UK Ocean Acidification Research Programme

Exeter: 16 April 2012

Welcome to the 2nd Annual Science Meeting of the UK Ocean Acidification research programme (UKOA)

Harry Elderfield
Chair: UKOA Programme Advisory Group

NATURAL ENVIRONMENT RESEARCH COUNCIL

defra Department for Environment Food and Rural Affairs

DEPARTMENT OF ENERGY & CLIMATE CHANGE

Science to Policy

The basic physics and chemistry theory of ocean acidification due to atmospheric CO_2 increase is well known

The magnitude of ocean acidification can be predicted with a high level of confidence since the ocean chemistry is well known

The strongest direct evidence for ocean acidification is from the time series stations ALOHA, BATS and ESTOC. But variability and trends of oceanic pH not known

Impact of the acidification on marine organisms and their ecosystems is much less predictable. Not only calcifying organisms are potentially affected by ocean acidification. **I**t is also possible that some species that use CO_2 for photosynthesis are positively influenced by ocean acidification

Requirement for the challenging science to determine and understand the biological and biogeochemical, regional and global, and climate consequences. This requires observations of upper ocean and benthic processes, modelling, and evidence from past OA events

Important to improve understanding of impacts on commercially-important species at population-to-ecosystem level

Ocean acidification research is still in its infancy and more studies are required to answer the numerous questions related to its biological, biogeochemical and climate consequences. Requires connected programme to meet Science to Policy objectives

UK Ocean Acidification Research Programme

1. Researchers supported by the UKOA programme and other OA researchers
2. Invited research users and stakeholders including representatives from DECC, SNH, SEPA and Greenpeace
3. Invited international guests from Germany, Ireland and USA
4. Members of the UKOA Programme Advisory Group and Programme Executive Board including Jolene Cook, Paul Halloran and John Raven

UK Ocean Acidification Research Programme

UKOA timeline

2008 Funders' initial commitments; programme planning starts

2009 **Science Plan and Implementation Plan; call for bids**. Formal links with EPOCA and BIOACID . Knowledge Exchange Coordinator appointed.

2010 **Awards announced; most projects start.** Science Coordinator appointed. Participation in meetings at Bremerhaven and Monaco; links with MedSeA

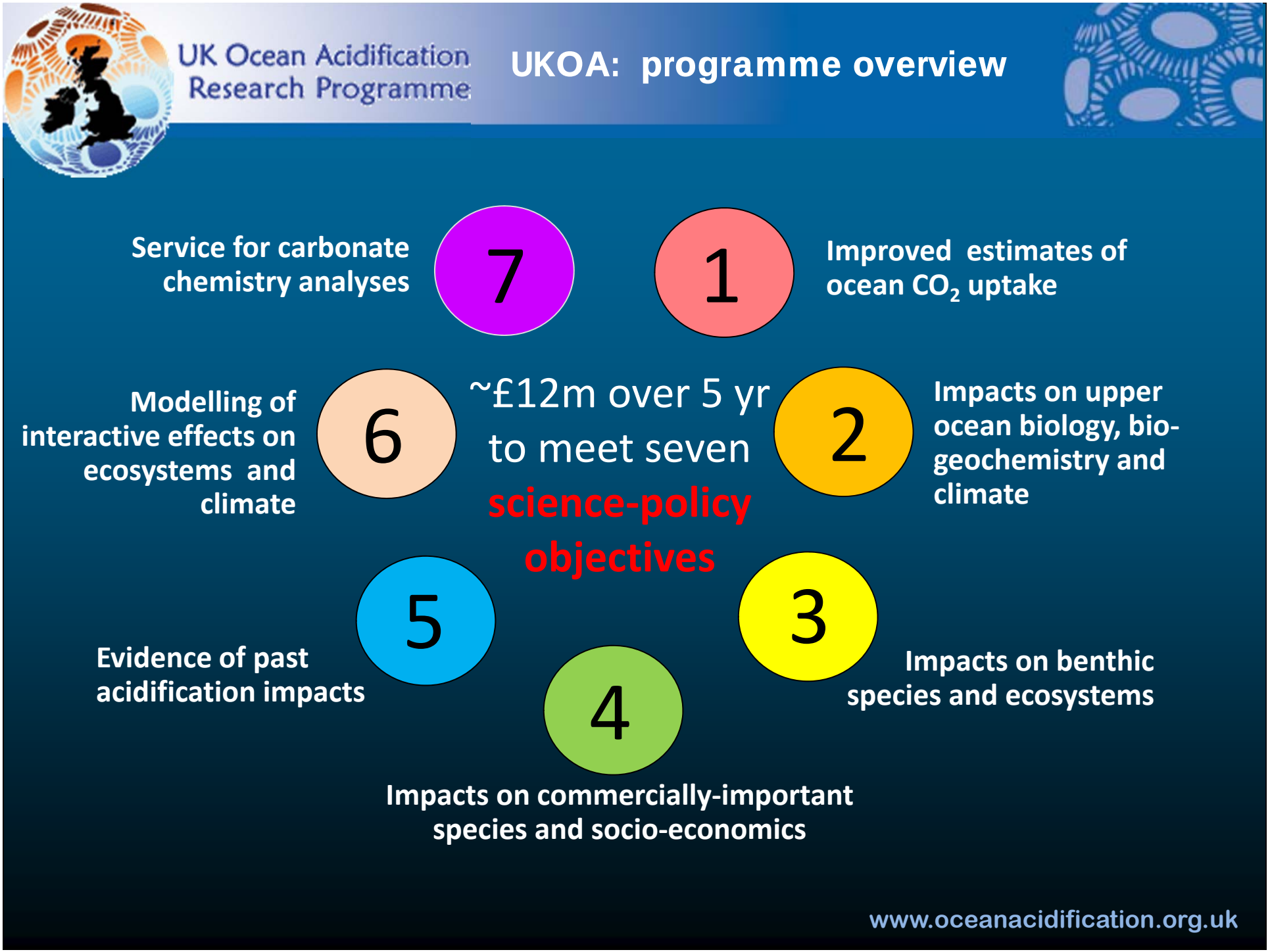
2011 First UKOA Annual Science Meeting: Cambridge, 6-7 Jan. **Major experiments start. 'Around Britain' research cruise (June-July).**

2012 **2nd programme Annual Science Meeting: Exeter, 16-18 April.**
Fieldwork includes **cold water coral research cruise** (NW Scotland; 17 May - 15 June) and **upper ocean cruise to Arctic** (2 June - 5 July).

