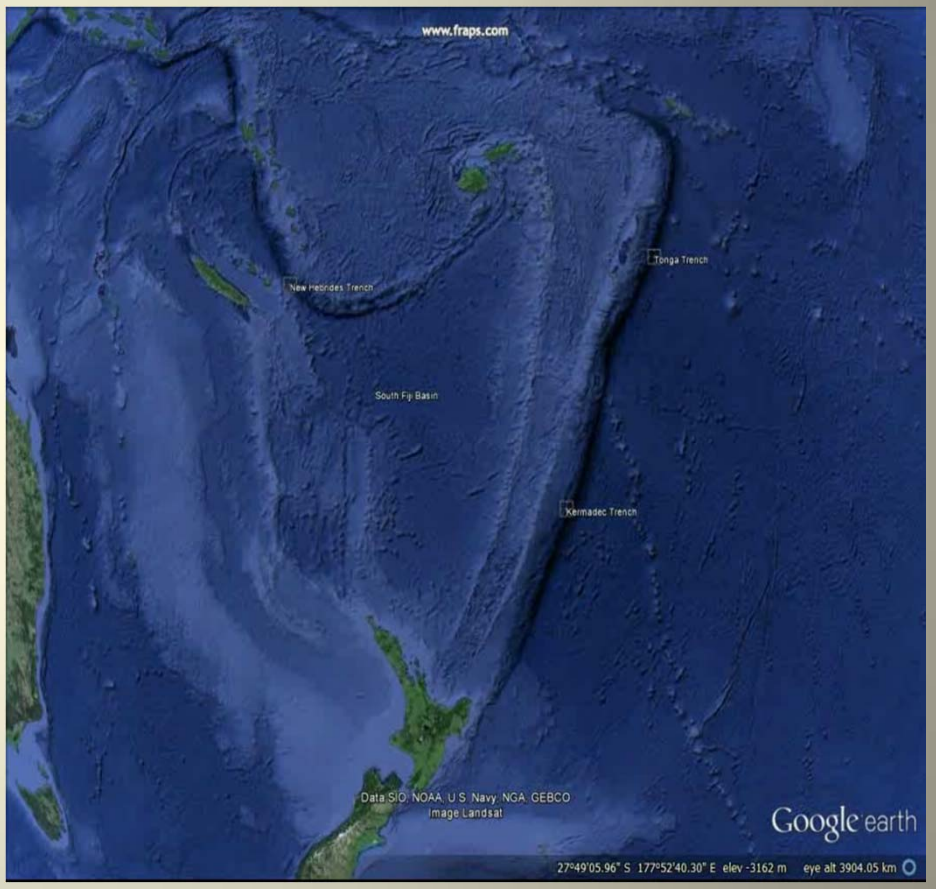
Deep-sea fish community shift in the South Fiji Basin

Linley, T. D.[1], Stewart, A[2], McMillan, P.[3], Clark, M[3]., Ichino, M.[4] and Jamieson, A. J.[1]

1. *Oceanlab, University of Aberdeen* - t.linley@abdn.ac.uk, a.jamieson@abdn.ac.uk
2. *Te Papa Collection, Wellington, NZ* – andrews@tepapa.govt.nz
3. *NIWA, Wellington, NZ* - peter.mcmillan@niwa.co.nz, malcolm.clark@niwa.co.nz
4. *National Oceanographic Centre, Southampton* - matteo.ichino@noc.soton.ac.uk

The South Fiji basin

- Large depth range
  - >10km
- Abyssal plain surrounded by trenches
- Potential species barriers:
  - Topographic
  - Environmental

