Fine scale movements of a mesopelagic fish at Cross Seamount

Kevin Weng, Andrew Gray, Jeff Muir, Dave Itano, Kim Holland, Mike Seki

Supported by NOAA-PIFSC

Seamounts

- 39,000-100,000+ seamounts over 1km height (Hiller 2007, Wessel 2010)
- One of largest biomes in the world--28.8 million km^2 (Etnoyer 2010)
- Vulnerable to anthropogenic impacts

Seamounts

- Commercially valuable and ecologically important fauna (Morato 2008, Holland 2007, Campbell 2003, Worm 2003)
- Unsustainably exploited (Koslow 2000, Niklitschek 2010, Clark 2000, Clark & Koslow 2007, Clark 2009, Clark 2010, Roark 2009, Williams et al. 2010)
- Limited resources
    - Depletion (Koslow 2001, Clark & Koslow 2007)
    - Overcapitalization (Foley 2011)
- 'K' selected
    - High longevity
    - Late maturation
    - Low natural mortality
    - Low fecundity
    - Sporadic recruitment

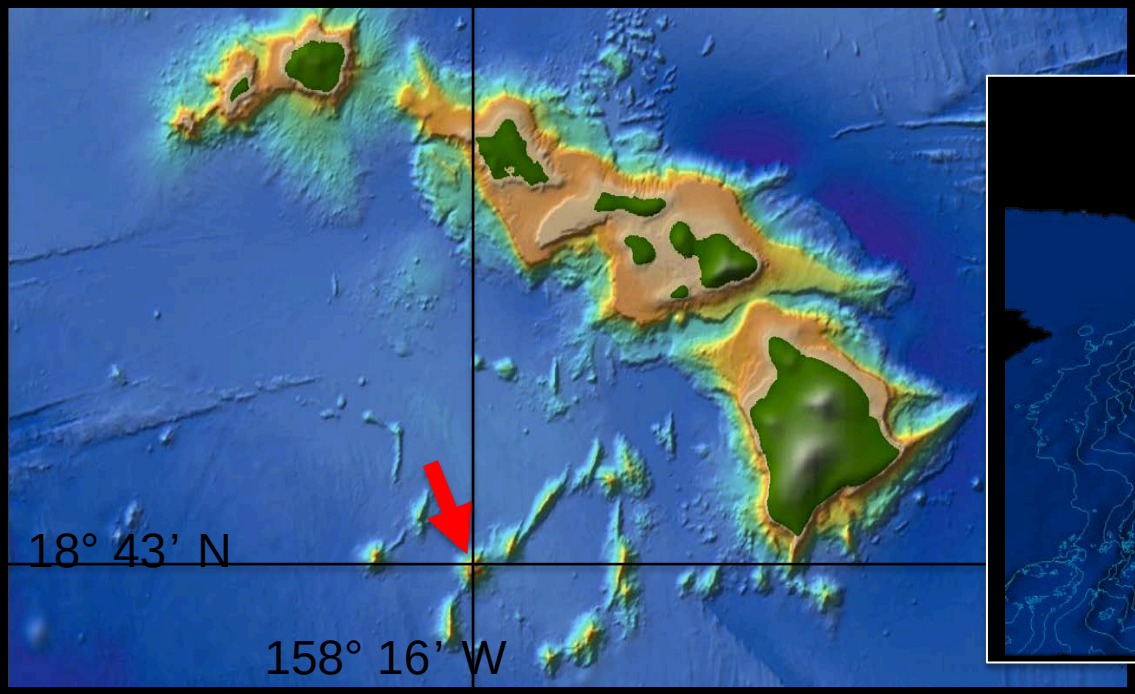
→ Low sustainable yield

Seamount Fish Aggregations

- Increased concentration of micronekton in otherwise diffuse foraging area
  - Feed-rest (Genin 2004)
  - Topographic blockage (Isaacs & Schwartzlose 1965)
  - Mesopelagic boundary communities (Holland & Grubbs 2007)

→Not mutually exclusive

Cross Seamount



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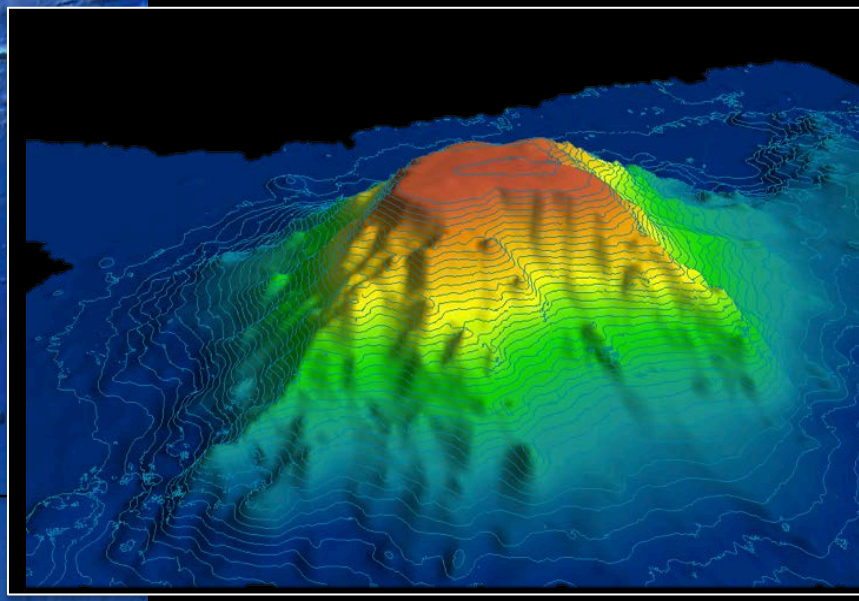
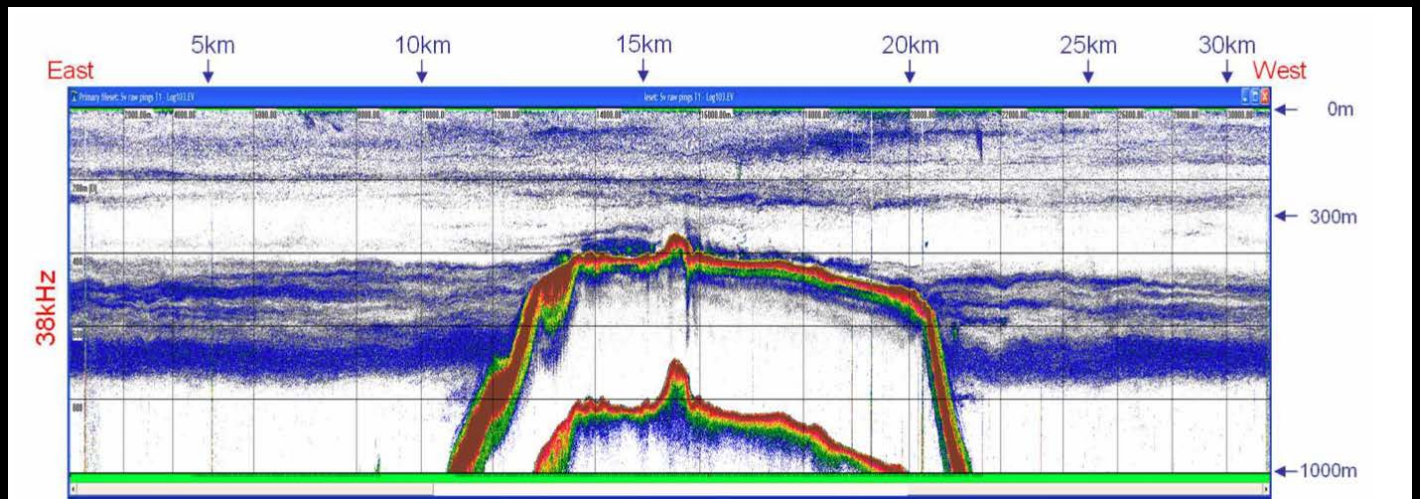




Domokos 2009

Monchong

- 2 species
- Increasing popularity
- $2-$6 at auction
- Targeted at Cross
- Adults have restricted seamount & deep slope habitat, 270-620m depth (Chave 1994)

→ risk of over harvest?

