

# **Trophic levels ( relationships) and Isotopes**

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## ECOFISH: WP2:Task 2.4

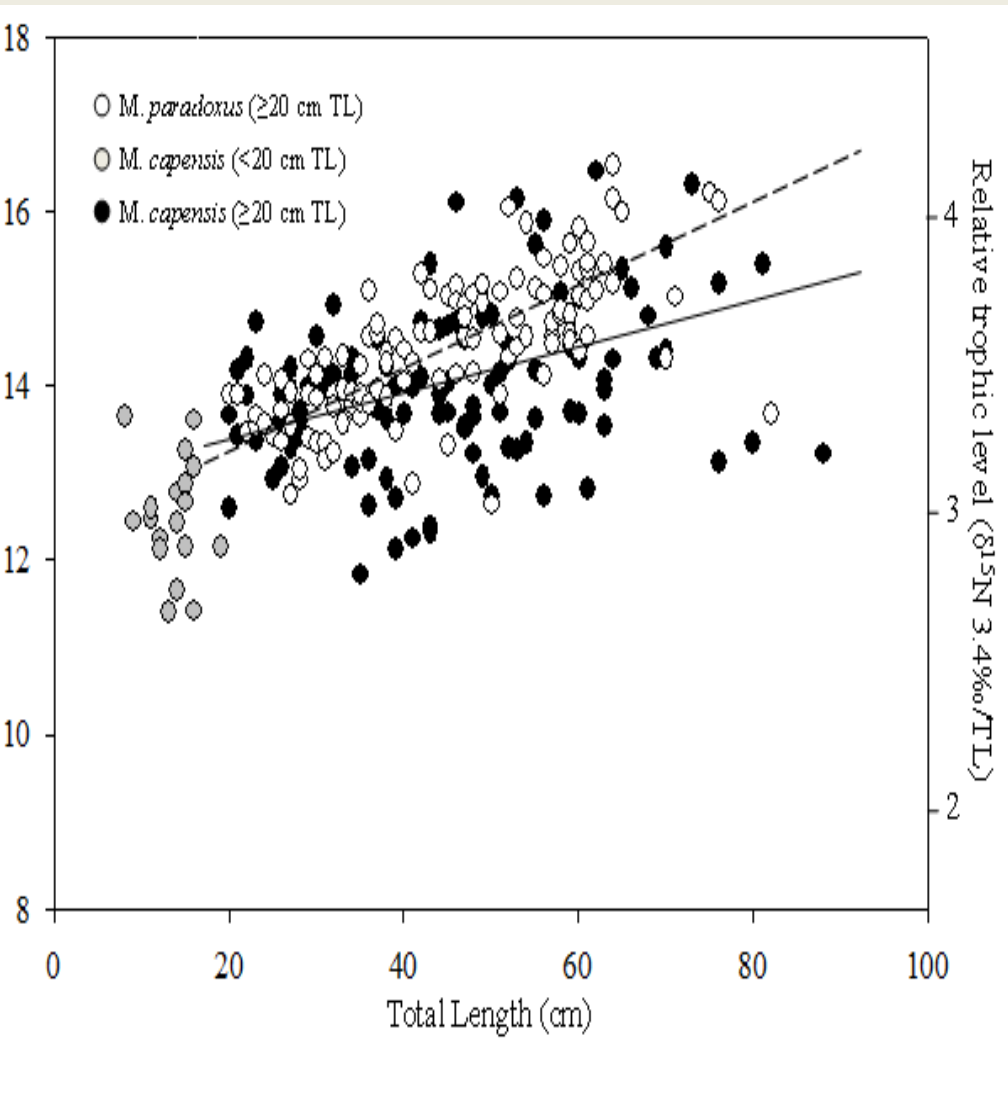
- To determine the trophic positions of hake, horse mackerel , sardinella, and other important pelagic and demersal species using stable isotope( $\delta^{15}\text{N}$  and  $\delta^{13}\text{C}$ )
- Refinement and/or further development of ecosystem model based on trophic information.

