UK participation in 3rd Ocean in a High CO_2 World conference
Monterey, USA: 24-27 September 2012

UK scientists had a high profile at the 3rd Ocean in a High CO_2 World conference, held in Monterey, 24-27 September 2012, with its focus on ocean acidification research. They presented 55 science contributions (the second largest national number, after the US), with the majority of these (75%) fully or partly arising from the UK Ocean Acidification (UKOA) research programme, supported by NERC, Defra and DECC.

UK attendance at the meeting was assisted by UKOA travel awards (covering ~50% of costs for 27 participants), also by funding from the FCO-BIS Science & Innovation Network, and other sources. The conference organisers considered the scale of UKOA support to represent formal co-sponsorship; as a result, the programme logo was included on the back cover of the conference handbook and shown in the opening/closing presentations at the meeting. The main meeting sponsors were the Scientific Committee on Oceanic Research (SCOR), the International Geosphere-Biosphere Programme (IGBP) and the Inter-governmental Oceanographic Commission (IOC) of UNESCO.

As detailed below, UK contributions comprised 2 plenary talks (out of 10); 20 lead-author presentations in parallel sessions (out of 135); and 33 posters (out of 234). Media coverage of the meeting that highlighted UK contributions included Nature News www.nature.com/news/tiny-fossils-hint-at-effects -of-ocean-acidification-1.11500 and Science www.sciencemag.org/content/338/6103/27.full (both on the talk by Paul Bown), also the online marine science news service Ocean Sp@ce (on the talk by Daniela Schmidt).

Note that: i) 'UK authorship' in the tables below is based on the author's affiliation, not his/her nationality, (on the basis that the former information relates to funding support, and hence UK investment in OA research); ii) not all co-authors named below attended the meeting; and iii) there were a total of ~550 meeting participants, from 38 countries. For additional information on the conference, including abstracts and participants list, see www.highco2-iii.org.

1. Oral presentations in plenary sessions with UK lead authorship

Speaker and co-authors	Affiliation	Talk title	UKOA involvement*	UKOA support*
Daniela Schmidt Laura Foster Suzanne Jennions Andy Ridgwell Ellen Thomas	Bristol	Rates of change of ocean acidification: insights from the paleorecord	Supervisor of UKOA research student	X
Steve Widdicombe	PML	Ecosystem change and resilience in response to ocean acidification	Lead PI: benthic consortium	XX

*UKOA involvement and UKOA support relate to first author. XX, most/all presented work UKOA-supported; X, some UKOA support; (T), UKOA AVA travel award to assist conference participation

2. Oral presentations in parallel sessions with UK lead authorship

Speaker and co-authors	Affiliation	Talk title	UKOA involvement	UKOA support
Paul Bown Samantha Gibbs Jeremy Young	UCL Southampton UCL	Ocean acidification insights from exceptional coccolithophore fossils	PI: palaeo-consortium	XX (T)
Piero Calosi Sedercor Melatunan Jonathan Byrne Robert Davidson Mark Viant Steve Widdicombe Simon Rundle	Plymouth .. .. NBAF-B'ham .. .. PML Plymouth	Populations living along a thermo-latitudinal gradient vary in their response and vulnerability to ocean acidification and warming	PI: benthic consortium	XX (T)

