Workshop on the Regional Environmental Plan for the Area of the Northern Mid Atlantic Ridge
25 -29 November 25, 2019, Évora, Portugal.

Pelagic Habitats

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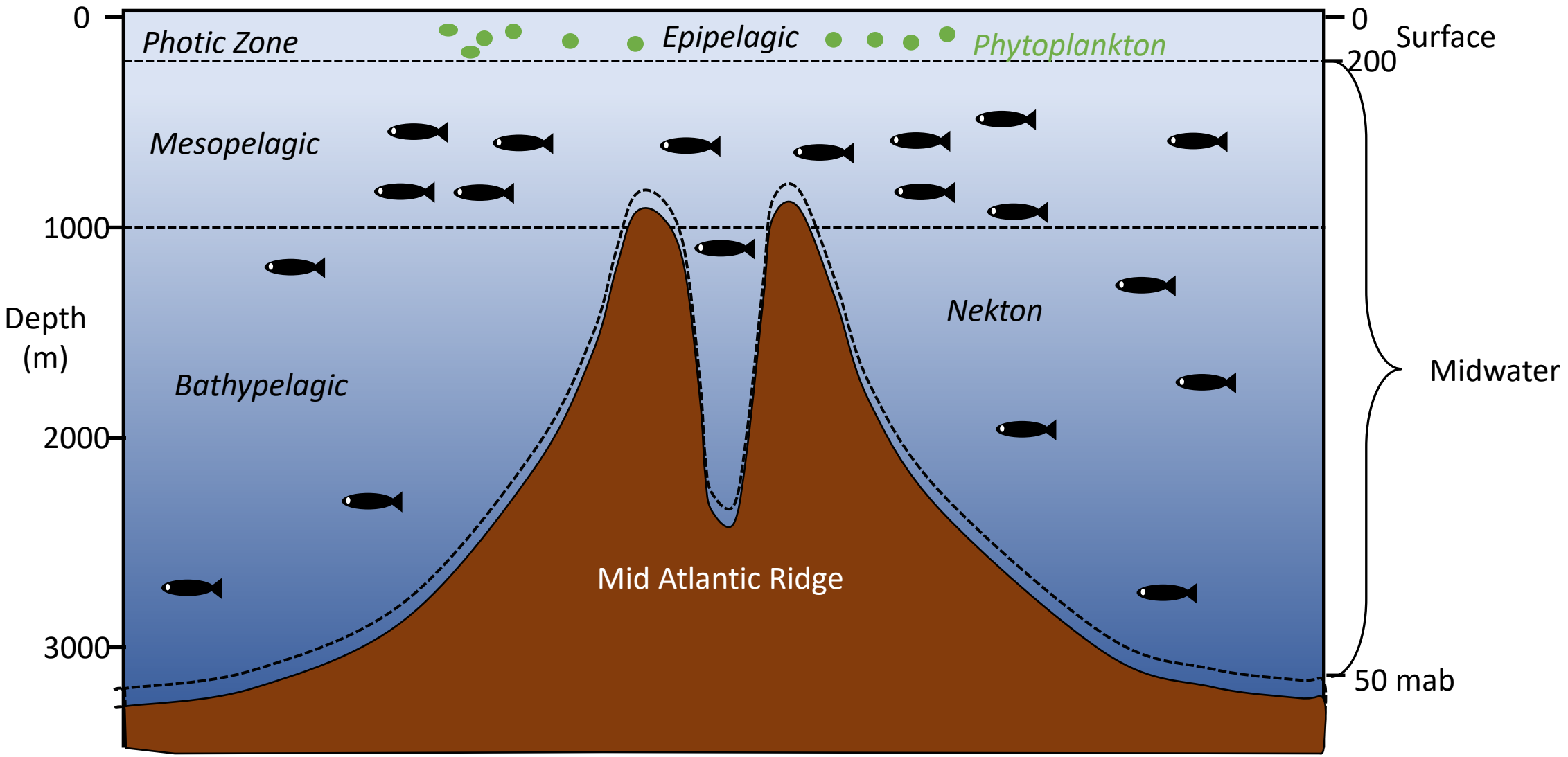
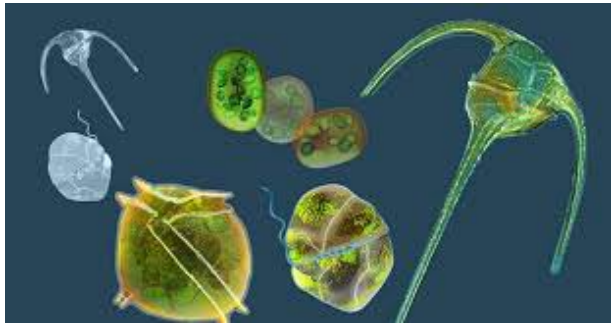
Pelagic Depth Zones over the Mid Atlantic Ridge