Eumegistus illustris

honoluluadvertiser.com

Monday, March 5, 2012

Monchong swims into the mainstream

- Monchong fillets cook up quickly

By Wanda A. Adams
Advertiser Food Editor

Grace-Ann Robello eyed the package of slightly pink-fleshed fish in the Mo'ili'ili Star Market seafood section and nodded. "Monchong. Yeah, I heard of it, but I only ate it once, in a restaurant, and it was good. But it wasn't something we grew up eating, and I don't how to make it," the 32-year-old Makiki resident said. She put the package back and reached for more familiar salmon fillets, then turned to ask, "Is it Chinese or local, or what?"

Good questions, Grace, and questions that many folks have no doubt asked as this mild-flavored, easily prepared fish moves further into the mainstream.

Monchong — *Taractichthys steindachneri*, aka sickle or big-scale pomfret, aka hire jiro monchong (Japanese), aka mukau (Hawaiian) — is a deep-water fish that is brought into local ports by longline and bottom-fishing boats. It's generally a by-catch — that is, not the fish that they were going for, but one that's brought up along with

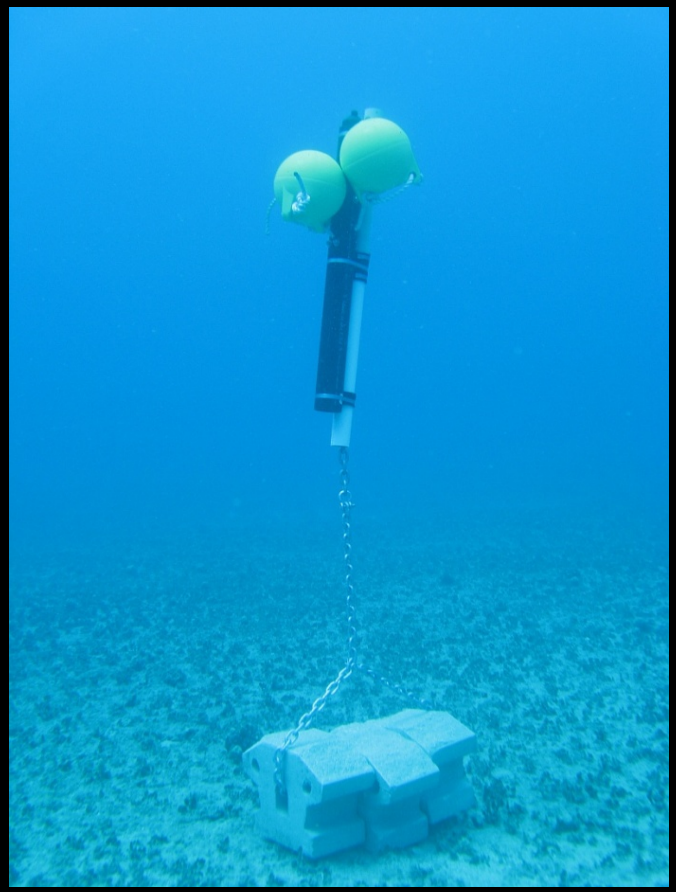
Monchong
• *Taractichthys steindachneri*; big-

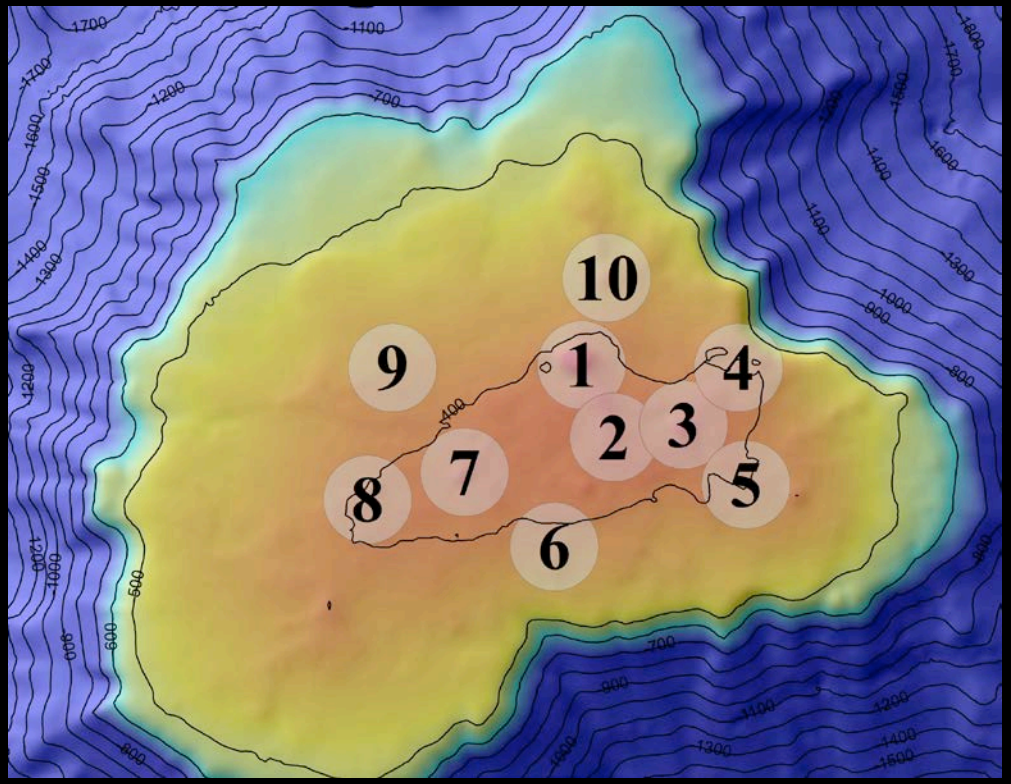
Objective:

Describe spatial ecology of *E. illustris*

- Vertical and horizontal movements
- Environmental influences on movements
- Residence time

Methods





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- 356-414 m depth
- Vemco V13 tags

Results

Year	Monchong Tagged	Notes
2010	14	Deploy acoustic receiver array, poor fishing
2011	19	Retrieve and redeploy acoustic array
2012	40	Retrieve and redeploy acoustic array, good fishing