Penelope Donohue Sebastian Hennige Murray Roberts Maggie Cusack Nicholas Kamenos	Glasgow Heriot-Watt .. .. Glasgow	Synergistic effects of temperature and pCO_2 on photosynthesis, respiration and calcification in the free-living coralline alga *Lithothamnion glaciale*	Associate research student	
Robert Ellis Helen Parry John Spicer Tom Hutchinson Steve Widdicombe	PML/Plymouth PML Plymouth Cefas PML	A physiological trade-off in mussels exposed to ocean acidification – immune system plasticity ensures survival but at the cost of reproduction	Researcher: benthic consortium	X (T)
Laura Foster Federica Ragazzola Marlene Wall Armin Form Daniela Schmidt	Bristol Bristol/GEOMAR Bremerhaven GEOMAR Bristol	The biomineralization response of the cold-water coral *Lophelia pertusa* to ocean acidification	Associate research student	
Jasmin Godbold Martin Solan	Southampton	Interactive effects of ocean acidification and temperature on benthic invertebrate behaviour affect nutrient cycling over longer timescales	Researcher: benthic consortium	XX
Helen Graham Sam Rastrick Gary Caldwell Matthew Bentley Steve Widdicombe Antony Clare	Newcastle Plymouth Newcastle .. .. PML Newcastle	Reproduction in a changing ocean: the effects of longterm exposure to combined multiple stressors	Associate research student	
Lauren Gregoire Andy Ridgwell	Bristol	Evaluating the controls on organic matter transport efficiency in an Earth system model: implications for future warming and ocean acidification	Researcher: global modelling consortium	XX (T)
Nicholas Kamenos Jonathan Dunn Piero Calosi Helen Findlay Steve Widdicombe Elena Aliosio Heidi Burdett	Glasgow .. .. Plymouth PML .. .. Glasgow	Buffering of calcium carbonate polymorph change by coralline algae in response to pCO_2 enrichment	Associate researcher: benthic consortium	X (T)
Ceri Lewis Karen Chan Sam Dupont	Exeter U Washington Kristineberg	Physiological responses of invertebrate sperm to a contaminated, high CO_2 ocean: mechanisms and consequences	Co-I: ecosystem & socio-economic impacts consortium	X
Nova Mieszkowska Mike Burrows	MBA SAMS/SMI	Long term, transgenerational impacts of temperature and ocean acidification in keystone intertidal invertebrates	PI: benthic consortium	XX
Sam Rastrick Piero Calsi Helen Findlay Helen Graham Jasmin Godbold Chris Hauton Ana Querios Martin Solan John Spicer Nia Whitely Steve Widdicombe	Plymouth .. .. PML Newcastle Southampton .. .. PML Southampton Plymouth Bangor PML	Determining the resilience of ecologically-important intertidal invertebrates to elevated CO_2 and temperature: physiological responses and energetic trade-offs	Researcher: benthic consortium	XX (T)

Sophie Richier Mark Moore Dave Suggett Alex Poulton Ross Holland Mark Stinchcombe Mike Zubkov Eric Achterberg Toby Tyrrell	Southampton .. .. Exeter Southampton	Short-term response of natural microbial community to ocean acidification on and around the north west European continental shelf	Researcher: sea surface consortium	XX (T)
Andy Ridgwell Elena Couce Erica Hendry	Bristol	Is ocean acidification a significant threat to coral reefs? (Out of the frying pan, into the acid bath?)	Lead PI; global modelling consortium	X (T)
Daniel Small Piero Calosi John Spicer Dominic Boothroyd Steve Widdicombe	Plymouth/NLH Plymouth .. .. NLH Padstow PML	Interactive effects of ocean acidification and warming on aspects of the developmental ecophysiology of the European lobster *Homarus gammarus*		
Karen Tait Bonnie Laverock Steve Widdicombe	PML	Changes to an Arctic sediment nitrogen cycling community in response to increased CO_2. *TALK SCHEDULED BUT COULD NOT BE GIVEN DUE TO TRAVEL PROBLEMS*	Co-I: benthic consortium	X (T)
Carol Turley	PML	The science into policy challenge of ocean acidification	KE Coordinator	XX
Eithne Tynan Toby Tyrrell Eric Achterberg	Southampton	Seasonal variability of the carbonate system along the Atlantic gateway to the Arctic Ocean	Researcher: sea surface consortium	X (T)
Toby Tyrrell Alex Poulton Anastasia Charalampopoulou Eithne Tynan Jeremy Young	Southampton .. .. UCL	The role of ocean acidification on coccolithophore distributions in polar and temperate seas	Lead PI; sea surface consortium	X (T)
Nia Whiteley Clara Mackenzie Ruth Nicholls Richard Patton Daniel Lee Ian McCarthy Shelagh Malham	Bangor	Physiological effects of elevated temperature and ocean acidification in two commercially-important shellfish species from the Irish Sea	PI: benthic consortium	

In addition, there were six other oral presentations with UK co-authorship (and non-UK lead authorship)