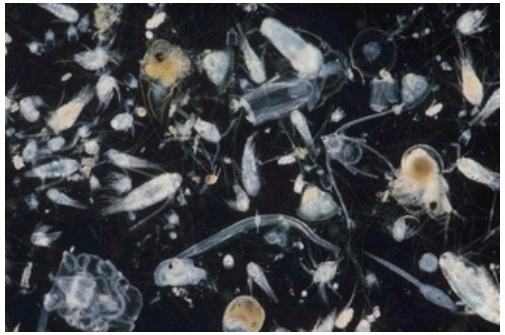
Pelagic Life

Phytoplankton



https://marine-phytoplankton.com.au

Zooplankton



https://gomecc3.wordpress.com

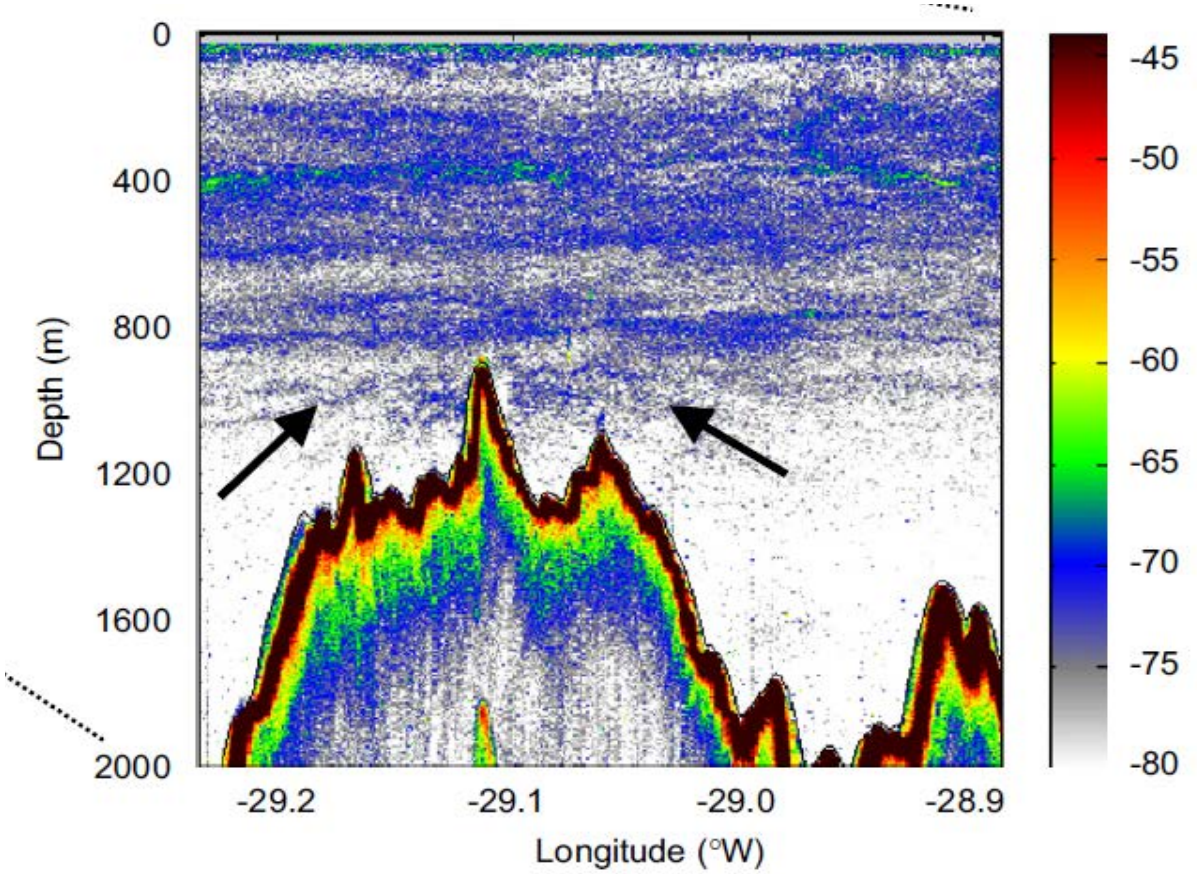
Nekton

Spivak etal2019_FrenteMaritimo_Annotated checklist of SWA decapoda

https://apeirondivulgacion.wordpress.com/2017/11/10/curiosidades-el-vampyrot

Deep-scattering Layer over the Mid Atlantic Ridge

Ship's sonar image 18 kHz acoustic backscatter



48°N 28.5°W in the Azores region. (Sutton et al, 2008)