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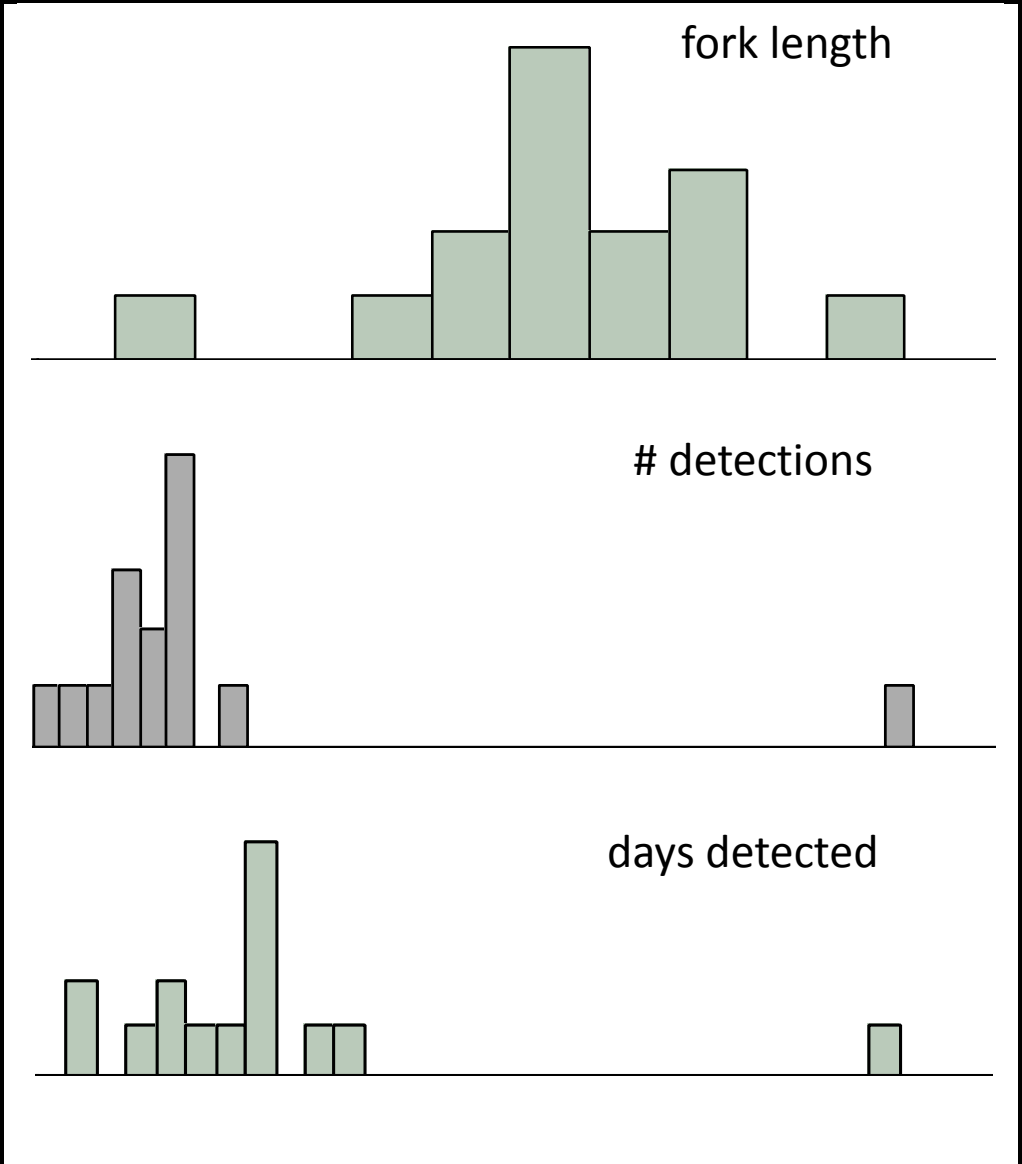
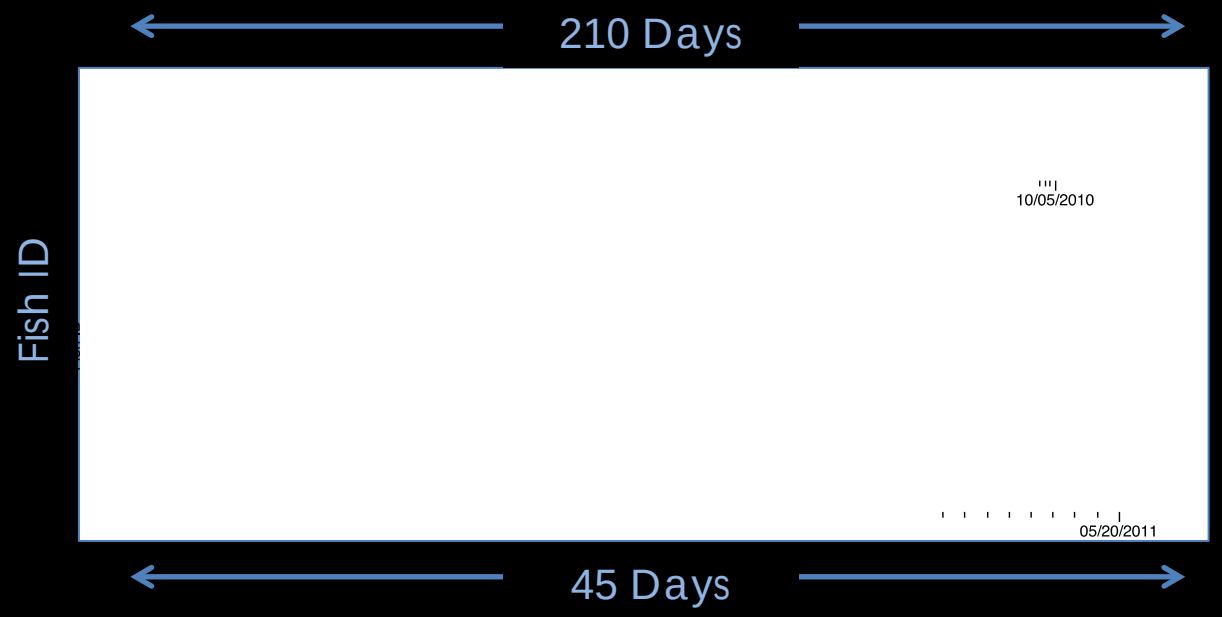
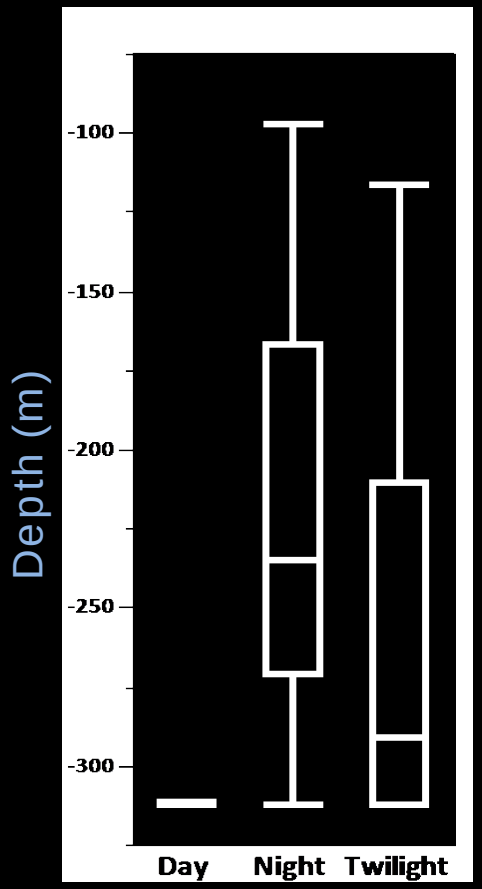
Detection Summary

- 15 fish
- 53-76 cm
- 1,539-54,293 detections
- 8-178 days
- 1 recapture, 10 months after tagging



