

Elemental distributions in otoliths of eel

Zumholz, K.¹, Schroeder, J.¹, Hansteen, T.H.¹, Piatkowski, U.¹, Lechtenberg, F.²

1. Leibniz Institute for Marine Research, Kiel, Germany; kzumholz@ifm.uni-kiel.de
2. Röntgen Analytik Service Lechtenberg, Itzehoe, Germany

Otoliths ("earstones") are small, white calcium carbonate-dominated structures found in the head of most fish. They grow throughout the lifetime of the animal. Otoliths provide a sense of balance to fish in much the same way that the inner ear provides balance in humans. The characteristic trace element patterns in otoliths are governed by the composition and temperature of the surrounding sea water. Thus otoliths can reflect the changing environmental factors such as temperature, salinity and trace element composition, and can be used to study the distribution and migration pathways of fish.

Synchrotron X-ray Fluorescence Analysis (SYXRF) and electron microprobe analysis were used to determine the distribution of minor and trace elements in otoliths of European eel (*Anguilla anguilla*). Doubly polished, 60 micrometers thick otolith sections were analysed at the SYXRF set-up at HASYLAB Beamline L, using white synchrotron radiation and a glass capillary producing a beam diameter of about 12 micrometers. We see important variations especially in the concentrations of Sr and Sb in the otoliths (Figures 1,2), probably reflecting changing environmental conditions throughout the eel's lifetime. The excellent micro-scale resolution and the precise analysis of elements from Calcium (Ca) to Lead (Pb) makes SYXRF a very accurate tool to gather life history information of individual fish from otoliths. A major advantage of the SYXRF method is that the analysis is non destructive, thus allowing for further investigations of the analysed sample material.

