'Rates of Ocean Acidification and Mass Extinctions in the Oceans'

Locations	NG08 - School of Biosciences – R27 on the Edgbaston Campus map
Date(s)	Wednesday 24th April 2013 (16:15-17:15)
Download	**Add to Calendar (/schools/gees/news/2013/24Apr13-school-seminar.aspx?ical=true)**

Part of the School Seminar Series

Speaker: Professor Ellen Thomas, Yale University (currently Leverhulme Visiting Professor, School of Earth Sciences, University of Bristol)

Host: **Ian Boomer (/staff/profiles/gees/boomer-ian.aspx)**

Abstract:
Deep-sea benthic organisms use organic matter produced in the photic zone, so that productivity in surface and bottom waters are coupled in the present oceans. We thus expect that severe extinction of plankton and benthos in the geological past would have been coupled, but if we use foraminifera, eukaryote single-celled organisms, as our indicators, we see that planktic and benthic extinctions have not been not coupled. The asteroid impact at the end of the Cretaceous (K/Pg) caused mass extinction of calcifying plankton but not of the benthos, whereas the reverse occurred 10 myr later, during global warming at the Paleocene-Eocene (P/E) boundary. The K/Pg extinction has been seen as caused by collapse of primary productivity due to darkness-caused, but such a collapse should have caused benthic extinction. Across the P/E boundary, productivity increased close to the continents, whereas open ocean productivity may have declined, thus no global pattern in productivity changes which could have explained extinction of benthos. The unexpected difference between planktic and benthic extinction patterns may have been caused by the occurrence of ocean acidification at different rates. Rapid surface ocean acidification at the K/Pg boundary may have been due to influx of impact-generated nitric acid, followed by rapid oceanic buffering, and have been a factor in the massive extinction of pelagic calcifyers, ammonites and top-level predators, while oceanic productivity in terms of biomass recovered rapidly. Acidification at the end of the Paleocene was triggered by much slower injection of carbon-compounds into the ocean-atmosphere system, leading to severe extinction of deep-sea benthos, much less severe turnover in the plankton. The study of the biogeography of biotic effects of events at the K/Pg and P/E boundaries thus may assist in the evaluation of effects on oceanic biota with varying rates and sources of acidification.