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Response of pteropods and foraminifera to changing pCO2 and pH in last 250,000 years

Malcolm Hart, Deborah Wall-Palmer, and Christopher Smart

University of Plymouth, School of Geography, Earth & Environmental Sciences, Plymouth PL4 8AA, United Kingdom (mhart@plymouth.ac.uk, +44 1752 584776)

Over the last 250,000 years the diversity and quality of preservation of pteropods (holoplanktic gastropods) has fluctuated in response to glacial/interglacial cycles. This is almost certainly related to the change in oceanic pH as the best preservation is recorded in glacial cycles when pCO2 was at a lower level than during interglacials. Detailed studies of the pteropod assemblages from marine cores taken near Montserrat (Caribbean Sea) have provided a high resolution database with which to make comparisons world-wide. There are peaks of diversity (and good preservation) in Marine Isotope Stages 2 and 6 and these can be found elsewhere in the Gulf of Mexico, in the Indian Ocean and the South China Sea. Using a "pteropod preservation index" it can be seen that this parallels the changing pCO2 and pH and is clearly related.

Research on benthic foraminifera living in high CO2, low pH waters near Ischia (Bay of Naples) shows that it is possible to change the foraminifera living in the environment with a change of pH from 8.14 to 7.8 and 7.6. The changes in the diversity and composition of the foraminiferal assemblages parallel changes seen in other benthic faunas (e.g., gastropods, bivalves, echinoderms and calcareous algae). The reductiuon in foraminiferal diversity and the change in the composition of the assemblage is seen to be triggered by a very small change in pH, and something which - if present trends continue - could be seen in the natural world in a few decades.