## **Samples / data**

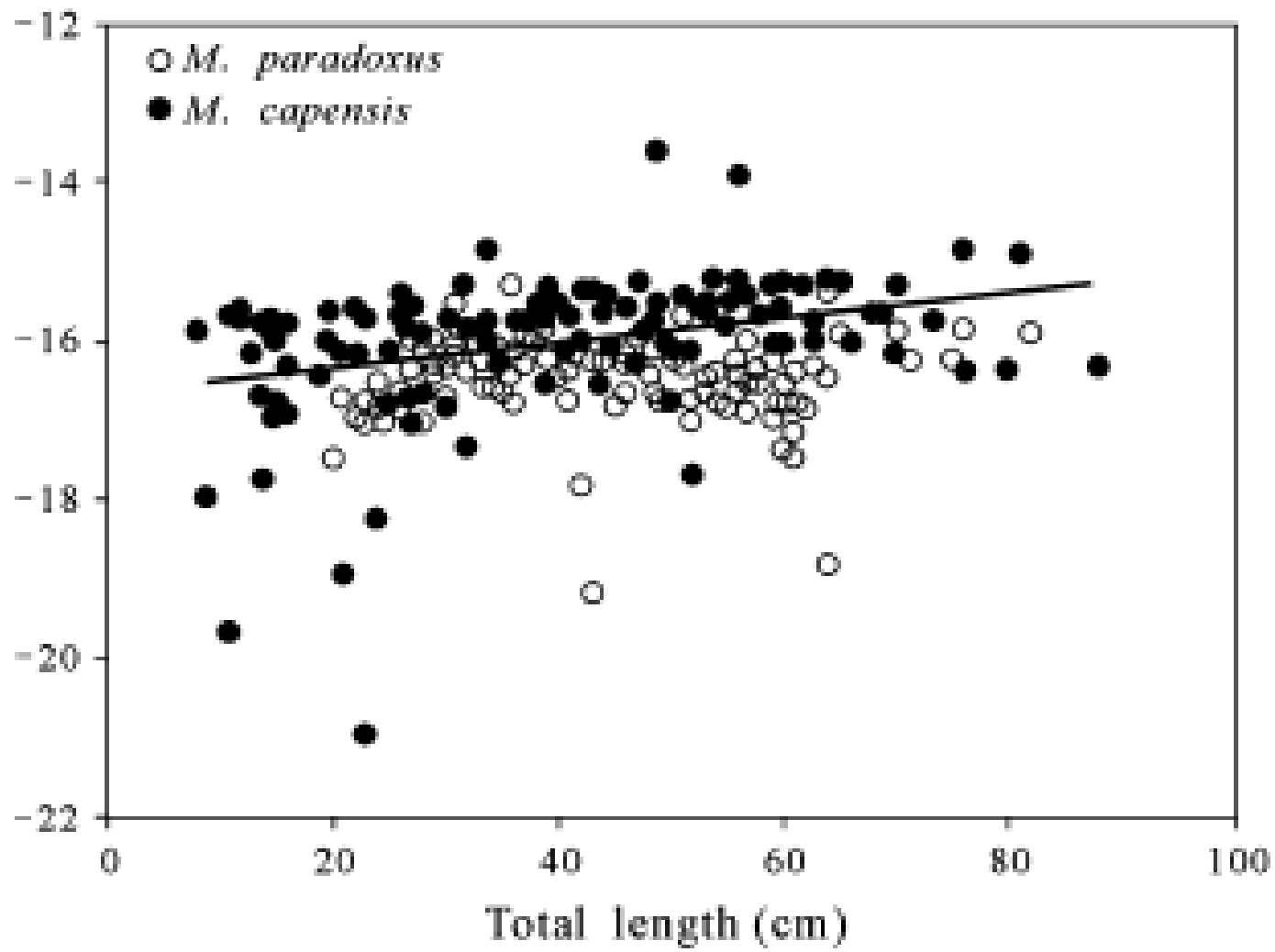
- Data are collected from Northern Benguela region (Namibia and Angola) during national survey
- Laboratory preparations are done at NatMRIC
- Isotopic analysis is done at Rhodes University