2013 Fieldwork includes **Southern Ocean research cruise** (Jan-Feb)

2014 **Data synthesis and dissemination**. Component projects end.

2015 Programme ends


UK Ocean Acidification Research Programme
UKOA: programme overview
Service for carbonate chemistry analyses
7
1
Improved estimates of ocean CO_2 uptake
Modelling of interactive effects on ecosystems and climate
6
~£12m over 5 yr to meet seven science-policy objectives
2
Impacts on upper ocean biology, bio-geochemistry and climate
5
3
Evidence of past acidification impacts
Impacts on benthic species and ecosystems
4
Impacts on commercially-important species and socio-economics
www.oceanacidification.org.uk

UK Ocean Acidification Research Programme

Programme connections: Consortia

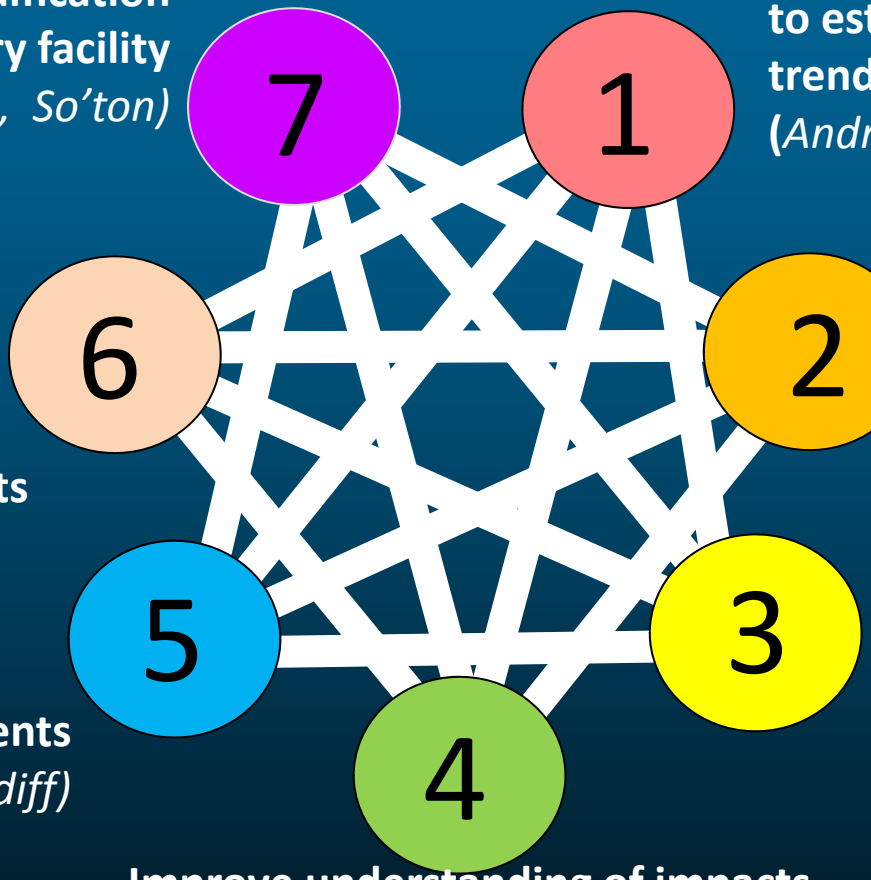
Ocean acidification carbonate chemistry facility *(Eric Achterberg, So'ton)*

Observations and synthesis to establish variability and trends of oceanic pH (*Andrew Watson, UEA***)**

CO_2 - carbon cycle - climate interactions *(Andy Ridgwell, Bristol)*

OA impacts on sea surface biology, biogeochemistry and climate *(Toby Tyrrell Southampton)*

Regional ecosystem & biogeochemical impacts of OA *(Jerry Blackford, PML)*



Abrupt OA events *(Paul Pearson, Cardiff)*

OA impacts on key benthic ecosystems, communities, habitats, species and life cycles *(Steve Widdicombe, PML)*

Improve understanding of impacts on commercially-important species at population-to-ecosystem level, and socio-economic implications *(Kevin Flynn, Swansea)*

UKOA also supports two rounds of 'stand-alone' research studentships

Impact of ocean acidification on the air-sea exchange of trace gases
Alison Webb (UEA & PML)

Evolutionary responses to ocean acidification in free-living protists
Ewan Minter (Liverpool)

Assessing the effects of longterm ocean acidification at volcanic vents
Laura Pettit (Univ Plymouth)

Responses of calcifying macroalgae to ocean acidification
Chris Williamson (Cardiff & NHM)

Field investigation of the physiological response of phytoplankton to past fluctuations in surface water carbonate chemistry *Harry McClelland (Oxford)*

Understanding the impact of recent ocean acidification on bio-calcification
Kate Salmond (Open Univ)

The pelagic record of ocean acidification since the beginning of industrialisation
Maria Williams (Bristol)

Also studentship award to Lloyd Peck (BAS): currently unfilled