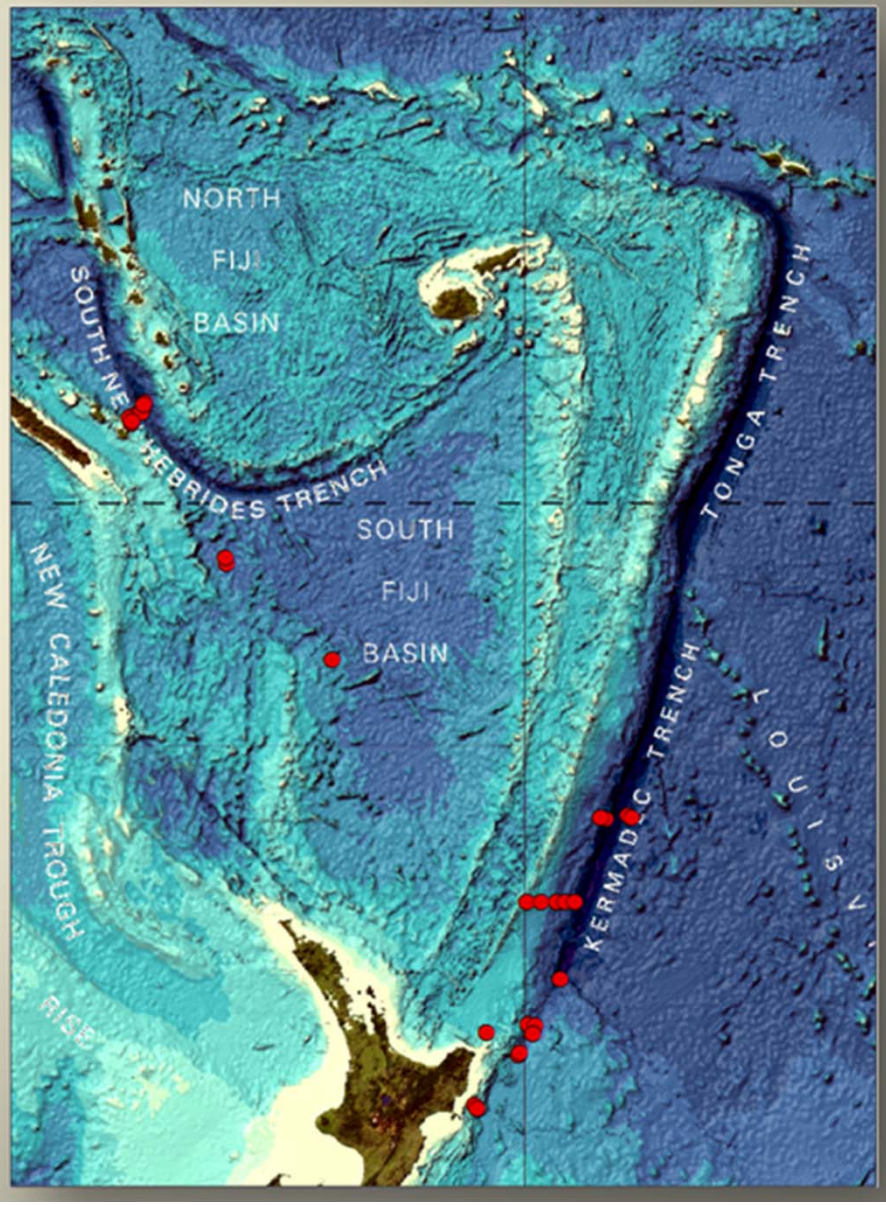


Data collection

- Data collected using autonomous free-fall landers
- Mackerel bait attracts animals within view of the camera
- Data is from a stills system 2m above the seabed
- Data from a video system is included when relevant

Deployments

- 22 deployments in the Kermadec Trench
  - Depth range from 1,000 – 6,068m
  - Along and across axis
- 11 deployments in the South New Hebrides Trench
  - Depth range from 2,086-6,898m
  - Across the axis
- 3 deployments in the South Fiji Basin
  - Depth range from 4,078 to 4,100m