DVM & strong association with the seamount summit



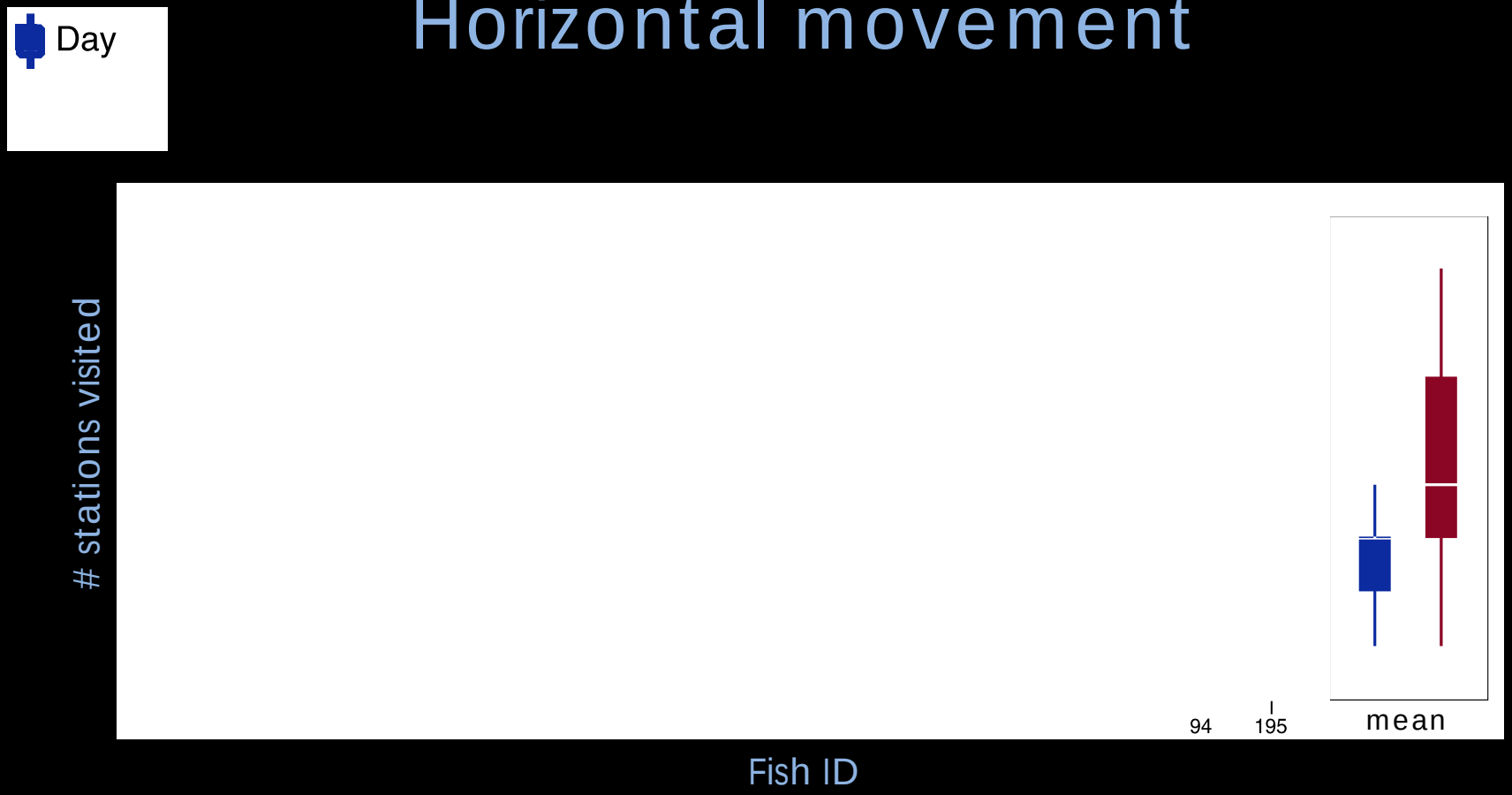


Daily vertical migrations

- Daily presence on array
- Departures > 6 hrs from array once every 3 days on average
- 5 individuals died within 6 weeks of tagging

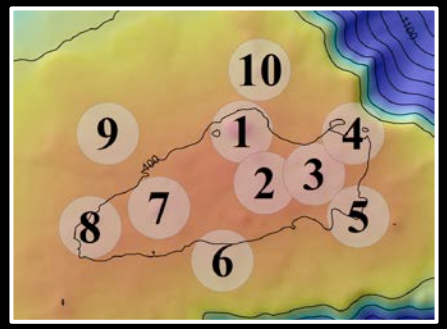
variability between individuals

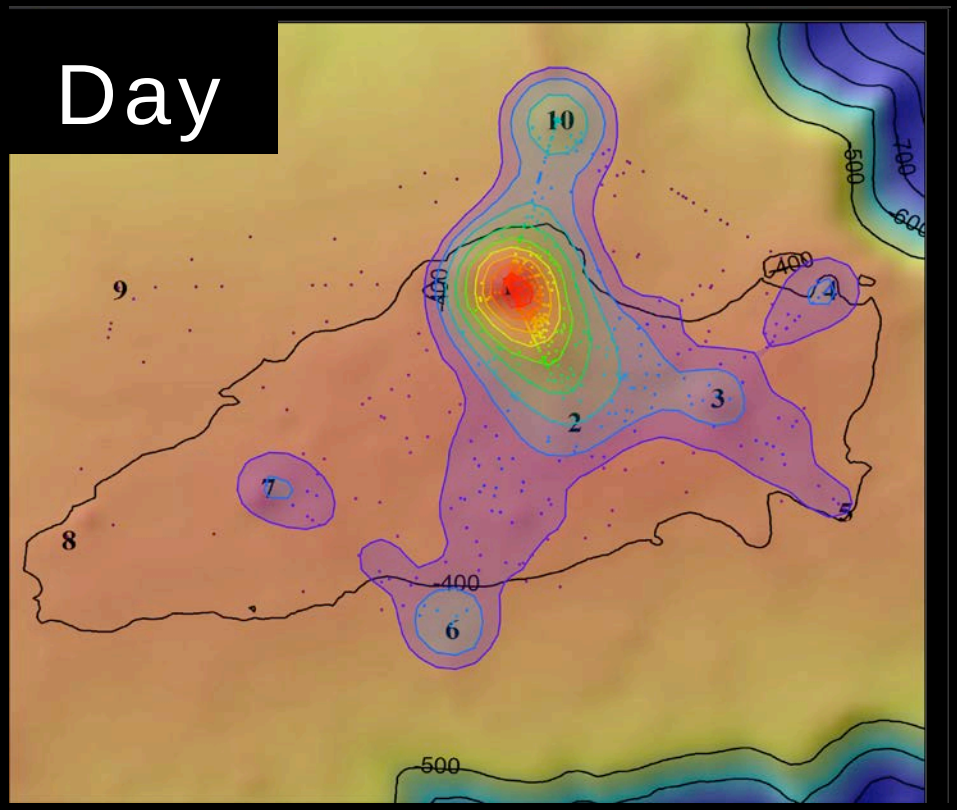
Horizontal movement



Mean # Stations:

24-hours: 4.9
Nightly: 4.4
Daily: 3.0

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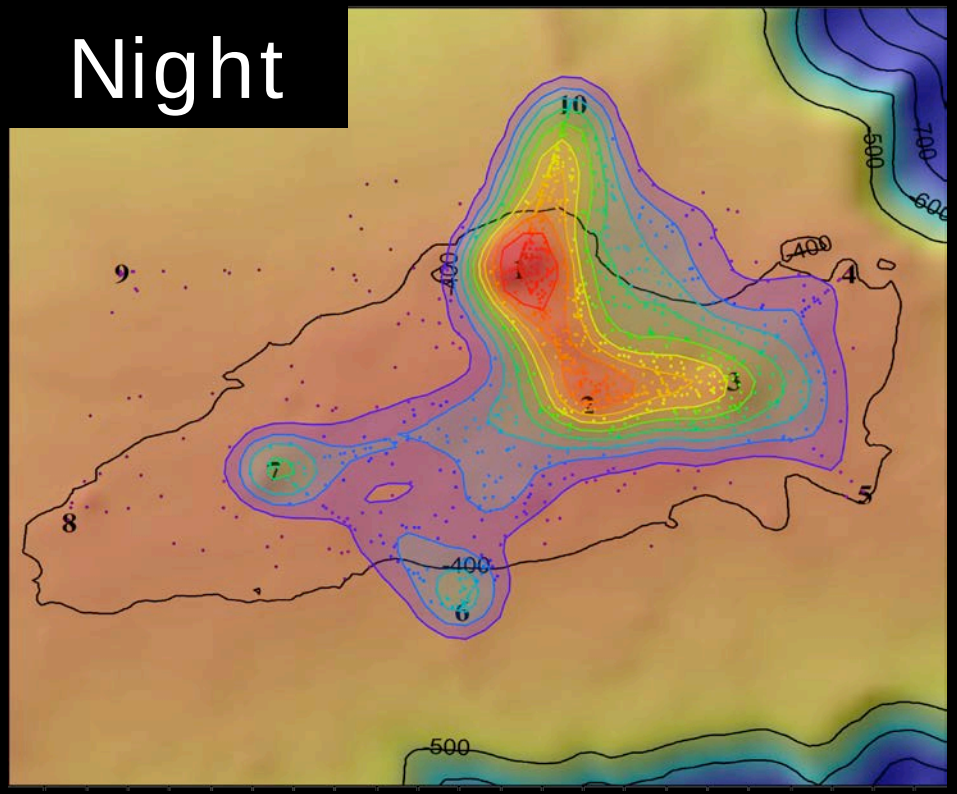
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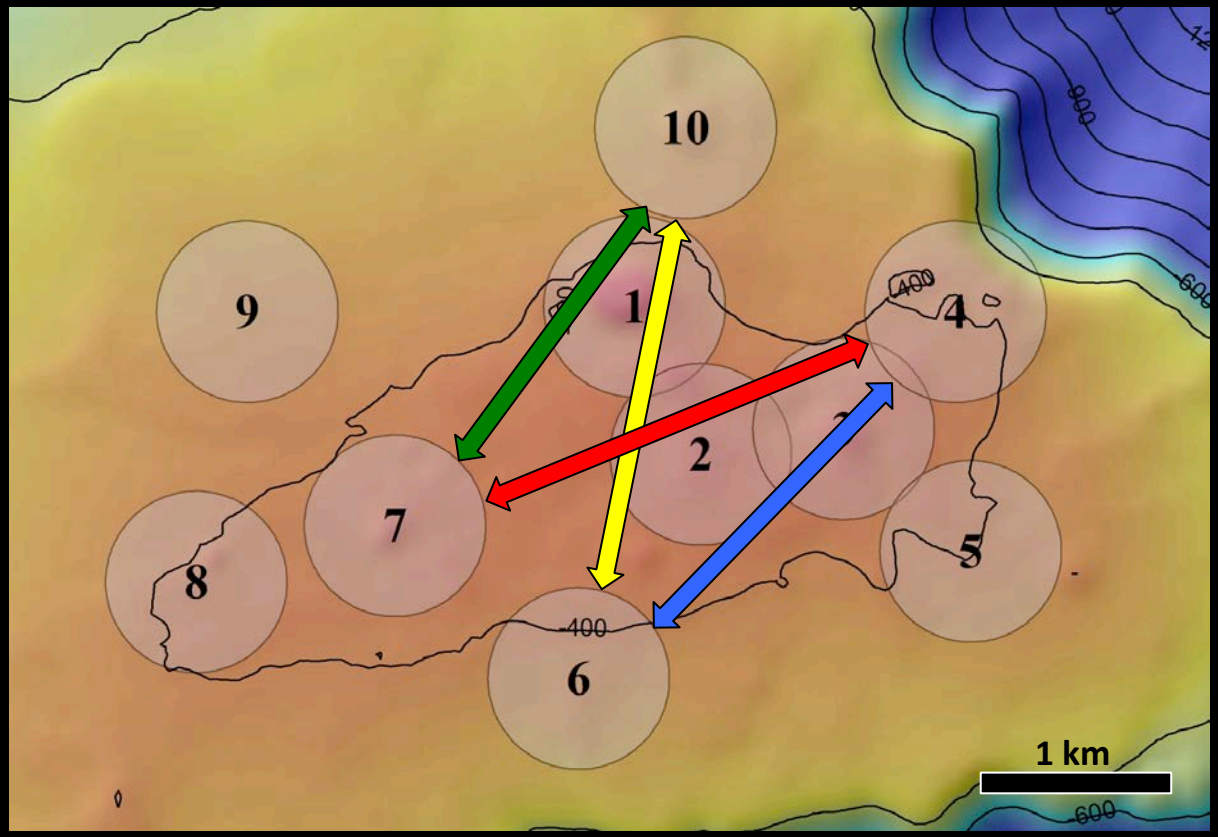
Horizontal movement



Stations	Stations
6 & 10	6 & 10
6 & 4	6 & 4
7 & 4	7 & 4
7 & 10	7 & 10
Mean	Mean

Summary

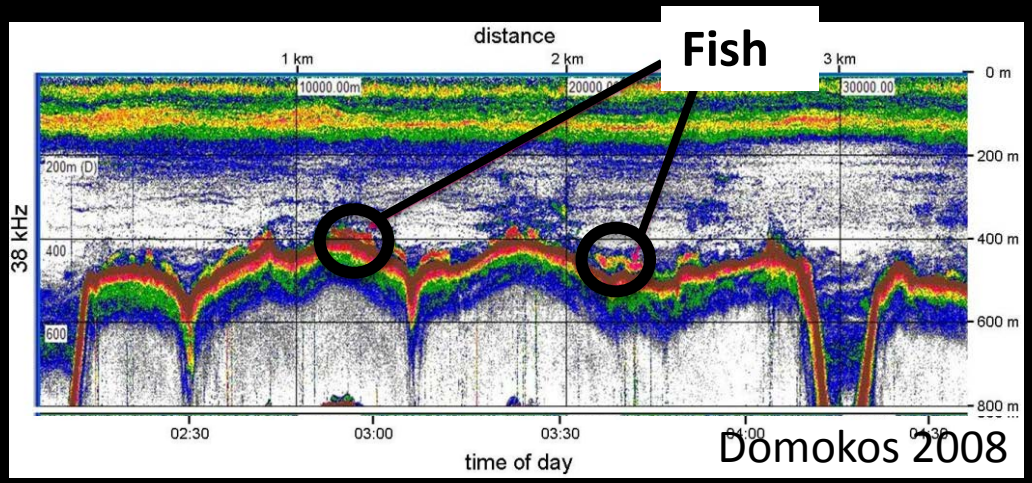
- High utilization of plateau, few gaps
- Daily presence of fish on the array until detections ceased completely.
- Residence for at least 10 months. Others remained in the array for < 10 weeks. Emigration from the seamount may be common.
- Daytime site preference, moved about plateau at night
- Individual depth preference
- Rapid movement across plateau. Sustained swimming speeds of >2 km/hr and 1 FL/sec

What's next?