Very large Biomass

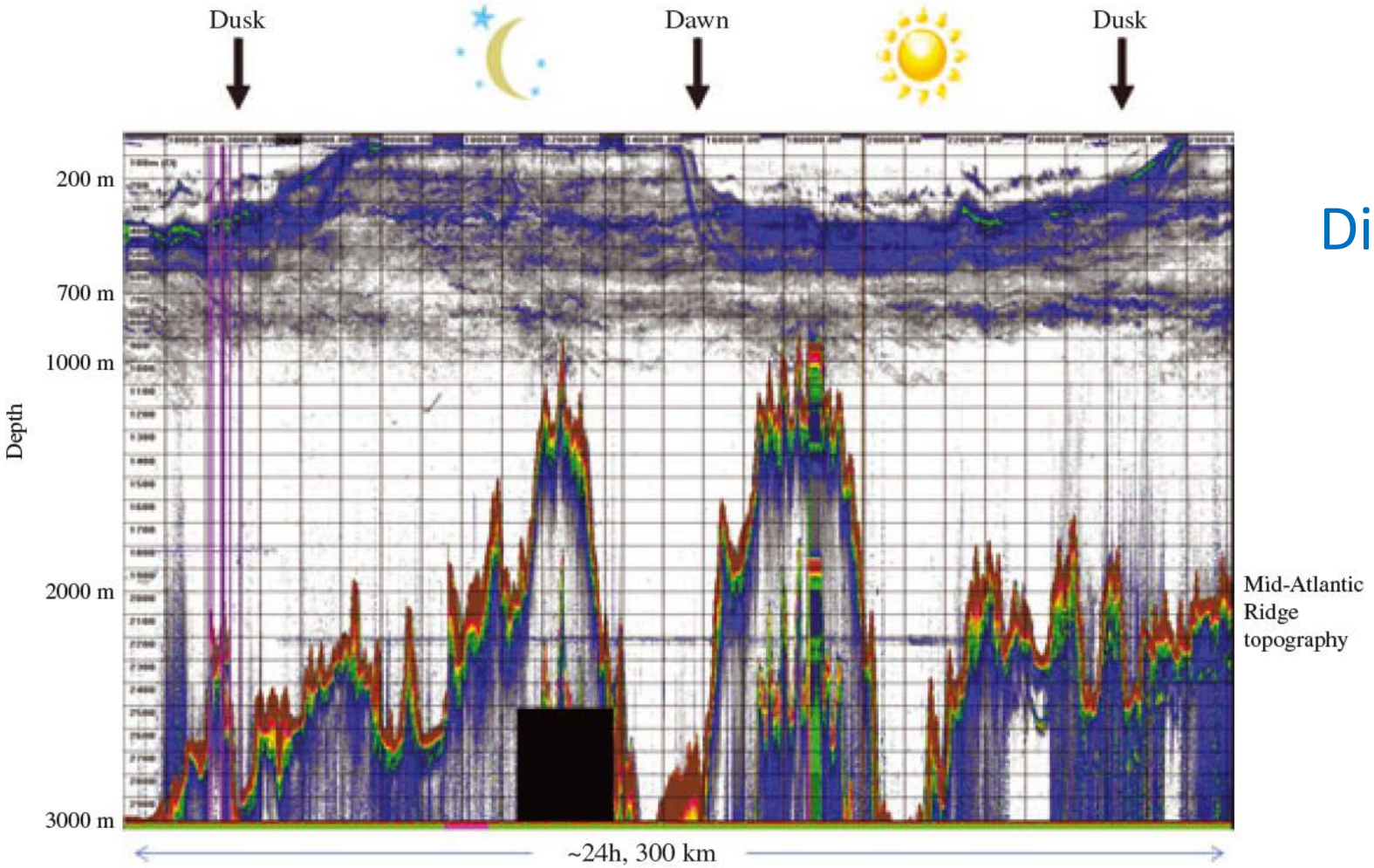
Mesopelagic fishes global biomass

1 Gt (10^9 tonnes, Gjøsæter & Kawaguchi, 1980)

10 Gt (10^{10} tonnes, Kaartvedt et al. 2012)

Global fish catch 100 Mt

Deep-scattering Layer over the Mid Atlantic Ridge

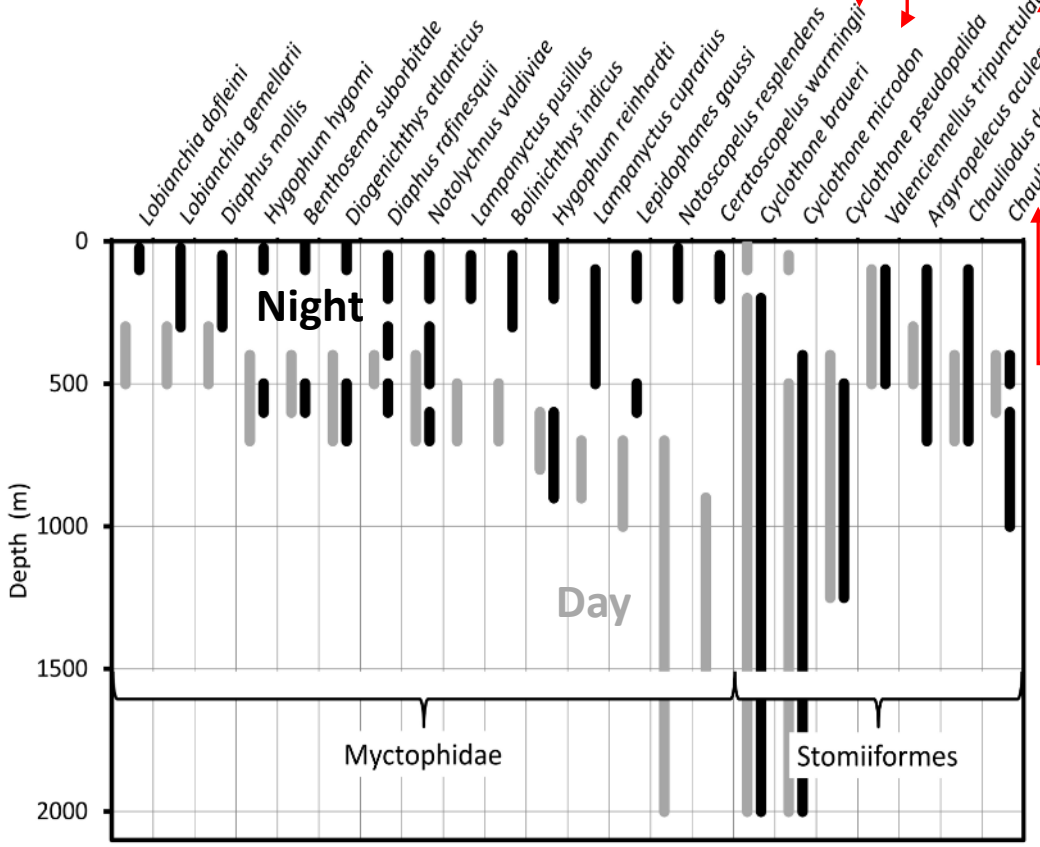


Diel vertical migration

DVM

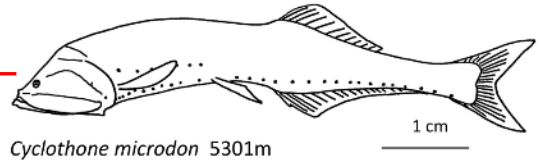
From Sutton et al., (2013)

Diel vertical migration varies between species

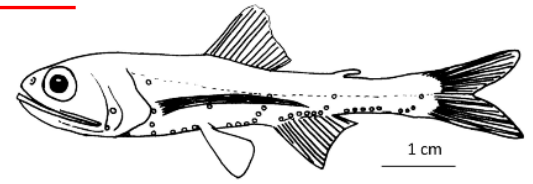


After Badcock & Merrett(1976)