**Preliminary results with a special focus on hake**

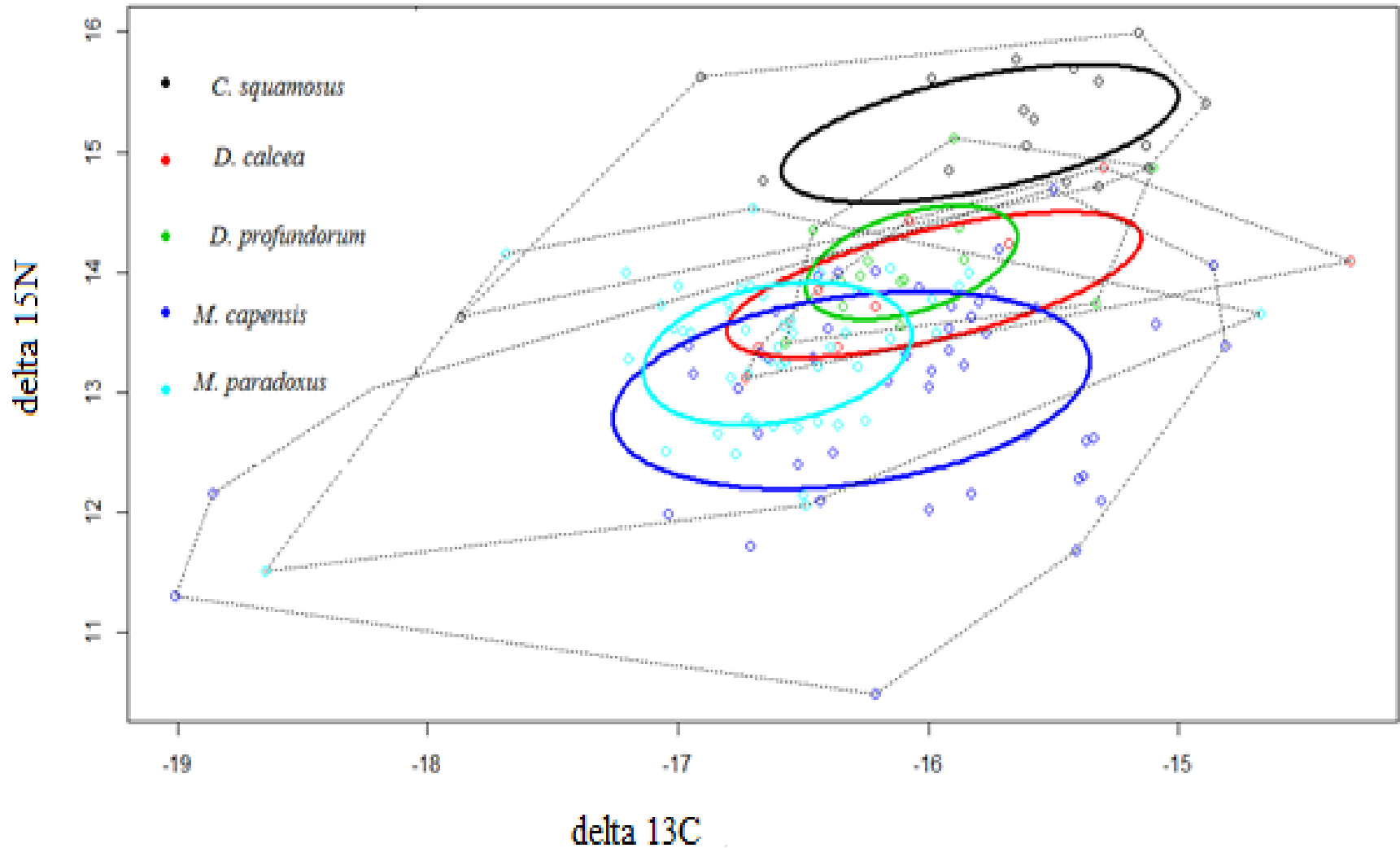
# On hake species ontogenic trophic relationships