Character synopsis

Coryphaenoides armatus

- Ubiquitous
- Scavenger
- Very active

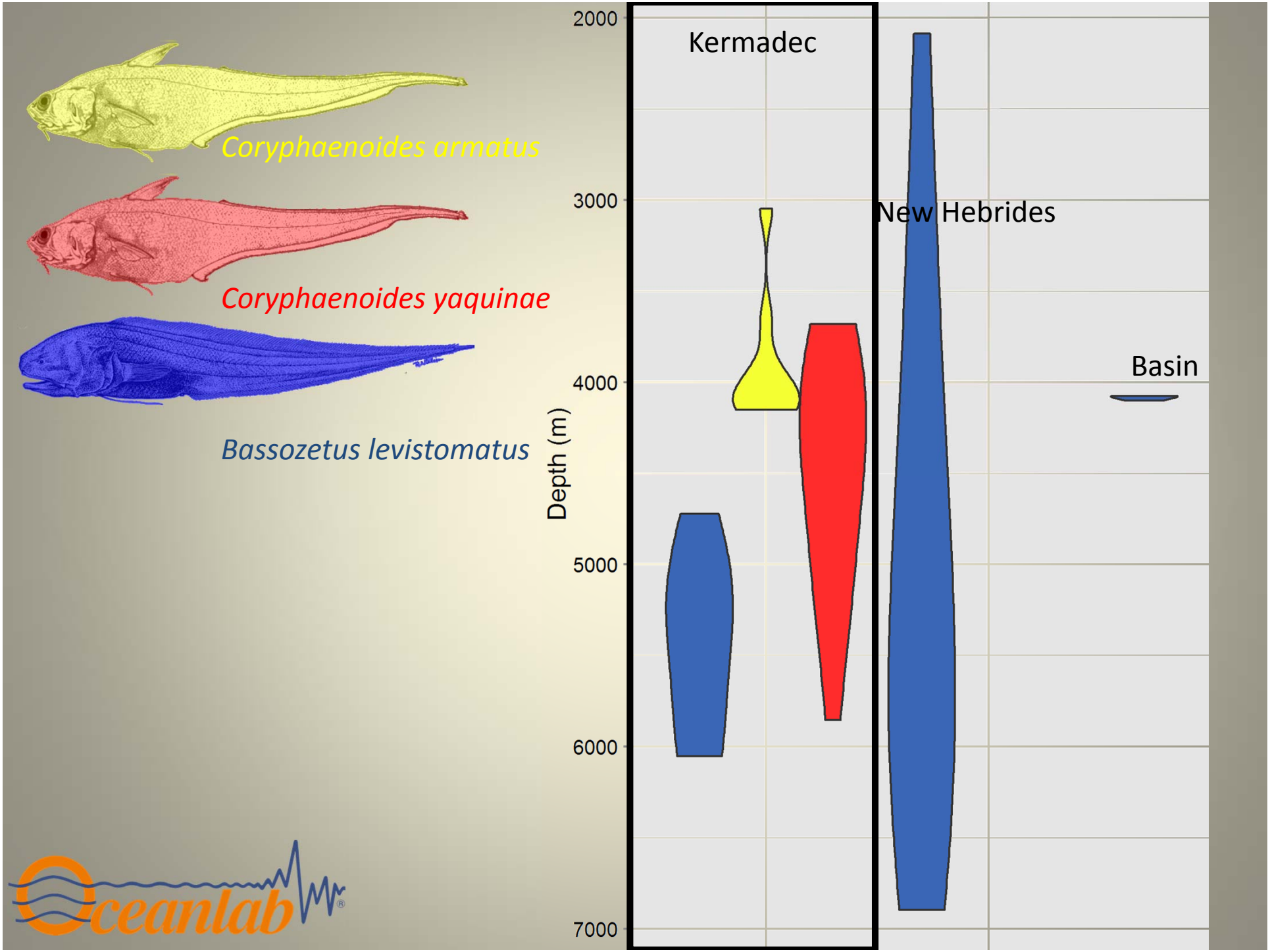
Coryphaenoides yaquinae

- Close relative
- Generally deeper
- Lower metabolic rate

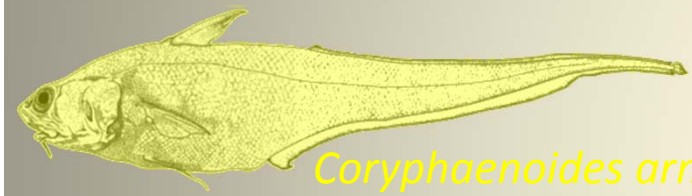
Character synopsis

Bassozetus levistomatus

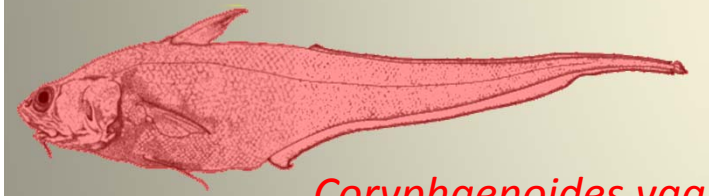
- Has managed to elude us
- Appears attracted to bait but disinterested
- restricted globally to abyssal depths
- 3,965-5,200m


Coryphaenoides armatus
Coryphaenoides yaquinae
Bassozetus levistomatus
Depth (m)
2000
3000
4000
5000
6000
7000
Kermadec
New Hebrides
Basin
Oceanlab

