Cod (Gadus morhua) otoliths from fisheries-dependent or fisheries-independent surveys from 1988-2017 in the Baltic Sea

Website: https://www.bco-dmo.org/dataset/757334
Data Type: Cruise Results
Version: 0
Version Date: 2019-02-28

Project
» Collaborative Research: Consequences of sub-lethal hypoxia exposure for teleosts tracked with biogeochemical markers: a trans-basin comparison (OtolithHypoxia)

Contributors	Affiliation	Role
Limburg, Karin	State University of New York College of Environmental Science and Forestry (SUNY ESF)	Principal Investigator
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Coverage

Temporal Extent: 1988-12-06 - 2017-03-01

Dataset Description

Cod (Gadus morhua) otoliths were collected in routine monitoring either from fisheries-dependent or fisheries-independent surveys from 1988-2017.

Data Processing Description

BCO-DMO Processing Notes:
- removed color syntax in original file
- reformatted dates into yyyy-mm-dd format
- removed empty rows
- replaced spaces with underscores in the column Casini_Batch_or_Hypoxolith_Group
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions

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Supplemental Files

File	
ICE Map filename: ICES_Map.jpg	(JPEG Image (.jpg), 55.04 KB) MD5:ddce5cc32318c1f69571143d10359df8
nternational Council for the Exploration of the Seas (ICES) Sub-Division Map	

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Related Publications

Limburg, K. E., & Casini, M. (2018). Effect of Marine Hypoxia on Baltic Sea Cod Gadus morhua: Evidence From Otolith Chemical Proxies. Frontiers in Marine Science, 5. doi:10.3389/fmars.2018.00482
Results

Limburg, K. E., Wuenschel, M. J., Hüssy, K., Heimbrand, Y., & Samson, M. (2018). Making the Otolith Magnesium Chemical Calendar-Clock Tick: Plausible Mechanism and Empirical Evidence. Reviews in Fisheries Science & Aquaculture, 26(4), 479–493. doi:10.1080/23308249.2018.1458817
Results

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Parameters

Parameter	Description	Units
Casini_Batch_or_Hypoxolith_Group	Internal references for different collections. Casini was a collaborator who provided otoliths from the SLU-Aqua archive. The "Casini cod" project is labeled as numbers of Batches, since the otoliths were sent in different groups, which were referred to as batches. The Hypoxolith etc. (not Casini HaV) starts at the row where Caini_Batch_or_hypoxolith_Group = Misc_older_collection and continues down.	unitless
ICES_SD	International Council for the Exploration of the Seas Sub-Division: fishing areas. As shown on the map in the description	unitless
Date_of_Capture	Calendar Date of Capture of the fish specimen	unitless
Year_of_capture	Year of Capture of the fish specimen in YYYY format	unitless
Total_L	Total length of the fish	millimeters (mm)
Weight	Weight of the fish	grams (g)
Fultons_K_on_W	Fulton's K is a condition index: K = W/(L^3) x 1E6; where W = weight and L = length	unitless
Section_no	The ID for a particular otolith	unitless
Date_Analyzed	Date of chemical analysis in yyyy-mm-dd format	unitless
Estimated_Year_Class	The year class assigned to the individual fish; based on KL chemical age determination in yyyy format	unitless

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Project Information

Collaborative Research: Consequences of sub-lethal hypoxia exposure for teleosts tracked with biogeochemical markers: a trans-basin comparison (OtolithHypoxia)

Coverage: Northern Gulf of Mexico, Baltic Sea, and Lake Erie

Description from NSF award abstract:
Hypoxia occurs when dissolved oxygen concentrations in aquatic habitats drop below levels required by living organisms. The increased frequency, duration and intensity of hypoxia events worldwide have led to impaired health and functioning of marine and freshwater ecosystems. Although the potential impacts of hypoxic exposure are severe, there is little known about the consequences of systemic, sub-lethal exposure to hypoxic events for populations and communities of fishes. The objective of this project is to determine whether sub-lethal exposure to hypoxia during early life stages leads to poor growth and hence increased mortality. This project will use "environmental fingerprint" methods in fish ear stones (otoliths) retrospectively to identify periods of hypoxia exposure. The project will compare consequences of hypoxia exposure in different fish species from the Gulf of Mexico, the Baltic Sea, and Lake Erie, thus examining the largest anthropogenic hypoxic regions in the world spanning freshwater, estuarine, and marine ecosystems.

This project will employ long-term, permanent markers incorporated into fish otoliths to identify life-long patterns of sub-lethal hypoxia exposure far beyond time spans currently achievable using molecular markers. This work will capitalize on patterns of geochemical proxies such as Mn/Ca and I/Ca incorporated into otoliths and analyzed using laser ablation inductively coupled plasma mass spectrometry to identify patterns of sub-lethal hypoxia exposure. The investigators will then determine whether exposure results in differential growth and survival patterns compared to non-exposed fish by tracking cohorts over time and identifying characteristics of survivors. Because this work involves multiple species in multiple hypoxic regions, it will allow cross-system comparisons among unique ecosystems. The results from this project will thus provide unprecedented insight into effects of hypoxia exposure in three major basins using novel biogeochemical proxies, thereby paving the way for a fuller understanding of the impacts of "dead zones" on coastal resources.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1433759

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