- Currently 40 more acoustic tags deployed and 18 archival tags
  - Deeper depth rating
  - Vertical movement outside of array
  - Temperature

- Reproductive biology

- 2007 and 2008 NOAA acoustic fish surveys



Domokos 2008

Acknowledgements

- NOAA- Pacific Island Fisheries Science Center
- Captains and crew of F/V Hoku & F/V Ao Shibi IV
- James at HIMB and Dodie and Johnoel at PFRP

Pelagic Fisheries Research Program

Questions?

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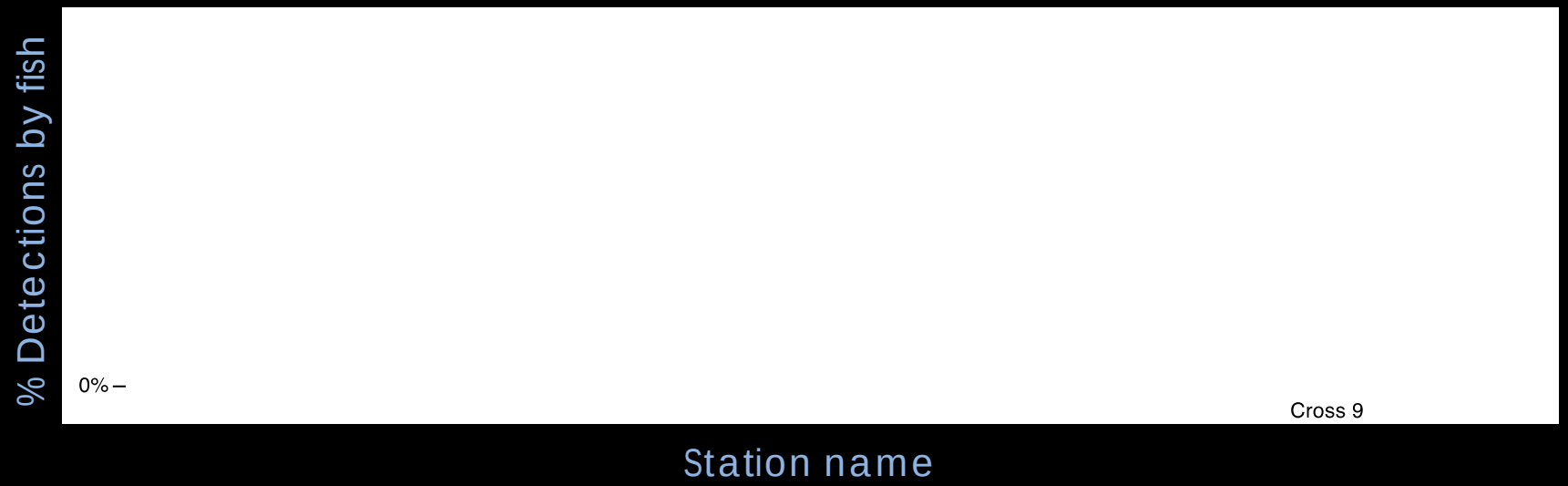
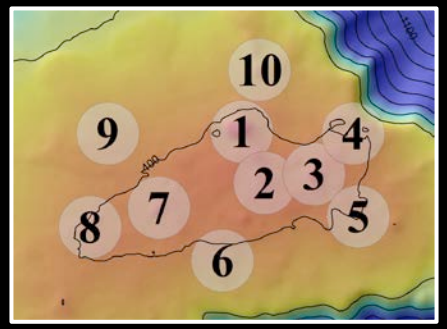
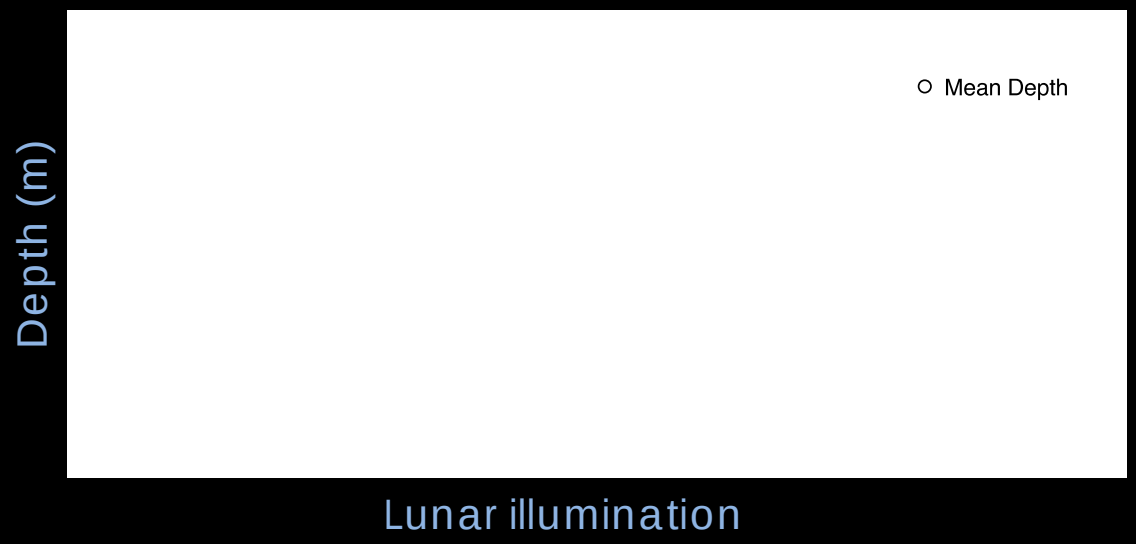
Horizontal movement