Poster presentations with UK lead authorship

Author(s)	Affiliation	Talk title	UKOA involvement	UKOA support
Yuri Artioli Jerry Blackford Gisle Nondal Richard Bellerby	PML .. .. Bergen	Multi-stressor response of the planktonic ecosystem of the North-Western European shelf	Researcher: regional modelling consortium	XX (T)
Cecilia Baggini Riccardo Rodolfo-Metalpa Jason Hall-Spencer	Plymouth	Effects of ocean acidification on *Mytilus galloprovincialis* and *Patella caerulea* at natural CO_2 vents		
Cecilia Balestreri Andrea Highfield	MBA	Genetic and physiological plasticity in extant phytoplankton	Research student: sea surface consortium	XX

Matt Keys Jack Allum Ros Rickaby Jeremy Young Colin Brownlee Declan Schroeder	MBA .. .. Oxford UCL MBA	assemblages		
Jerry Blackford Yuri Artioloi Momme Butenschön	PML	Multi-scale variability of ocean acidification in the North-Western European shelf	Lead PI; regional modelling consortium	XX (T)
Heidi Burdett Elena Aloisio Piero Calosi Helen Findlay Steve Widdicombe Angela Hatton Nicholas Kamenos	Glasgow Plymouth .. .. PML .. .. SAMS/SMI Glasgow	The effect of low and low-spiked pH on the intracellular DMSP production and epithelial cell morphology of red coralline algae		
Piero Calosi Sam Rastrick Chiara Lombardi Jörg Hardege Adriana Giangrande Anja Shulze Maria-CristinaGambi	Plymouth .. .. La Spezia Hull Salento Texas A&M Naples	Metabolic plasticity and adaptation in polychaete species inhabiting a CO2 vent coastal system	Co-I; benthic consortium	X (T)
Nadja Christen Piero Calosi Caroline McNeill Steve Widdicombe	Plymouth .. .. PML	Structural and functional vulnerability to elevated pCO2 in marine benthic communities		
Ashleigh Currie Natalie Hicks Henrik Stahl	SAMS/SM I	Effects of ocean acidification on benthic oxygen dynamics in muddy and sandy sediments	Researcher: benthic consortium	XX
Beatriz de Francisco-Mora Kim Last Henrik Stahl Murray Roberts	SAMS/SMI .. .. Heriot-Watt	Effects of ocean acidification and warming on the calcification and respiration of the cold-water coral *Lophelia pertusa*	Associate research student	X
Helen Findlay Malcolm Woodward Juan Moreno Navas Sebastian Hennige Laura Wicks Veerie Huvenne Murray Roberts	PML .. .. Heriot-Watt .. .. Southampton Heriot-Watt	Cold-water reef systems: tidal down-welling and implications for future ocean acidification	Co-I; benthic consortium	XX (T)
Susan Fitzer Vernon Phoenix Maggie Cusack Nick Kamenos	Glasgow	Biomineralisation: protein and mineral response of *Mytilus edulis* to ocean acidification		
Samantha Gibbs Chris Daniels Paul Bown Sarah O'Dea Alex Poulton Jeremy Young	Southampton .. .. UCL Southampton .. .. UCL	An unprecedented glimpse into plankton sensitivity to global warming and ocean acidification: modern plus fossil coccolithophores from the 'Lagerstatten' of Tanzania and the US	Co-I: palaeo consortium	XX
Rachel Hale Piero Calosi Louise McNeill Nova Mieszkowska Steve Widdicombe	UEA Plymouth PML MBA PML	Predicted levels of future ocean acidification and temperature rise could alter community structure and biodiversity in marine benthic communities	Associate research student	X