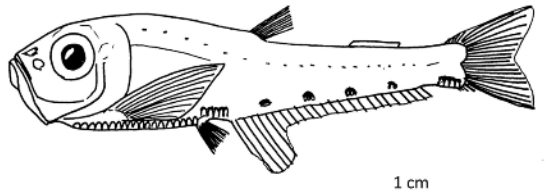
Forage Fish



Cyclothone microdon 5301m

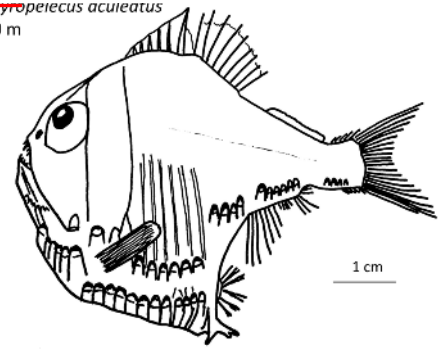


Ceratoscopelus warmingii 2014 m

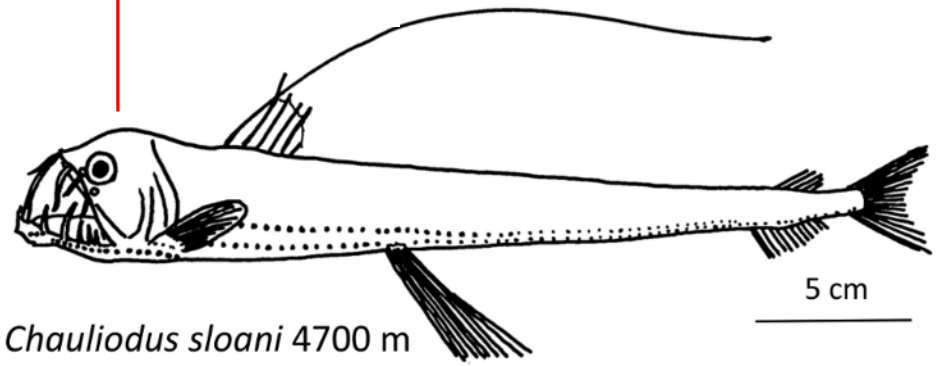


Valenciennellus tripunctulatus
1000 m

Argyropelecus aculeatus
600 m



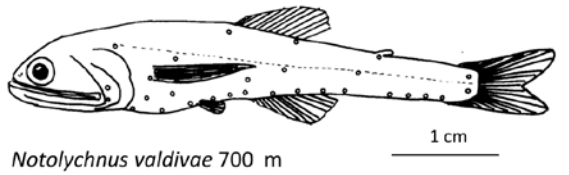
Predators



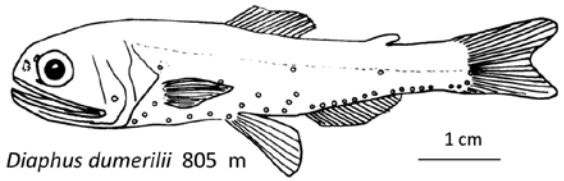
Chauliodus sloani 4700 m

Prey

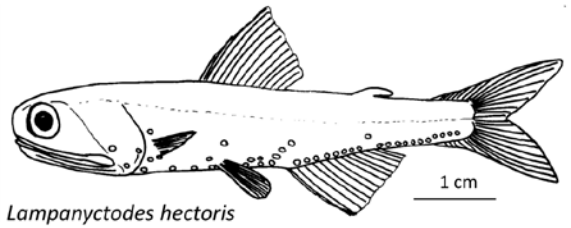
Myctophids (Lanternfishes)



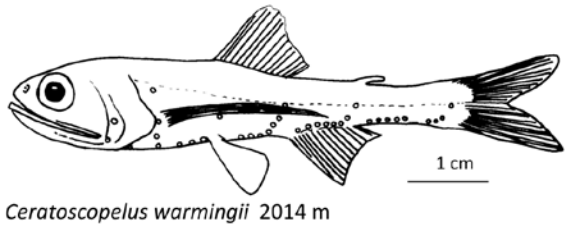
Notolychnus valdivae 700 m



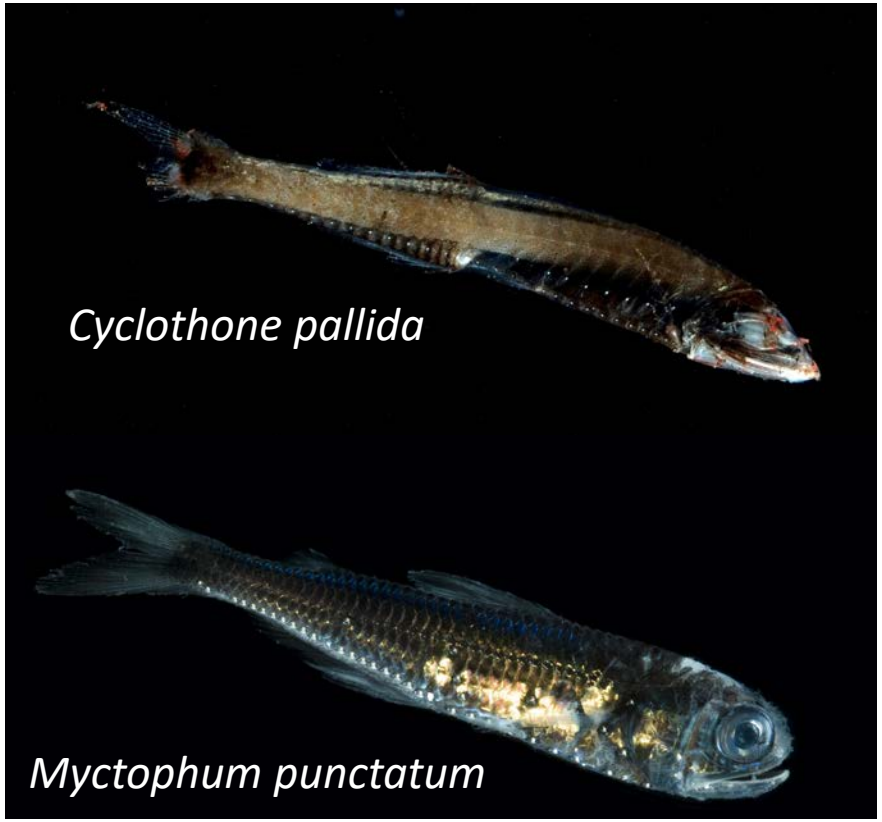
Diaphus dumerilii 805 m



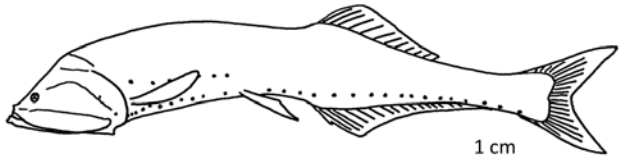
Lampanyctodes hectoris



Ceratoscopelus warmingii 2014 m



Gonostomidae (bristlemouths)