- Both hake species showed significant size-specific shifts in  $\delta^{15}\text{N}$
- MP displayed a stronger relationship between size and  $\delta^{15}\text{N}$
- MP feed at higher trophic position than MC



# On comparison of trophic niche (SIBER - Jackson *et.al* 2011)



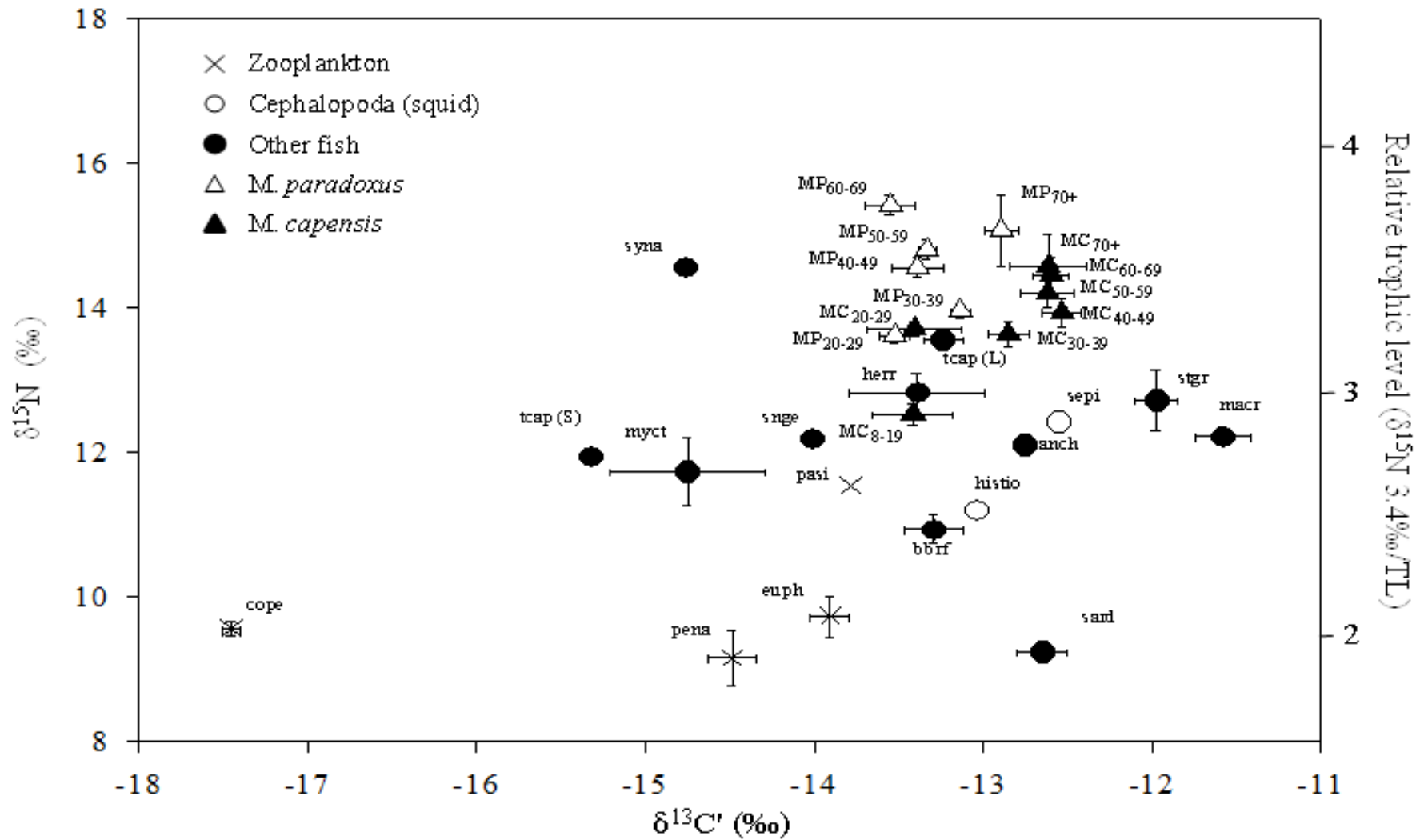
# On contributions of different prey to the diet of hake – Isotope mixing model (SIAR – Parnell *et.al.* 2010)

