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Can pelagic gastropods be used to assess the impacts of ocean acidification in the North Sea?

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The potential impact of ocean acidification (OA) on plankton calcifiers is a focus of interest for the marine science community. Most planktonic studies have focused on coccolithophores with mixed results, while other calcareous groups of great ecological significance have received less attention. This study will present the first investigation of the impacts of OA on pelagic gastropods at the Marine Scotland Science (MSS) monitoring site at Stonehaven (east coast of Scotland). Temperature, salinity, nutrients, phytoplankton and zooplankton have been monitored at the site weekly since 1997. Carbonate chemistry measurements total alkalinity (TA) and dissolved inorganic carbon (DIC) began in 2009. During this study the dissolution and elemental composition of archived pelagic gastropods shells (including pelagic larvae of benthic gastropod species and holoplanktonic pteropods) were examined using Scanning Electron Microscopy (SEM) and X-ray microanalysis. TA and DIC showed a seasonal pattern with considerable interannual variability and appeared to be influenced by higher salinity water entering the Scottish Coastal system at the end of 2012. Calculated pH values were influenced by the phytoplankton biomass in the water. Incidence of gastropod shell dissolution was scored and the relationship with OA and other environmental parameters investigated. The SEM images and concomitant molecular analysis will provide the first detailed assessment of the diversity of the pelagic gastropod community at the Stonehaven monitoring site. We intend to evaluate if the analysis of pelagic gastropods shells can be used as a tool to assess the impacts of OA on the plankton community in the Northern North Sea.

Keywords: Plankton; Ocean Acidification; Gastropods; North Sea; “Impact Assessment”.

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