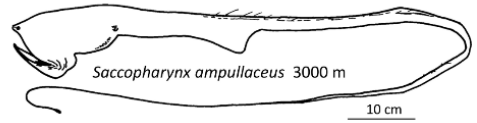
Cyclothone microdon 5301m

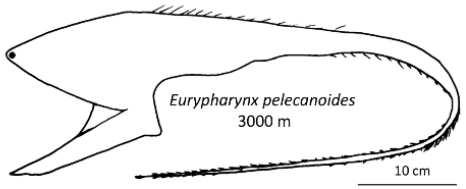
Caridea (shrimps)

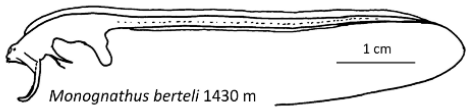
http://dx.doi.org/10.1016/j.dsr2.2013.08.017

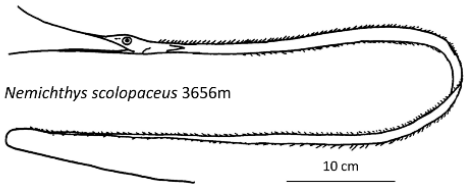
Predators

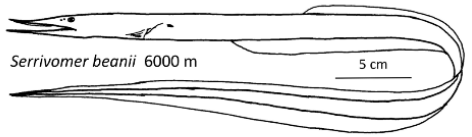
Eels, Gulpers Sawtooths etc.



