

Exploring impacts of environmental history on larval growth: Combination of

Otolith microstructure analyses & Particle-tracking experiments

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Objective

Examine the Relationship between environment and larval growth rate from hatching to capture

Data & Methods

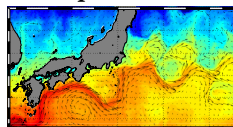
Otolith analysis



Combination



Particle-tracking experiment



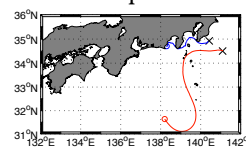
- Fish data
 - ▶ Field samplings of sardine and anchovy larvae
 - ▶ Sagittal otolith microstructure analysis
- Numerical particle-back-tracking experiments
 - ▶ FRA-JCOPE (data assimilation system) outputs
 - ▶ Egg production data (compiled by NRIFS)

Results

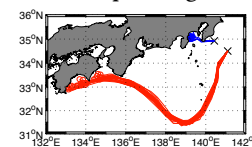
Back-tracking of sardine larvae



(a) simple tracking w/o dispersion

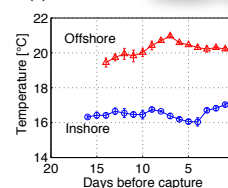


(b) considering dispersion from spawning areas

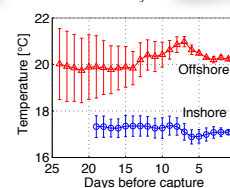


Temperature history estimation (an example of one larva)

(a) sardine



(b) anchovy



Discussion and Conclusion

- ▶ **Combination analyses work well** with high-accuracy environmental field and observed egg distribution
- ▶ Accuracy will be improved with increasing resolution of environmental field and egg distribution

Reference Itoh, S., T. Saruwatari, H. Nishikawa, I. Yasuda, K. Komatsu, A. Tsuda, T. Setou, and M. Shimizu, *Fish. Oceanogr.*, **20**, 114–124, 2011

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