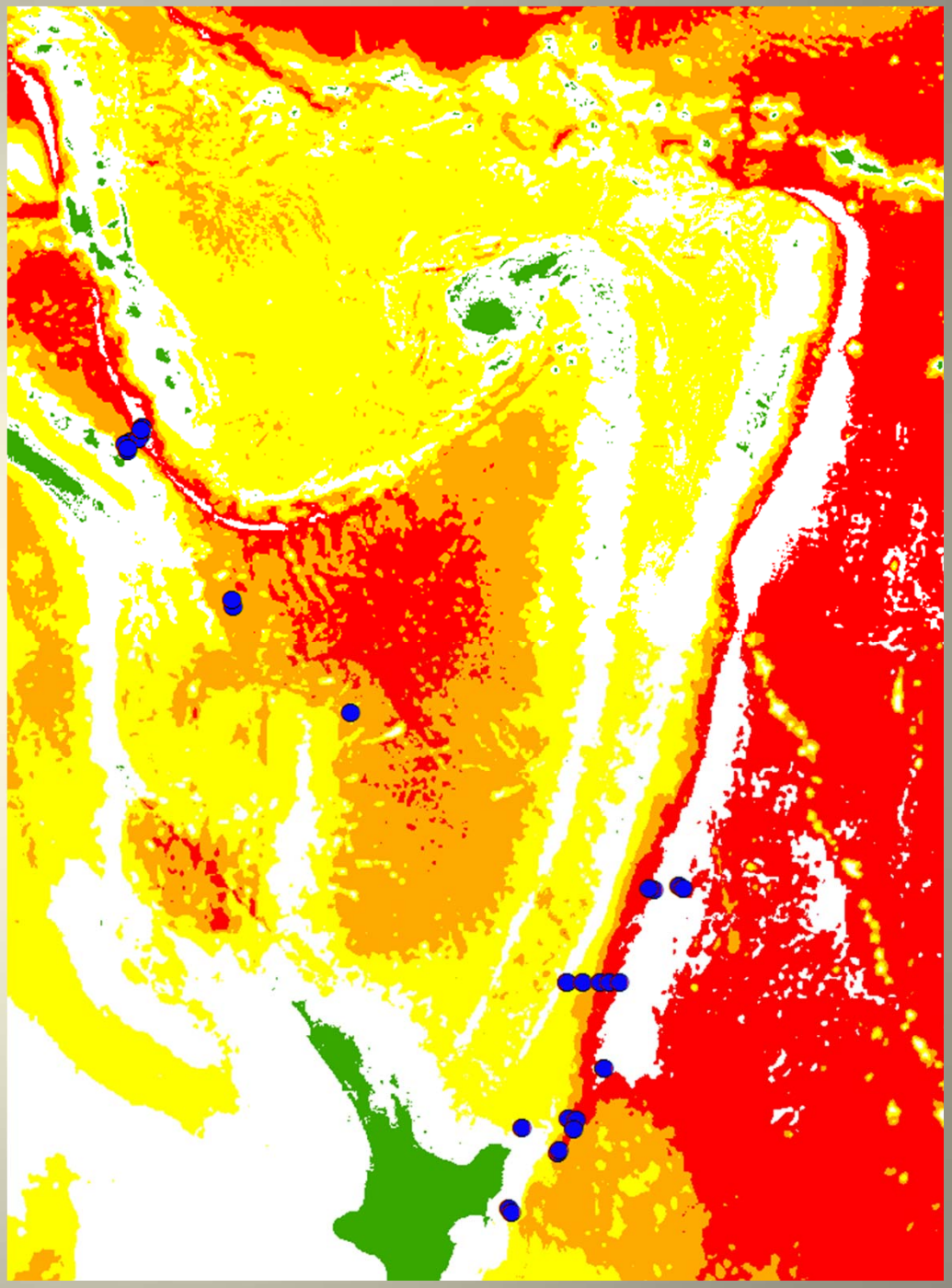
Is there a physical barrier?