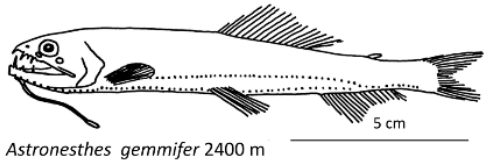


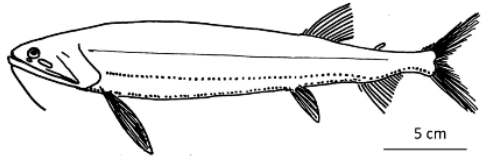


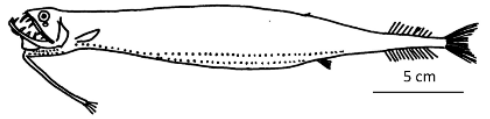


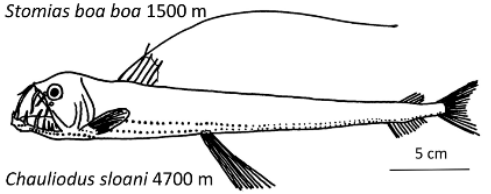


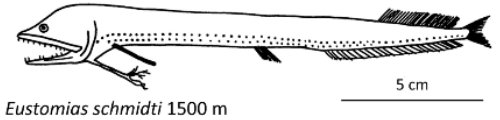
Dragonfishes

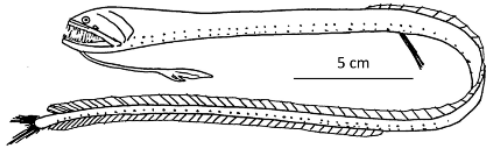


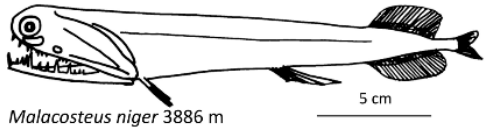








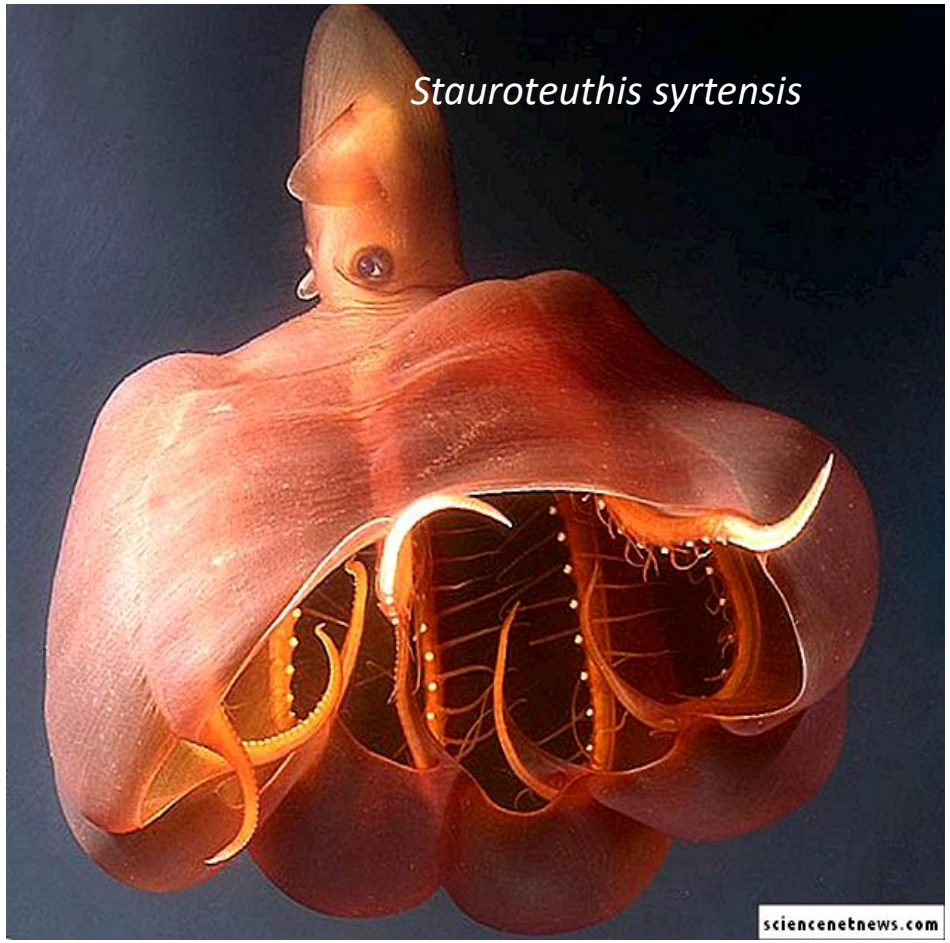




Predators

Squid

Octopus



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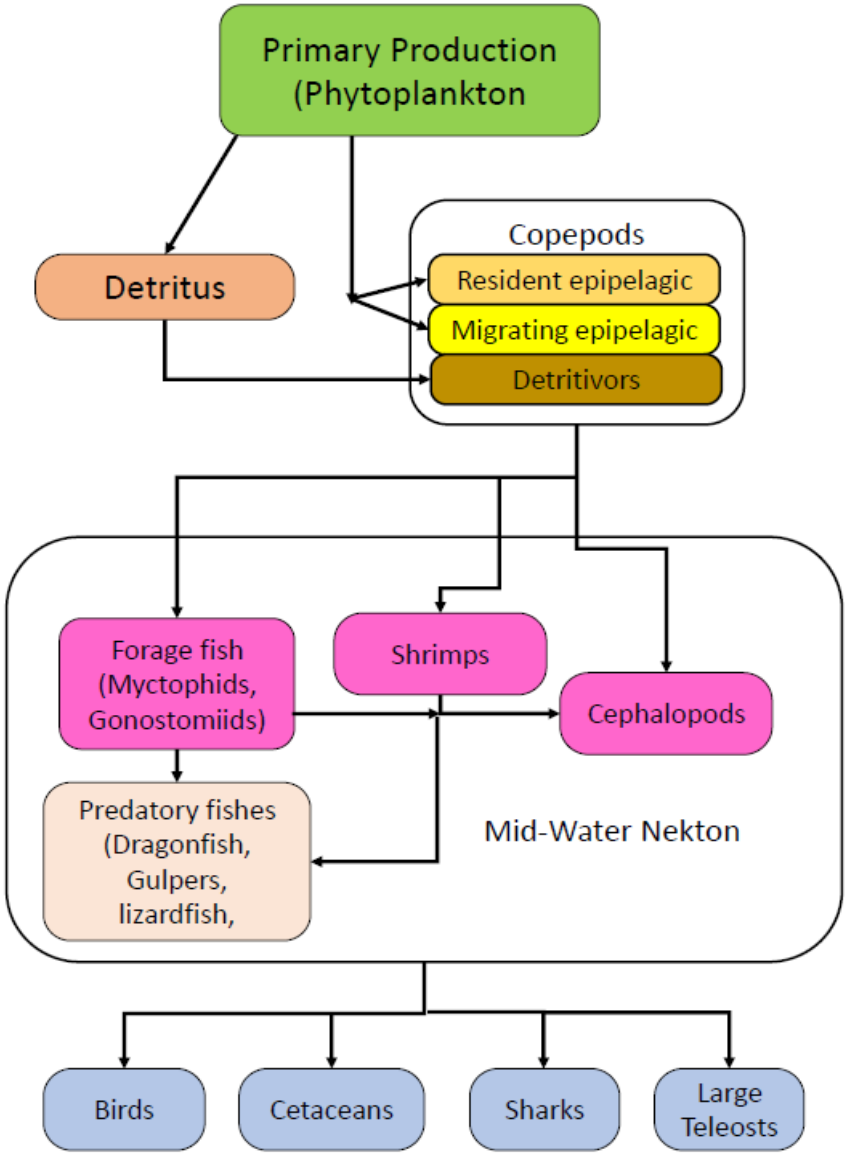
The Mid-Water Food Chain



After Anderson et al. (2019)