**Table 4.2:** Mode, mean and 95 % credible intervals (CI) of feasible contributions of the prey categories into the isotopic mixtures of *M. capensis* and *M. paradoxus*, respectively; all sizes of hake were pooled.

	<i>M. paradoxus</i>				<i>M. capensis</i>			
	Mode	Mean	95% CI		Mode	mean	95 % CI	
			Low	High			Low	High
<b>Crustaceans</b>								
<i>Trisetus varidens</i>	0.63	1.82	0.00	4.83	0.49	2.24	0.00	6.79
<i>Polinocera africana</i>	0.59	1.48	0.00	3.98	0.79	2.08	0.00	5.11
<i>Phelionika martia</i>	9.38	12.08	1.51	25.58	10.42	13.28	0.94	23.55
uphausiids(krill)	9.26	7.77	0.00	16.80	7.70	7.76	0.04	15.30
<i>Unchalia woodwardi</i>	0.83	2.50	0.00	5.72	0.72	3.37	0.00	8.81
<b>Teleosts</b>								
<i>Thelidonichthys capensis</i>	0.74	1.13	0.00	2.56	0.41	1.30	0.00	3.63
<i>Thlorophthamus agazizi</i>	18.54	18.32	4.24	30.88	13.92	15.71	1.41	27.70
<i>Immeliichthys nitidus nitidus</i>	0.23	1.54	0.00	3.75	0.62	2.38	0.00	6.77
<i>Pigonus denticulatus</i>	0.99	1.22	0.00	2.99	0.27	1.19	0.00	3.41
<i>Trumeus whiteheadi</i>	0.54	1.70	0.00	4.80	0.80	2.08	0.00	5.65
<i>Ielicolenus dactylopterus</i>	0.46	1.36	0.00	3.78	0.32	1.74	0.00	4.91
cyctophids	5.09	14.30	0.00	36.10	10.03	11.19	0.17	22.76
<i>Lezumia micronychodon</i>	0.23	0.64	0.00	1.49	0.27	0.79	0.00	2.13
<i>Paracallionymus costatus</i>	0.38	1.59	0.00	4.61	0.83	1.89	0.00	4.99
<i>Thosichthys argenteus</i>	0.74	3.25	0.00	8.81	0.76	3.34	0.00	8.65
<i>Ufflogobius bibartus</i>	0.19	1.03	0.00	2.37	0.32	1.29	0.00	3.76
<i>Ynagrops microlepis</i>	19.34	19.56	4.77	34.24	16.74	17.20	1.04	28.68
small hake (<15 cm)	0.46	1.71	0.00	4.12	1.01	2.16	0.00	6.16
<i>M. paradoxus</i> (<40 cm)	0.25	1.20	0.00	3.38	0.36	1.61	0.00	4.76
<i>M. capensis</i> (<40 cm)	0.23	1.31	0.00	3.28	0.40	1.67	0.00	4.96
<b>Cephalopods</b>								
<i>Godarodes sagittatus</i>	0.31	1.65	0.00	4.25	0.34	1.87	0.00	5.31
<i>Godaropsis eblane</i>	0.64	2.85	0.00	7.69	1.07	3.86	0.00	9.31



# On relative trophic levels



How can these trophic information be considered in fishery management decisions and stock assessment model ..?

## **Task 2.4 status : Ongoing**

- Field sample collection is finished
  - Finalization of laboratory sample Analyses (October 2013 – March 2014)
  - In depth data analyses (April 2014-August 2014)
  - Refinement of ecosystem models results with new trophic information (September 2014-February 2015).
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- **THANK YOU**