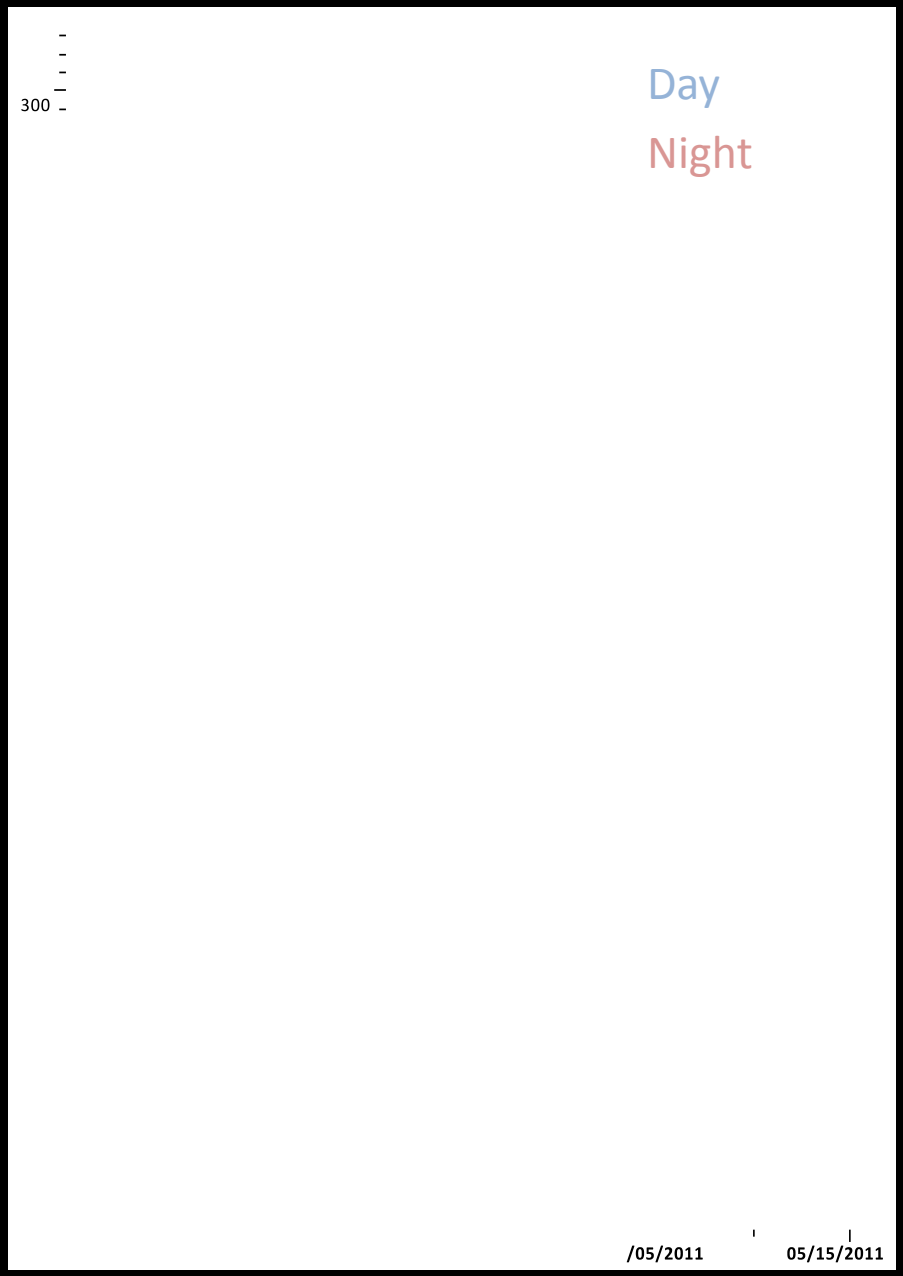




Lunar illumination

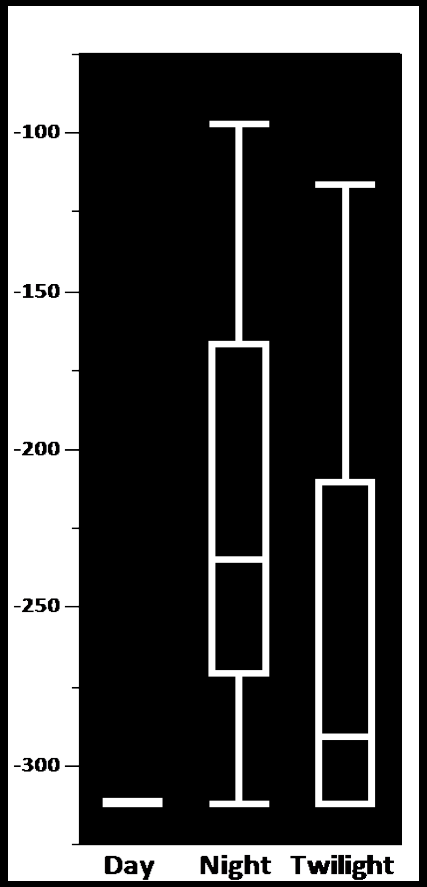


DVM & strong association with the seamount summit



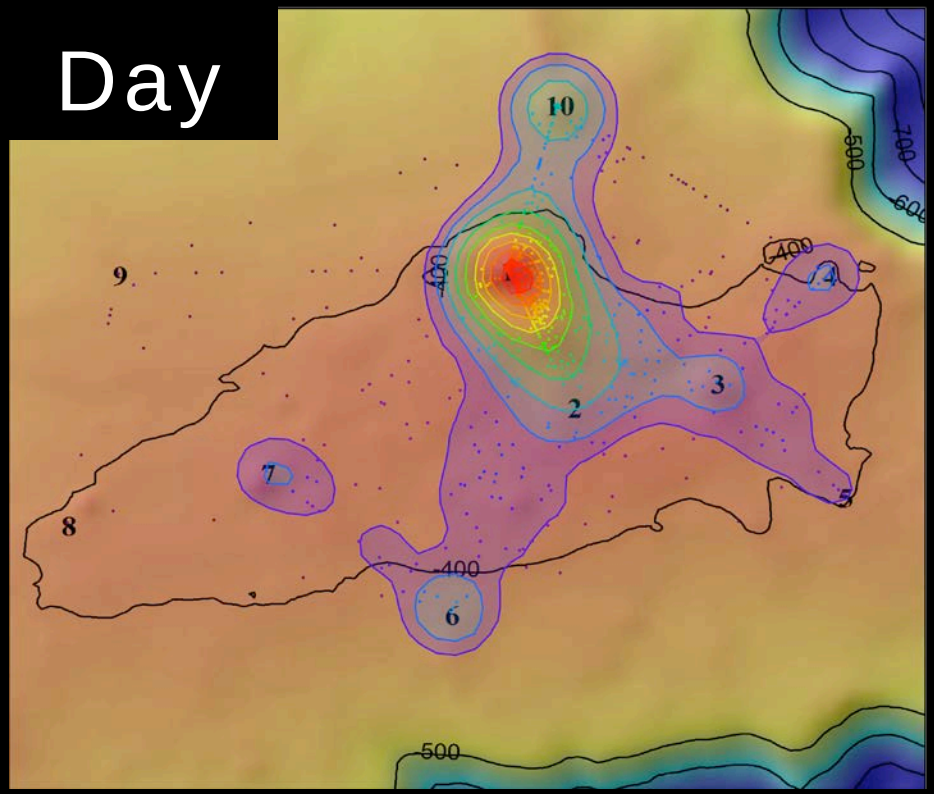
Depth (m)

45 Days



Depth (m)