Frances Hopkins Philip Nightingale Stephen Archer	PML .. .. Bigelow	Efffects of ocean acidification on the cycling of dimethyl sulphide (DMS) and its algal precursor dimethyl sulfoniopropionate (DMSP) in NW European shelf waters	Researcher; sea surface consortium	XX (T)
Suzanne Jennions Lauren Gregoire Andy Ridgwell Daniela Schmidt Katrin Linse Tom Scott	Bristol .. .. BAS Bristol	Antarctic bivalve response to ocean acidification: a modelling and historic perspective	Associate research student	X (T)
Zong-Pei Jiang David Hydes Toby Tyrrell Susan Hartman Mark Hartman Cynthia Dumousseaud	Southampton	Key controls on the seasonal and interannual variations of the carbonate system in the Northeast Atlantic	Associate research student	
Nikki Khanna Jasmin Godbold Martin Solan William Austin David Paterson	St Andrews Southampton .. .. St Andrews	Ocean acidification modifies the community structure of benthic foraminifera	Associate research student; benthic consortium	X (T)
Clara Mackenzie Graham Ormondroyd Nia Whiteley Richard Patton Shelagh Malham	Bangor	Effects of further ocean acidification and warming on biomineralization in a commercial shellfish species, the blue mussel *Mytilus edulis*		
Harry McClelland Ros Rickaby Michaël Hermoso Ian Hall Luc Beaufort	Oxford .. .. Cardiff CNRS	Coccolithophore calcification response to changing saturation state on a glacial/interglacial timescale	UKOA research student	XX (T)
Fanny Monteiro Andy Ridgwell Mick Follows Stephanie Dutkiewicz	Bristol .. .. MIT	Investigating the effects opf ocean acidification on coccolithophores in a self-assembling ecosystem model	Associate research fellow	X
Sarah O'Dea Samantha Gibbs Paul Bown Cherry Newsam Paul Wilson Jeremy Young Andy Purvis Luc Beaufort	Southampton .. .. UCL So'ton/UCL Southampton UCL Imperial CNRS	Coccolithophore calcification across the Paleocene Eocene thermal maximum: evidence of sensitivity to surface water acidification	Associate research student	X (T)
Sam Rastrick Piero Calosi Ruth Calder-Potts Greg Nightingale S Thomas Steve Widdicombe John Spicer	Plymouth .. .. PML Plymouth .. .. PML Plymouth	The combined effects of CO_2 and temperature on acid-base regulation during tidal emersion and re-immersion in *Necora puber*	Researcher; benthic consortium	X (T)
Victoire Rérolle Cedric Floquet Matt Mowlem	Southampton	Development of a colorometric micro-sensor for seawater pH analysis	Associate research student: sea surface consortium	X (T)

Andy Harris Richard Bellerby Eric Achterberg	.. .. Bergen Southampton			
Murray Roberts and cruise participants	Heriot-Watt	Changing Oceans expedition 2012: deep-sea ecosystem function and the impacts of ocean acidification on cold-water coral ecosystems in the Northeast Atlantic Ocean	PI; benthic consortium	XX (T)
Riccardo Rodolfo-Metalpa Jason Hall-Spencer and 17 others	Plymouth	Some Mediterranean corals, but also bryozoans, molluscs and gastropods keep calcifying at low carbonate ion concentrations		
Daniel Small Sam Rastrick Nathan Atkinson Lucy Turner Steve Widdicombe John Spicer Piero Calosi	Plymouth .. .. PML Plymouth	Impact of medium-term exposure to CO_2 enriched seawater on the physiological functions of the velvet swimming crab, *Necora puber*		
Coleen Suckling Melody Clark Lloyd Peck	BAS	Long term ocean acidification: forecasting the future and experimental considerations for life-cycle approaches		
Karen Tait Tom Vance Helen Parry Steve Widdicombe	PML	Investigating the impact of ocean acidification on biofilm formation and larval recruitment in the field	Co-I; benthic consortium	XX (T)
Alison Webb Peter Liss Frances Hopkins Gill Malin Claire Hughes Roland von Glasow Phil Nightingale Stephen de Mora	UEA .. .. PML UEA York UEA PML	Trace gas concentrations under high CO_2 and ocean acidification	UKOA research student	XX (T)
Laura Wicks Sebastian Hennige Murray Roberts	Heriot-Watt	Acclimation of cold water coral *Lophelia pertusa* to predicted rises in atmospheric CO_2 and sea temperatures	Researcher; benthic consortium	XX (T)
Laura Wicks Murray Roberts	Heriot-Watt	Benthic invertebrates in a high CO_2 world: what does the future hold?	Researcher; benthic consortium	XX (T)
Maria Williams Morten Andersen Paul Bown Daniela Schmidt	Bristol .. .. UCL	The pelagic record of ocean acidification	UKOA research student	XX
Phillip Williamson Carol Turley	NERC/UEA PML	Overview of the UK Ocean Acidification research programme	UKOA Science Coordinator	XX

In addition, there were four other poster presentations with UK co-authorship (and non-UK lead authorship)