

Extensive otolith archive opens for reconstruction of fish life history

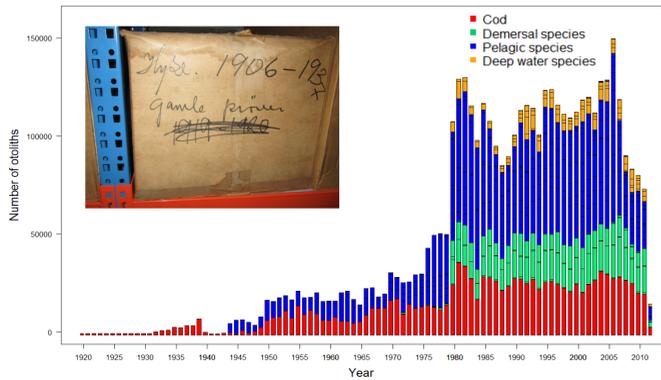


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Background

Today the Institute of Marine Research collects more than 80.000 otoliths each year, which are stored in a large storage facility in Bergen.



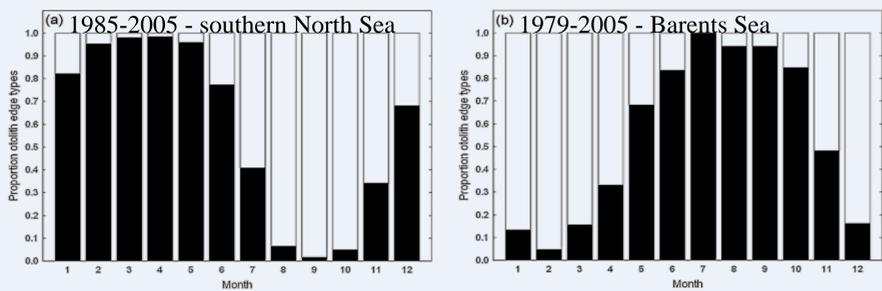
Cod otoliths have been collected since 1920. In addition to otoliths, herring scales have been collected since the beginning of the 20th century. The main focus is estimating age and spawning zones for assessment purposes.

We are establishing a research centre for advanced analyses of otoliths, to realize the full potential of this archive – to recover information about past populations and environment.

Windows on the past

Spatial variation in otolith phenology

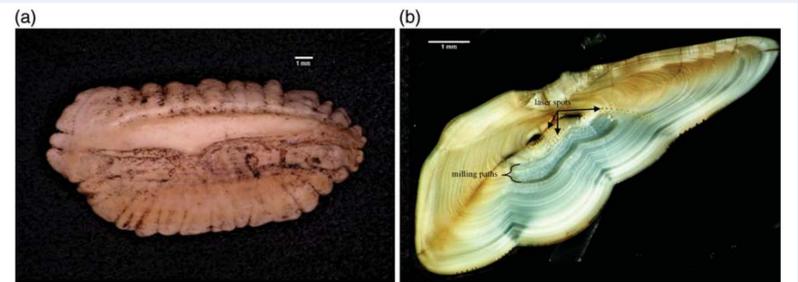
(Høie et al. 2009 Fisheries Research)



The timing of otolith zone formation varies by up to 5 months between North Sea and Barents Sea cod. The translucent zone is also forming earlier as sea temperatures increase.

Climate reconstruction from medieval cod otoliths

(Geffen et al. 2011 ICES Journal of Marine Science)

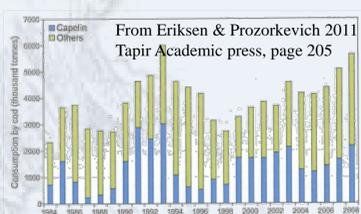


Element and isotope analyses of medieval cod otoliths reconstruct climate effects on growth and regional differences in exploitation of the stocks.

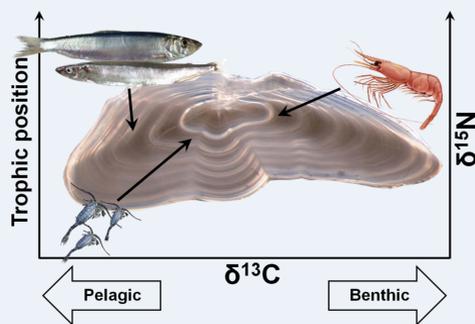
Ongoing research

Feeding history from otoliths

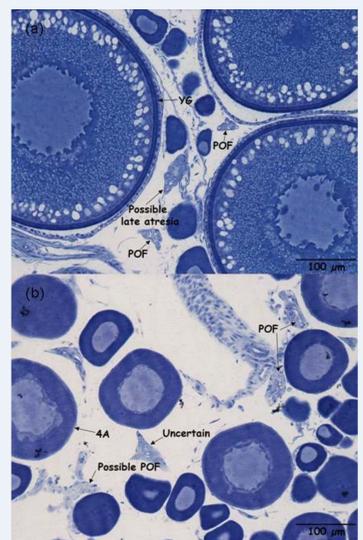
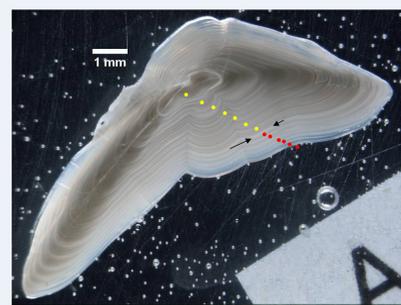
We are using N and C isotopes from annual zones of cod otoliths in order to estimate the timing of transition in trophic position over a time period of almost 100 years.



The isotopic composition of the historical cod otolith material may yield information of previous undocumented declines in the capelin stock, i.e. the main food item.



Otolith spawning zones



Spawning zones in the otoliths have been used to determine age at first spawning and may also hold clues about skipped spawning.

These zones can be validated against post-ovulatory follicles (POF) to investigate, for instance, the occurrence of skipped spawning in cod and saithe populations over the years.

DNA from otoliths

The DNA we extract from the otoliths in our archive covers almost 100 years of commercial fishing and may reveal the genetic basis of fishery-induced evolutionary changes, such as changes in growth and reduction in age at first maturity.