Daily vertical migrations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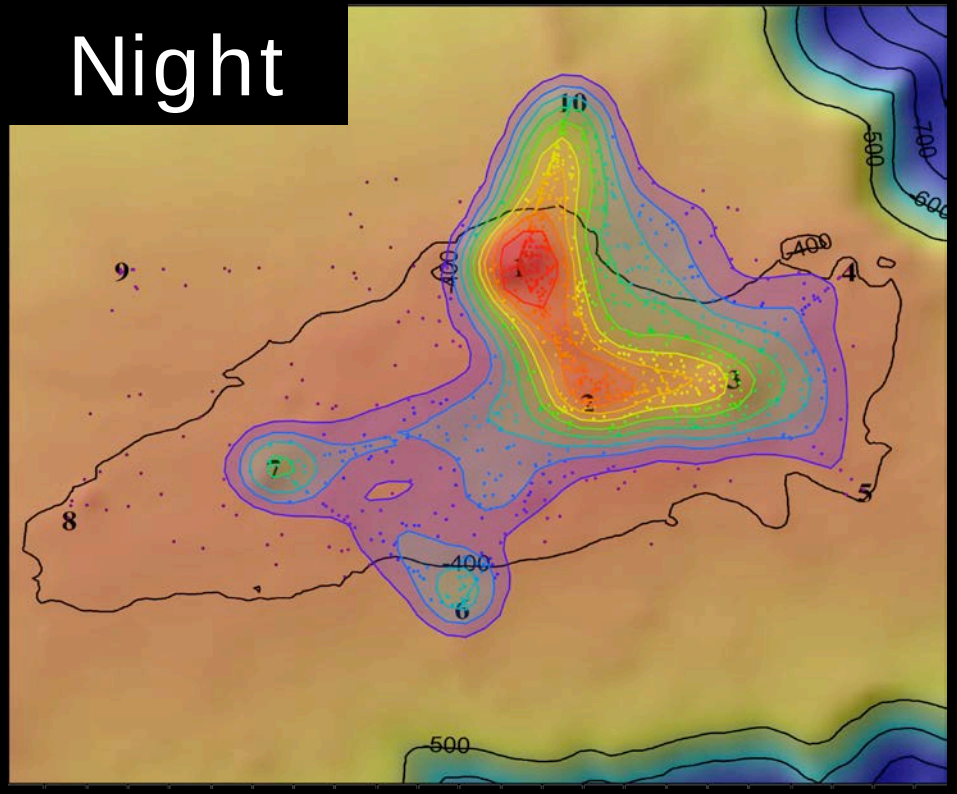
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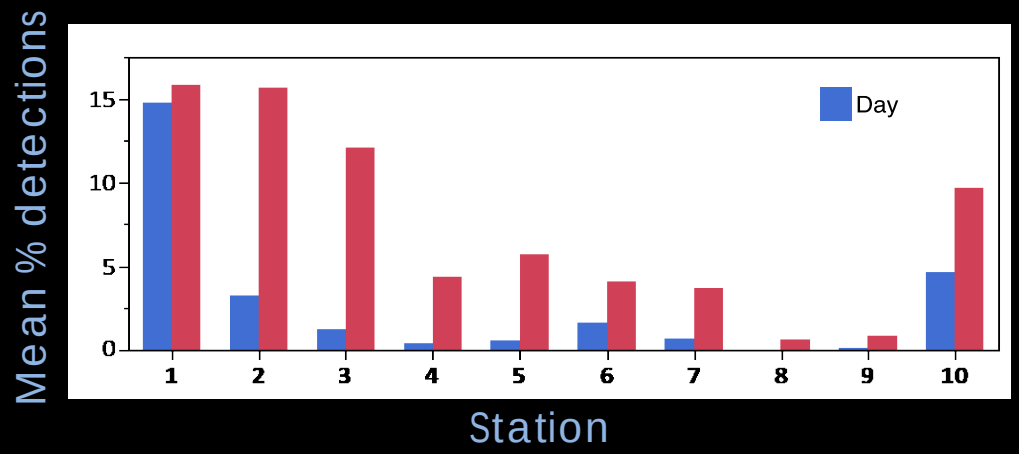
Mean % detections
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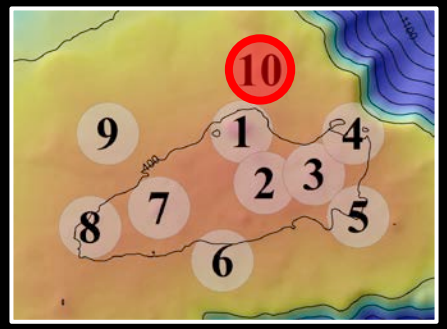
Station

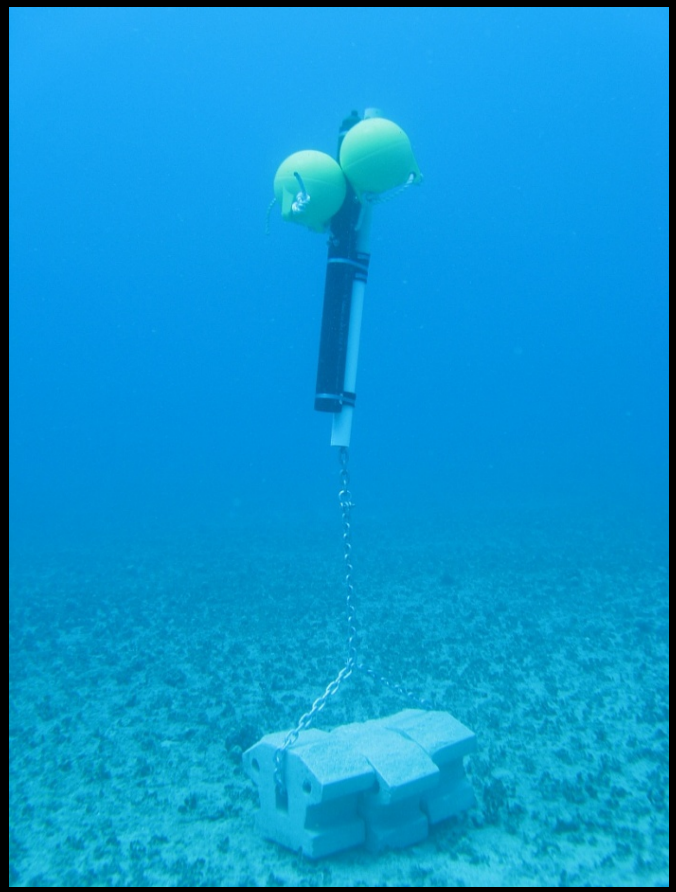
variability between individuals

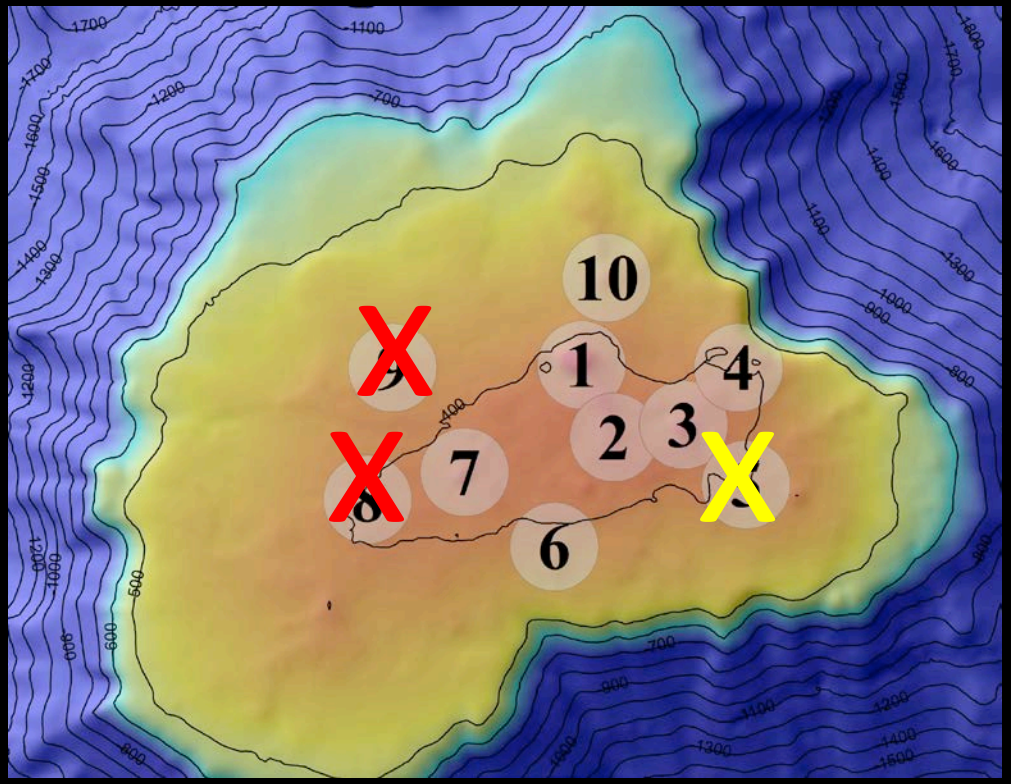
Depth (m)

Time of day



Methods





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2011: 9 of 10

2012: 8 of 10

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