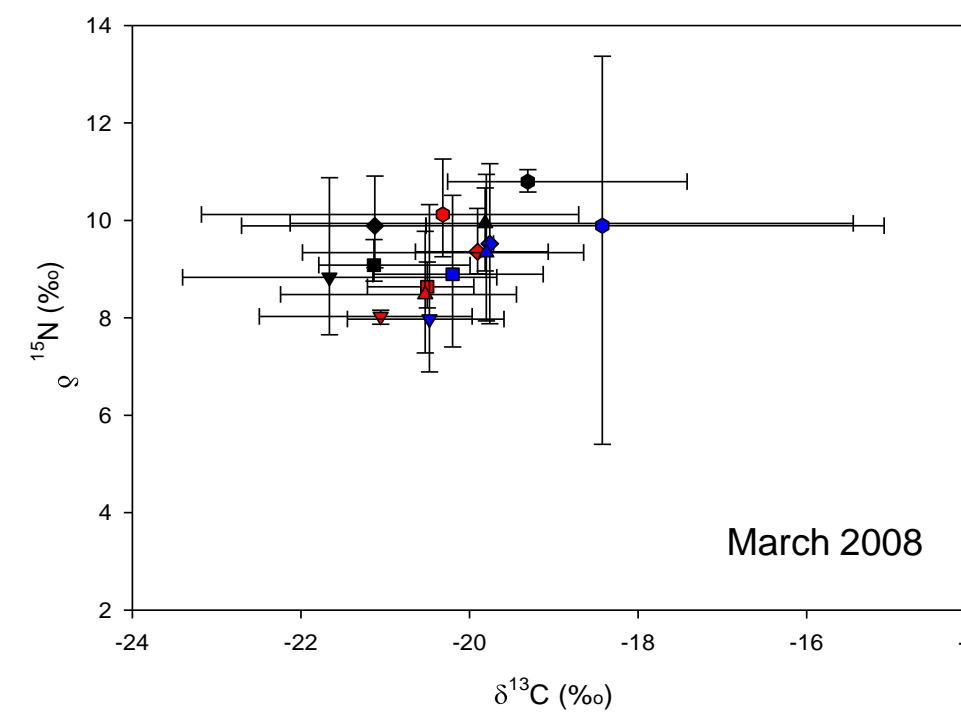


Velella sp.

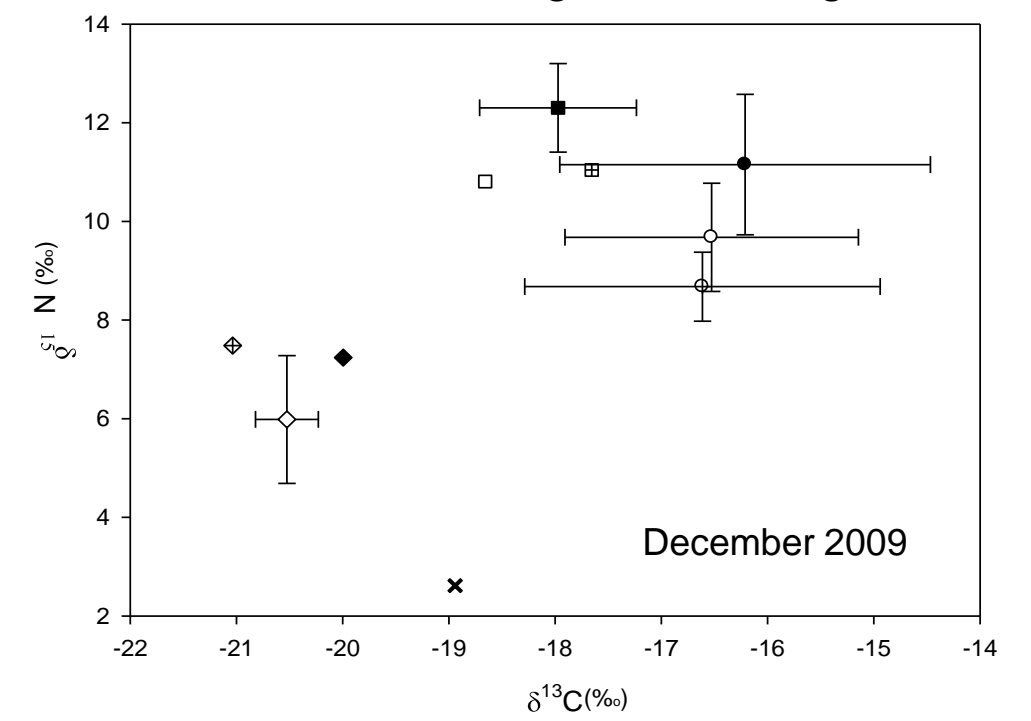
M.Sc. Sarina Jung

Stable nitrogen ($\delta^{15}\text{N}$) and stable carbon ($\delta^{13}\text{C}$) isotopic signatures

Zooplankton size classes



Gelatinous and half gelatinous organisms



Stable isotope analyses of zooplankton size classes revealed strong mean variations with highest $\delta^{15}\text{N}$ in organisms > 5 mm from mesopelagic depths (left). Chaetognaths as well as Medusae were identified as predators with $\delta^{15}\text{N}$ of 8 -11 (‰), while $\delta^{15}\text{N}$ values in filter feeders like salps and pteropods were low (right).