Geophysical Research Abstracts, Vol. 7, 04581, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04581

Time-lapse photographic records of shell activity in bivalve mollusks: implications for microgrowth increments as proxies for biological rhythms and environmental conditions

D. L. Rodland, B. R. Schöne

Johann Wolfgang Goethe University-Frankfurt am Main, Germany
(D.Rodland@em.uni-frankfurt.de / Phone: +49 69 798 22974)

Micro-growth increments preserved in the shells of bivalve mollusks provide a potential proxy for biological rhythms and environmental conditions at scales ranging from minutes to weeks. While the relationships between feeding, movement, shell closure and growth have been studied from a variety of approaches, previous techniques require that measuring equipment be affixed to the shell, potentially influencing behavior. By using commercially available digital cameras (webcams) it is possible to monitor shell activity of aquaria 24 hours a day for extended intervals without disturbing the animals. This method also permits the identification of disturbances directly and allows the investigator to account for them in the construction of time series monitoring the ventral margin of shells over intervals of days, weeks, or years. We have produced time-lapse photographic records of bivalve activity recorded at intervals of 20 seconds and extending over a period in excess of one year. Shell activity can be monitored by analyzing brightness variations in regions of interest (i.e., the shell margin) and processed to create long term, high-resolution records of bivalve activity. Preliminary results utilizing *Mytilus edulis* and *Arctica islandica* indicate that shell opening / closure events occur quasi-periodically over intervals of 5-15 minutes, but that the interval between events also varies in length over time scales of several days. Similar results for intertidal and subtidal species raised in aquaria suggests a role for intrinsic biological rhythms. Variations in the timing and duration of shell closure can also be studied in this manner. The results of this study have implications for the formation and temporal resolution of micro-growth increments in bivalve shells, and

hence for the development of high-resolution climate records from marine settings.