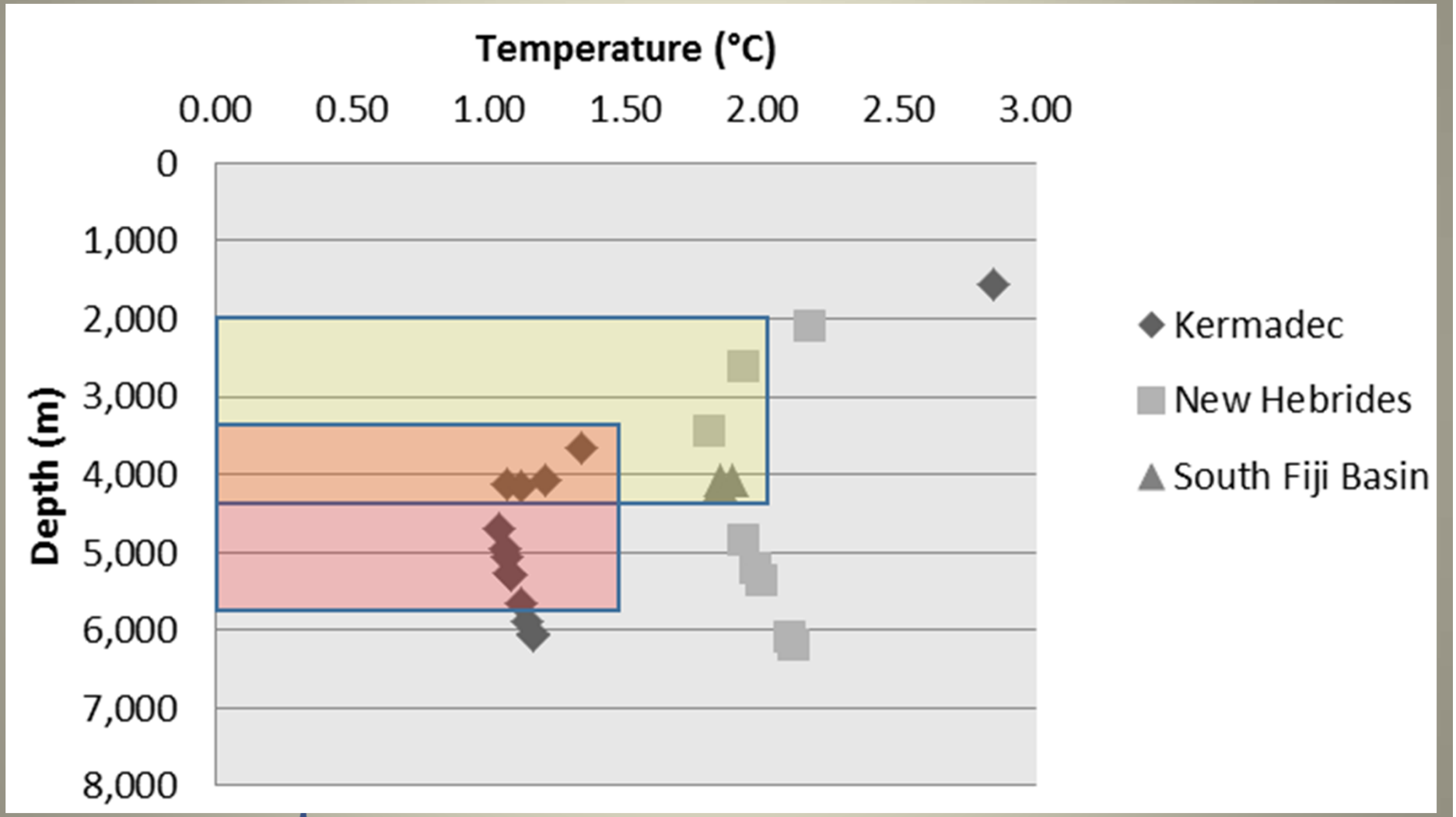
Coryphaenoides armatus



Coryphaenoides yaquinae



Is there a thermal barrier?