Deep-Scattering Layer

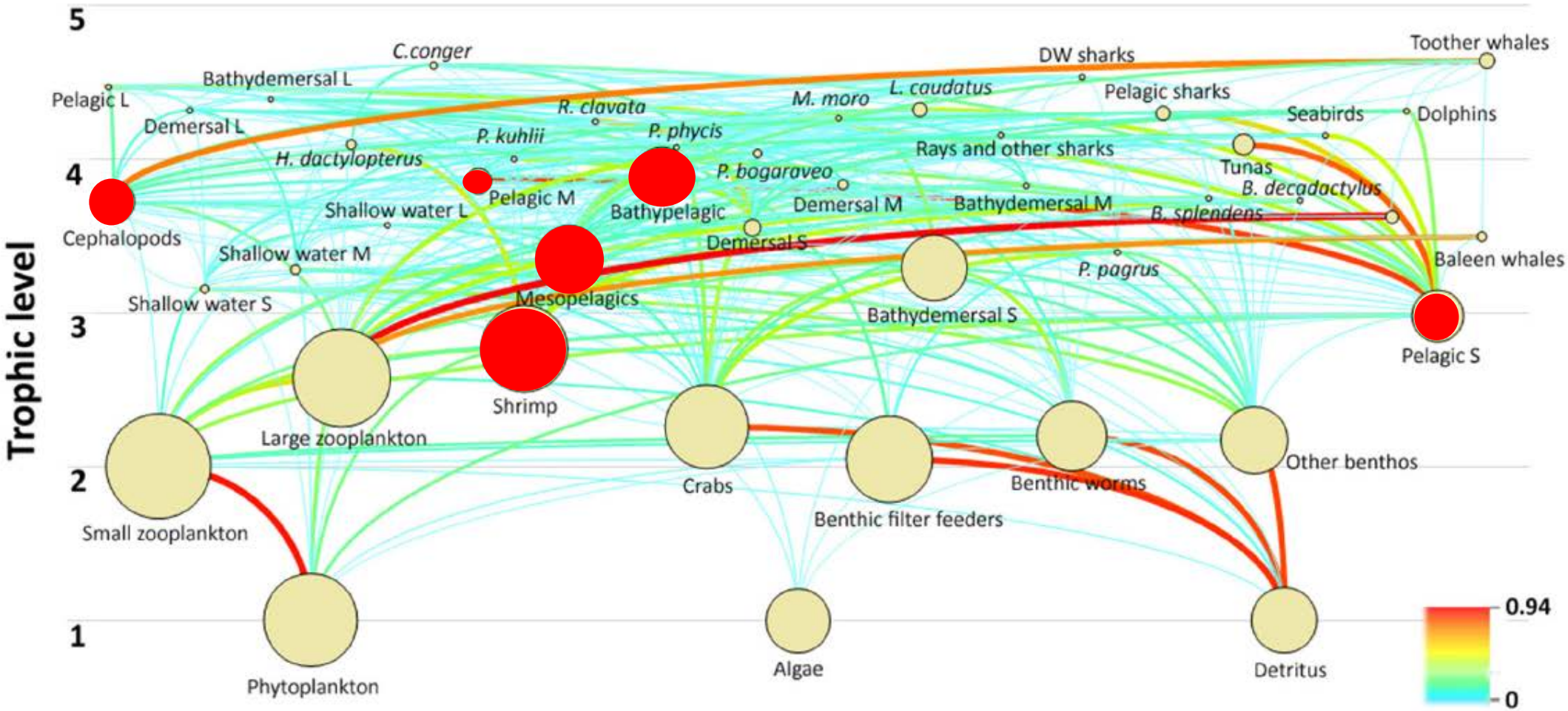
DVM

Biological Pump

Transfers energy from Plankton to

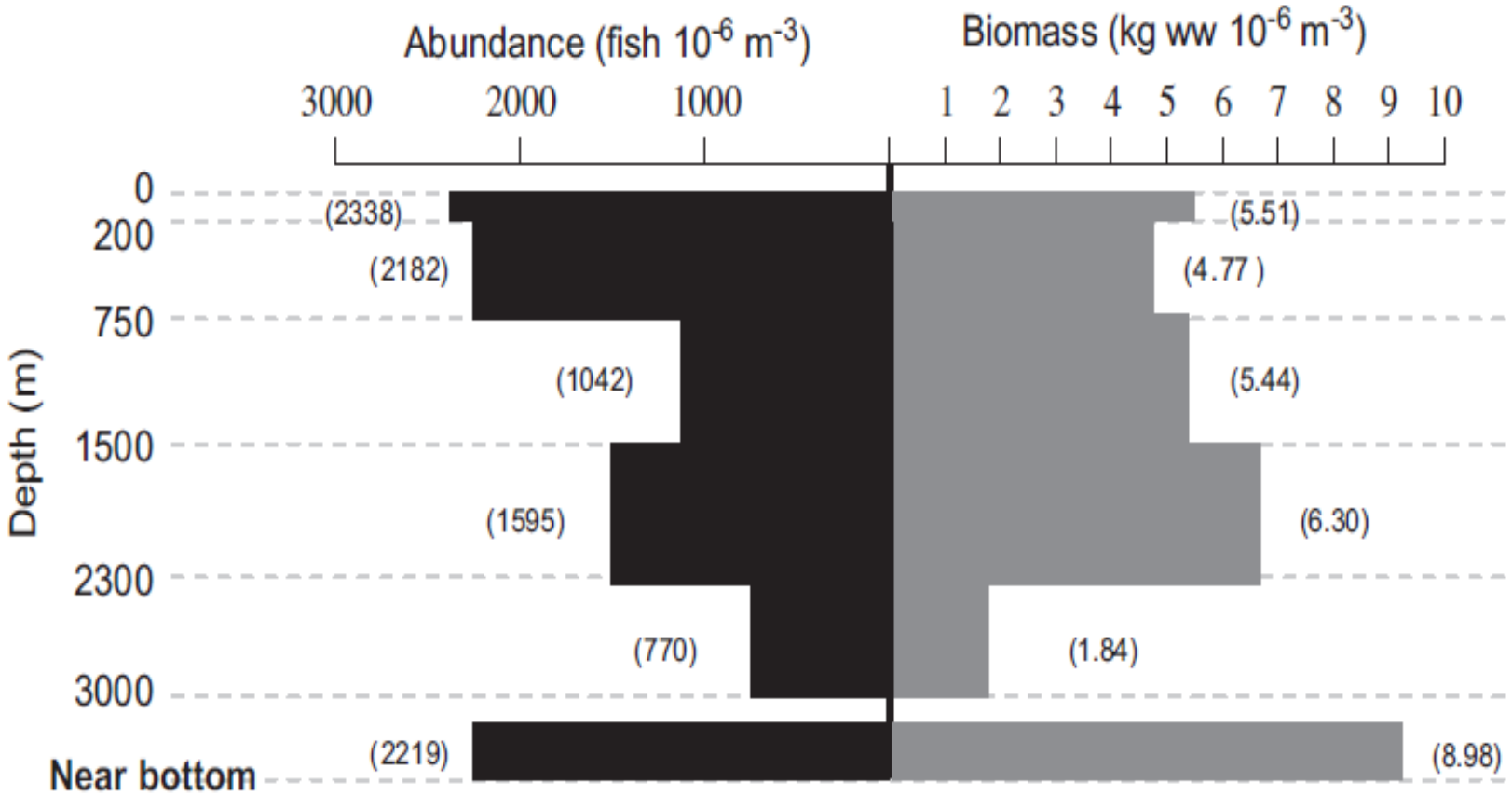
Large Predators

Food-Web of the Open-Ocean and Deep-Sea (Morato et al. 2016)



