



Growth chronology of Greenland Cockles (*Serripes groenlandicus*) from Bear Island, Svalbard, Norway

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Climate change is occurring rapidly in the Arctic, and observing the links between environmental drivers and biological effects can provide key information on the ecosystem consequences of climate change. Analysis of shell-based records of mollusks (sclerochronology) provides an effective and expanding approach to reconstructing environmental-ecological linkages. In particular, annually resolved archives can be key indicators of how climate change manifests in the marine ecosystem. We developed a master growth chronology of the Greenland Cockle (*Serripes groenlandicus*) from Bear Island (Bjørnøya), Svalbard, Norway (74°41'N, 18°56'E) from analysis of annual shell increments. The chronology was developed from 20 individuals ranging in age from 24 to 45 years old (the oldest known individuals of this species to date). The chronology, expressed as a standardized growth index (SGI), extended from 1968 to 2012 and exhibited a cyclical pattern, with decadal periods of high growth, alternating with slower growth intervals. We also identified significant relationships between large-scale climate regimes (e.g. NAO, AMO), local environmental conditions (e.g. sea temperature, sea ice), and shell growth. Additionally, growth chronologies, and environmental linkages were compared from this, near the southern extent of the Barents Sea polar front, with other Arctic locations influenced by different water masses to examine the nature of the environmental regulation on shell growth of this species in the Barents Sea and Arctic Ocean. We conclude that the Greenland Cockle is quite sensitive to environmental changes over annual to decadal scales and therefore can serve as a proxy of climate change effects on ecosystem processes in the Arctic.