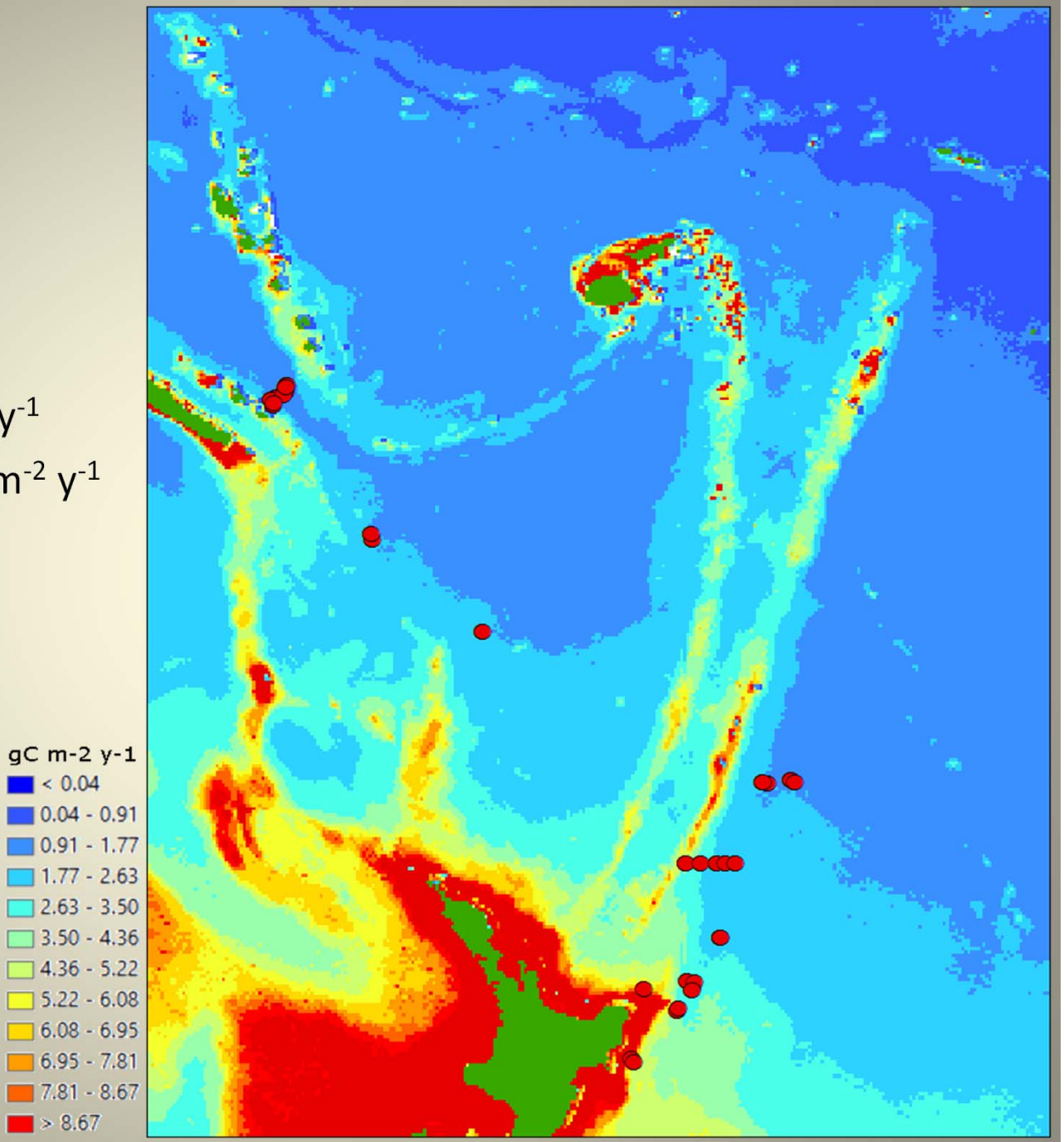


What is different about these fish?

- Video of fish of approximately equal size was accessed
- The cuskeel had a significantly lower tail-beat frequency, less than half that of the rattails.
  - *B. levistomatus* 29.8 ± 6.6
  - *Coryphaenoides sp.* 77.4 ± 21.0
- The cuskeel had a significantly lower speed (body lengths min^{-1})
  - *B. levistomatus* 2.8 ± 2.3
  - *Coryphaenoides sp.* 12.6 ± 4.3

Is energetic input the key factor?

- Kermadec: 1.637 gC m^{-2} y^{-1}
- New Hebrides 0.864 gC m^{-2} y^{-1}



Conclusions

- There is a switch from a scavenger to a predatory fish community
- This appears dependent on surface input. Below a certain threshold the fish community becomes a predatory one.
- Vertebrate scavengers can no longer exist, relying on scavenging invertebrates to consolidating surface input
- This switch often coincides with depth but that may be a symptom of the dropping input with increasing depth and therefore flexible

Thank you

Any questions?

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