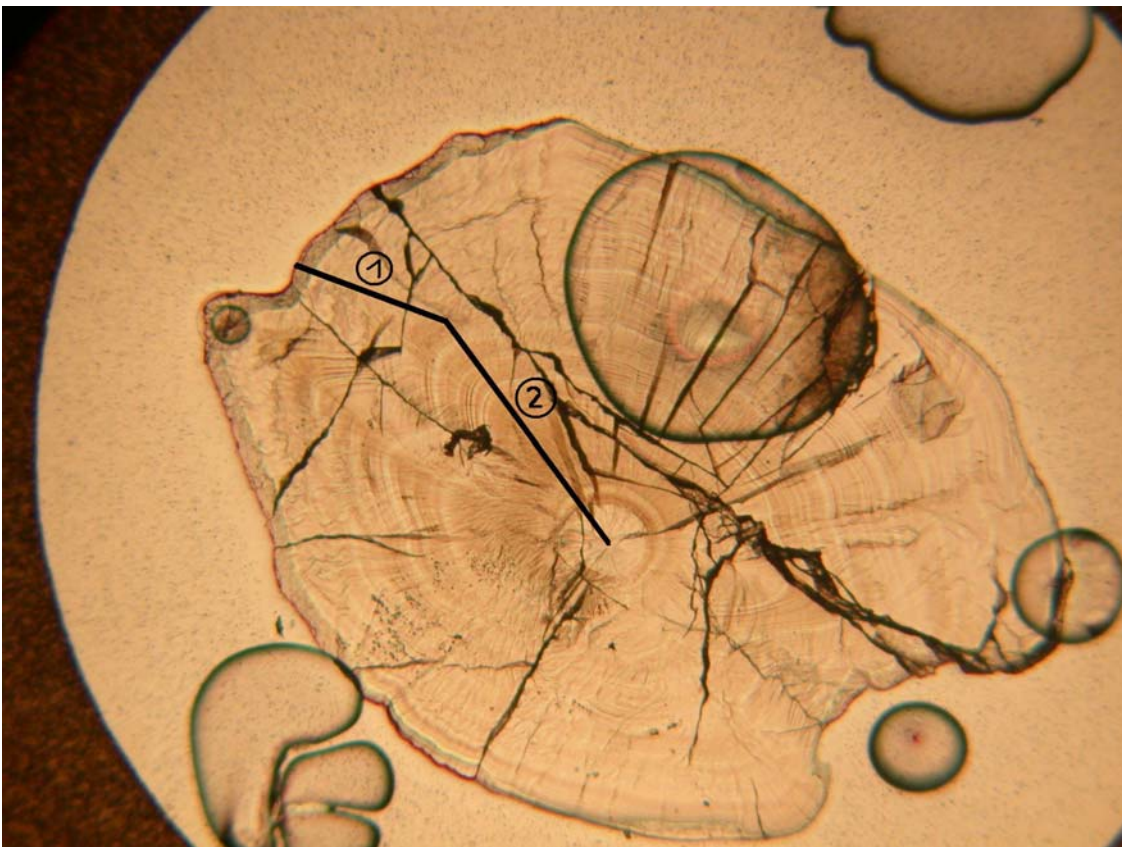


Fig. 1. 60 μm thick section of eel otolith showing the location of analytical profiles (Fig. 2)

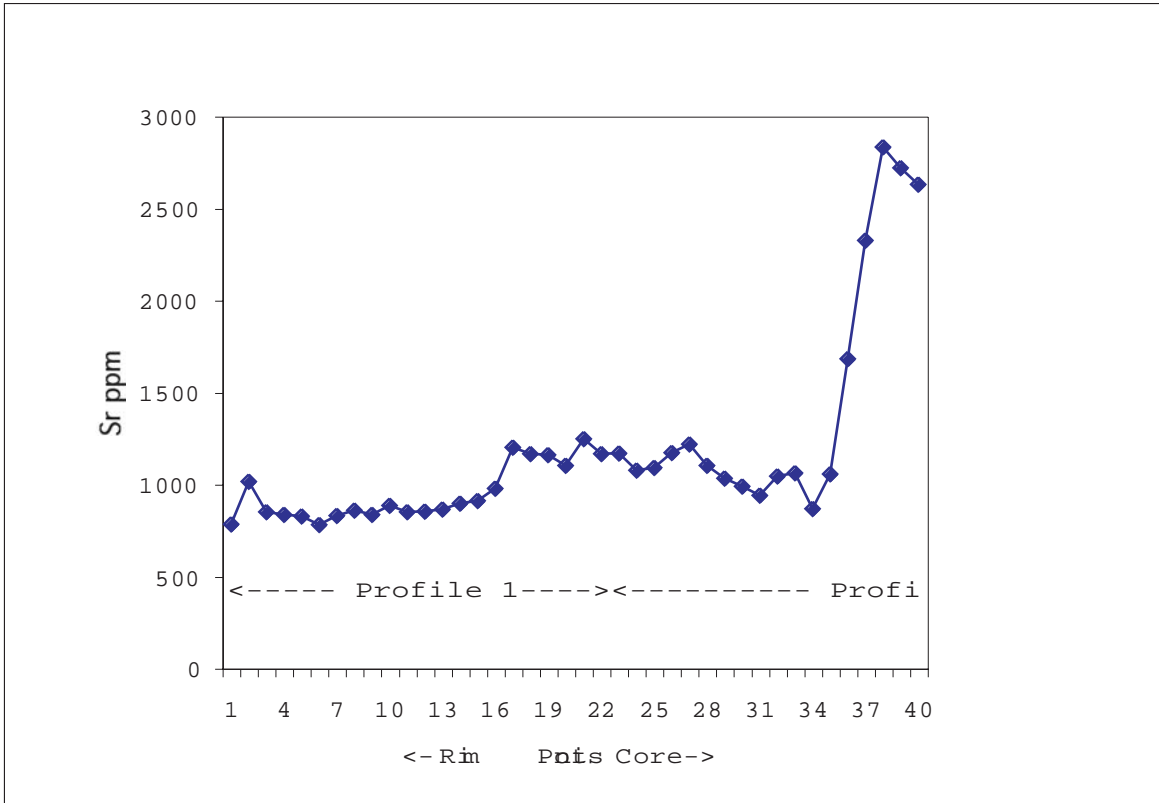


Fig. 2. Sr profile from rim to core of the eel otolith.