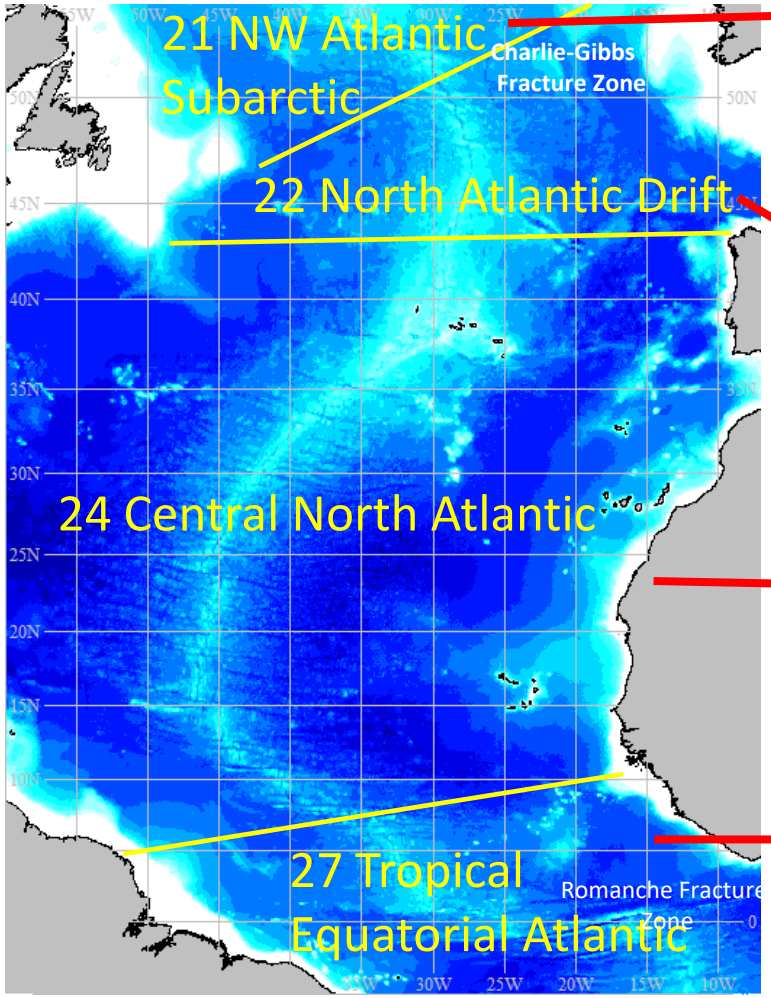
Pelagic Nekton

Vertical Distribution of Fish Biomass over the Mid Atlantic Ridge



Abundance and Biomass concentration within 200 m of ridge

Biodiversity Trends - Mesopelagic Ecoregions (Sutton et al, 2017)



21. Northwest Atlantic SubArctic Ecoregion
Low Diversity few dominant species
90 % of fish catch = lantern fish *Benthosema glaciale*
Cephalopods 3 species *Gonatus steenstrupi* dominant.

22. North Atlantic Drift Ecoregion
Mixture of species from North and South
Teuthowenia megalops endemic

24. Central North Atlantic Ecoregion
High Diversity.
19 dominant lantern fishes.
17 Cephalopods (15°C optimum temperature)

27. Tropical and West Equatorial Atlantic Ecoregion
Lower diversity
Relatively data deficient

Very High Global Connectivity

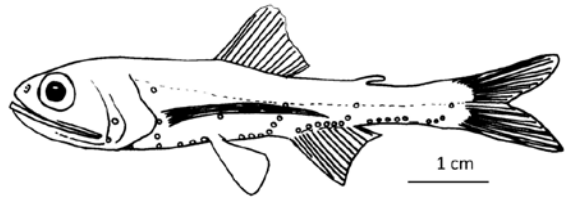
Many circumglobal species

Fishes

205 Species

72 Circumglobal

(35%)



Ceratoscopelus warmingii 2014 m

Shrimps

64 Species

40 Widespread

(62%)

Sergia japonica

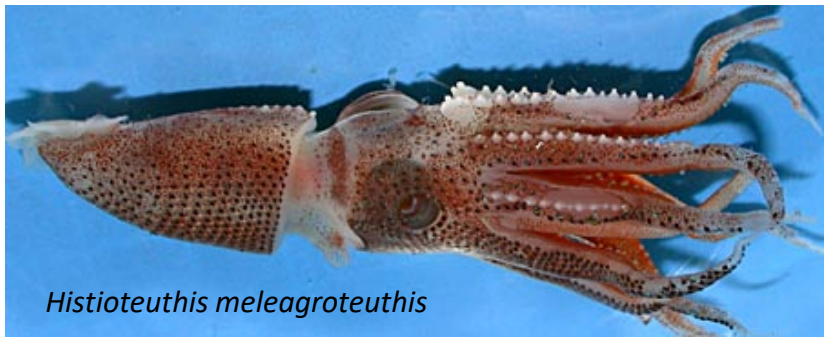
Cephalopods

41 Species

19 Circumglobal

(46%)

Octopoda (83%)



Histioteuthis meleagroteuthis

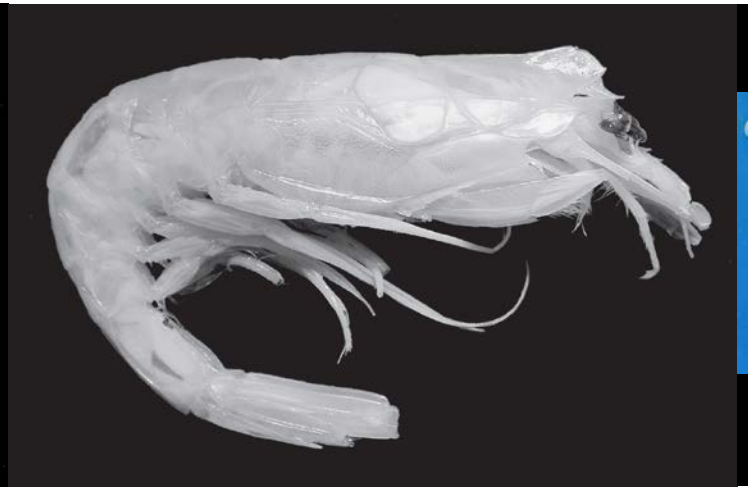
But there are many Rare Species

Fishes

Himatolophus sp. (footballfish)

2 found in sperm whale stomachs

Shrimps



Altelatipes falkenhaugae

(new species 7 specimens)

Cephalopods

Promachoteuthis sloani

(New species 2 specimens)

Conclusions-Comments
Mid-water Nekton

1. Productive high biomass, important in the Mid-Atlantic ecosystem
2. DVM transfers food energy from the surface to the ocean interior.
3. Biomass concentrated over the Mid Atlantic Ridge.
4. High proportion of circum-global species.
5. Rare species are an important component of the biodiversity.
6. Regional differences in species composition and diversity