Climate Change: Ignore the ocean at your peril

Niall McDonough, Executive Secretary at the European Marine Board outlines why the ocean should be part of the climate change discussion...

The United Nations Framework Convention on Climate Change COP21 meeting in Paris in December delivered an ambitious agreement on mitigating the effects of climate change. Before Paris, many commentators were worried that the agreement would not go far enough towards the aim of keeping the global temperature rise below 2°C above pre-industrial levels by the end of the century. The agreement finally reached a far more ambitious target of 1.5 °C. Following the disappointment of the 2009 COP15 in Copenhagen, this was undoubtedly a triumph.

Whilst not wishing to downplay the importance of this commitment from 195 counties to address the causes and the effects of global climate change, one issue continues to cause concern. That is the almost complete absence of the relationship between the ocean and climate in the COP21 negotiations and in the final agreement. The word "ocean" appears once in the preamble to the agreement and Article 5 stresses the need for "...action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases..", of which the ocean is one. This represents a poor return after many years of advocacy from an increasingly frustrated community of scientists and NGOs.

So why should the ocean be part of the international discourse on climate change? In reality, the poor attention to the role of the ocean in the climate discussions is symptomatic of a larger failure of human society and political opinion to understand the ocean's importance as a planetary life-support system. The ocean is, unquestionably, the dominant feature of the surface of our planet. It covers 70% of the earth's surface, supports around half of global primary production and harbours an enormous diversity of life (and a large fraction of the earth's biosphere, that part of the planet that can support life). It also provides an array of essential goods and services which support human health and wellbeing[1], not least of which is its capacity to reduce the global effects of climate change. Since the industrial revolution, the ocean has absorbed more than a quarter of human emissions of carbon dioxide and 90% of the additional heat resulting from the greenhouse gas effect. But how long can the ocean continue to take up excess heat and carbon and at what cost to the health of ocean ecosystems?

The ocean is warming, sea level is rising and sea ice in the polar regions is rapidly shrinking. Large areas of the global ocean are also becoming more acidic because of carbon-dioxide uptake, while reduced ventilation is leading to lower oxygen levels in localised areas. In 2015, warmer than average sea temperatures resulting from the El Niño phenomenon led to the third global coral bleaching event (the first 2 were in 1998 and 2010). Damage to coral reef ecosystems from such events has major implications for marine biodiversity and can affect fisheries that provide food for many developing nations. Without drastic action to reduce the causes of climate change addressed in the Paris agreement, these growing pressures and changes will have unforeseeable consequences for marine life, ocean health, and for human wellbeing[2].

Ocean scientists are at the front line in the quest for knowledge to understand the role of the ocean in the earth and climate systems, and the implications of changing oceans for our environment and wellbeing. As a research arena, the marine environment is difficult and costly to access (especially open ocean and deep water environments), and is highly unpredictable. In times of financial constraint it is often difficult, therefore, to argue for funds to support marine research, especially more fundamental research designed to improve our understanding of marine systems and processes.

So what do we need? In very simple terms, a change in mindset. This is not just another research sector looking for a piece of the funding pie; it is about raising our efforts across a whole range of areas necessary to understand and sustainably interact with the last great frontier of our planet. In practical terms we need much greater progress in a number of particular areas:

- An advanced ocean observing system, generating open access data and information across a range of key variables to underpin ocean modelling, forecasting, sustainable commercial activities, management and decision making;

- Enhanced funding and support for basic ocean science; yes a strong maritime economy is important, but its sustainability is dependent on that of the natural system upon which it depends. For this we need to understand pressures, impacts and resilience in relation to marine ecosystems;

- More effective training for the next generation of marine scientists and professionals, giving future marine graduates a greater interdisciplinary knowledge and skill set to address complex real world challenges;

- Better communication and education on the importance of the ocean and marine science using innovative outreach methods and tools (for information on "Ocean Literacy" see the EU funded Sea Change project[3]);

- The emergence of future ocean leaders, capable of motivating society and decision makers to respond with concrete actions and investments;

- A major European flagship ocean research and capacity-building project, combining elements from all of the above.

Research has a major role to play in ensuring that human interaction with the seas and coasts is sustainable, generating benefits for today's population, while protecting our marine environment so that future generations may also enjoy those benefits. Although elements of the above list are in place, a business as usual scenario is not sufficient to achieve this. For more detail on ocean research challenges, visit the European Marine Board website[4] where all our science policy publications are available to download free of charge. ■

1 Moore, M.N., et al. Linking Oceans and Human Health: A Strategic Research Priority for Europe. European Marine Board Position Paper 19. McDonough N., Evrard M., Calewaert JB., French V. (Eds). European Marine Board, Ostend,Belgium. 2013.

2 The Ocean-Climate Nexus Consensus Statement by the European Marine Board and the US Consortium for Ocean Leadership: www.marineboard.eu/ocean-climate-nexus/

3 www.seachangeproject.eu

4 www.marineboard.eu

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