Tracking in to the deep III: Multiscale acoustic telemetry of seamount fishes

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The coastal domination

Hussey et al 2015 Science
“I don’t know why I don’t care about the bottom of the ocean, but I don’t.”
A deeper view of the sea
Mid Atlantic seamounts

c. 434 large seamounts
in the Azores region alone
Ecological hypothesis testing and decision support: Essential habitat and connectivity of blackspot seabream

(deep) acoustic telemetry...or deep troubles?
Phase 1: experimental telemetry at the Condor seamount MPA

2 listening stations in the summit, 28 individuals tagged, 2 year monitoring

Graphics: F. Tempera ©ImagDOP
Bathymetry data credits: EMEPC, DOP-UAz, Project STRIPAREA/J. Luís/UAlg-CIMA, Lourenço et al., 1998
Phase 1: Experimental Passive acoustic telemetry at Condor

Can we use acoustic telemetry to study deepwater demersal species?

Yes, we can

But need improvements to reduce (potential) mortality and deepgoing 3D tags to studye their fine-scale behaviour

Do adult goraz reside at seamounts or visit them seasonally?

Large individual variation, but higher residency than expected (up to 2 yr)

But need wider and deeper receiver coverage + larger sample & sizes
Can local resources explain their fine-scale behaviour? 
Increased productivity on seamounts $\rightarrow$ increased residency? 
Vertical migrations DSL $\rightarrow$ vertical migrations of goraz?
Phase 2: Expanded 3D passive monitoring at Condor

Vertical Migrations of a Deep-Sea Fish and Its Prey

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seasonal and diel depth range changes
Phase 3 - Active 3D acoustic tracking & synoptic observations

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Plastic benthic vs pelagic behaviour depending on prey (DSL) availability
Ecological hypothesis testing and decision support: Essential habitat and connectivity of blackspot seabream

Ontogenetic migration hypothesis
Adult connectivity among seamounts / island slopes
Spawning aggregations
Phase 4: Multi-habitat long-term acoustic monitoring

- Gigante: 25 adults
- Condor: 36 adults
- Channel: 55 juvenile

25 km
Phase 4: Multi-habitat long-term acoustic monitoring
Connectivity among habitat boxes through ontogenetic migration

Pre-adults migrate to seamounts (20% tagged fish) and don’t come back
Little residency
Phase 4: Multi-habitat long-term acoustic monitoring
Connectivity among habitat boxes through adult migration

Adults reside at seamounts up to years (2/3 of tagged fish)
Very little movement between boxes detected
Phase 4: Multi-habitat long-term acoustic monitoring
Ontogenetically/habitat dependent habitat use

Adults much more resident than juveniles
Phase 4: Multi-habitat long-term acoustic monitoring

Seasonal trends in seamount use

No clear spawning aggregations but reproductive increase in movement

Spawning related or feeding related?
Acoustic telemetry of goraz at Condor

Can we use acoustic telemetry to study deepwater demersal fishes?

- Yes we can
- V13Ps proved efficient, high potential for VPS studies

- Improvements/adaptations will make the difference
- Adequate monitoring coverage
- Multi-scale protocols and techniques
- Deep-going telemetric gear!!!
- Technical improvements in tagging (deep tagging, recompression)

Behavioral ecology of goraz at seamounts

- Ontogenetic migration -> seamount residency while adult picture
- Highly specialized benthopelagic behaviour related to prey availability

- Finer scale concurrent telemetry + synoptic data experiments are much needed to understand the ecology of (seamounts) fishes
- Severe management implications
Basis for spatial management

- reserve effect  ✓
- larval dispersal  ✓ ?
- spillover  × ...but need to consider juvenile spillover!
Other species from here and there
The value of a deep sea array for multispecies ecosystem analysis
Other species from here and there
The value of a mid-oceanic listening outpost
Fieldwork voluntaries, Crews RVs (‘Águas Vivas’ & ‘Arquipélago’) and fishing boats, J. Santos (database), D. Bates (OTN), D. King and T. Stone (Vemco), A. Totland (IMR/Norway, acoustics)

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