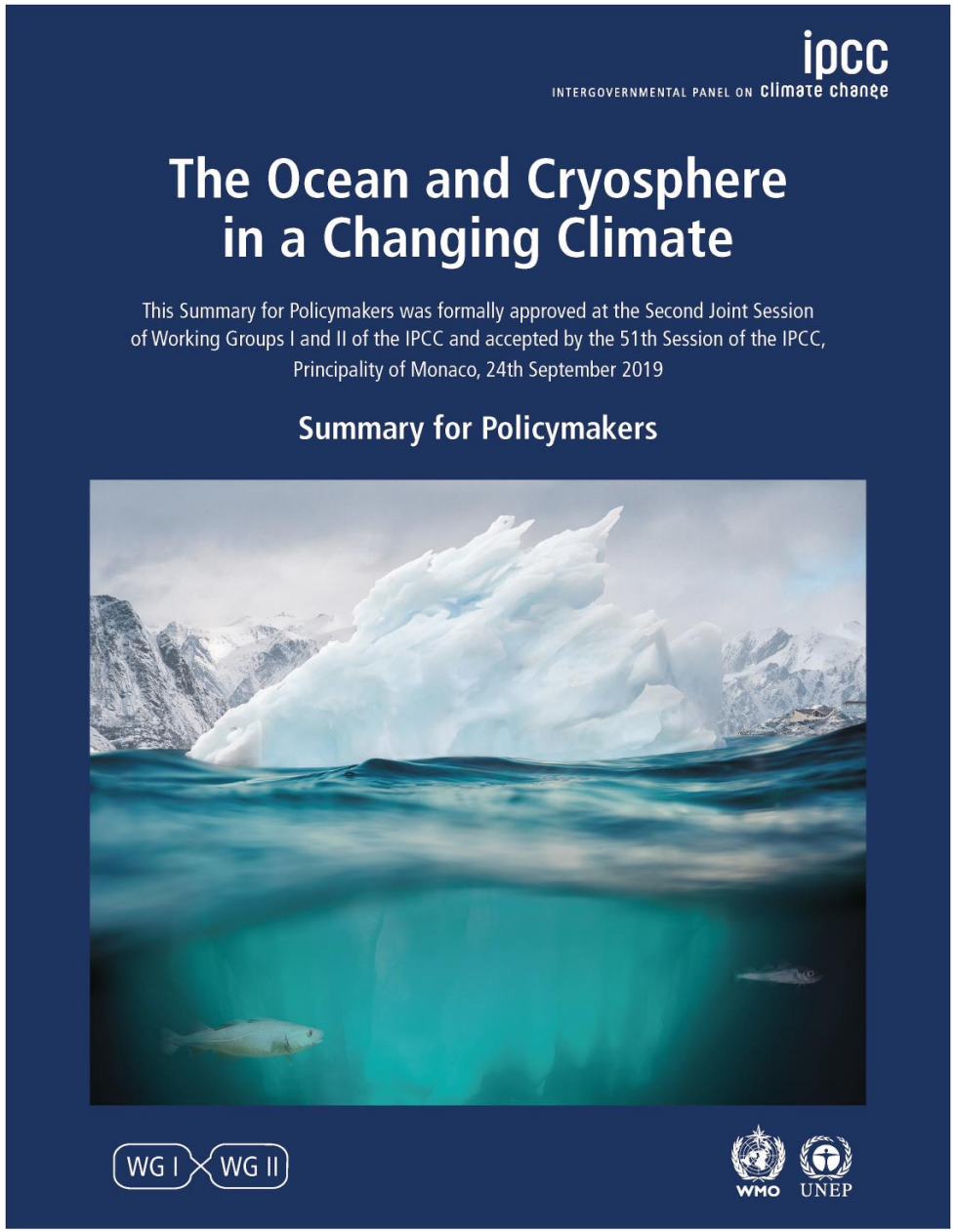
IPCC Ocean & Cryosphere



View of the Pacific Ocean

Image: NASA/JPL

View of the Arctic 2019

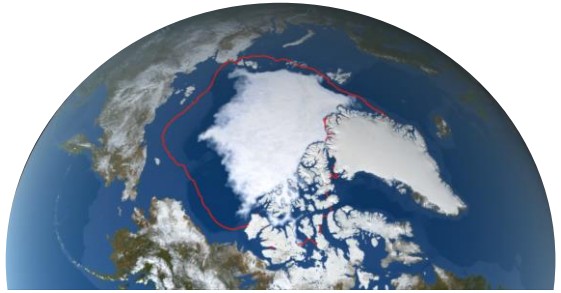


Image: NASA/Trent Schindler

What it means for the UK

THE ROYAL SOCIETY

Ocean, cryosphere and climate change
Opportunities and challenges for the UK

Introduction

The Intergovernmental Panel on Climate Change (IPCC) special report on the *Ocean and Cryosphere in a Changing Climate* summarises observed and projected effects of climate change in the ocean and for the frozen parts of the Earth – including sea ice, permafrost, mountain glaciers and ice sheets. Vigorous and flexible adaptation measures can help reduce the impact of these changes, but they must be applied in parallel with the emissions reductions needed to meet the goals of the Paris Agreement. This briefing provides an overview of the key findings of the IPCC report and their implications for the UK. It identifies possible UK policy responses that would improve outcomes, both in the UK and globally.

The global perspective

How ocean, ice and climate change are connected
The ocean plays a major role in regulating the Earth's temperature and carbon budget. It has absorbed about 25% of the carbon dioxide generated by fossil fuel burning and other human activity and has slowed warming by also absorbing heat.

Global warming causes melting of ice on land such as glaciers, and ice sheets in Antarctica and Greenland, adding water to the ocean, and thus raising sea level. The warming that has affected the atmosphere is also slowly penetrating the whole ocean, which causes the ocean to expand, adding to sea level rise.

By reflecting sunlight, ice and snow have a cooling effect on the climate. Removing the ice to leave darker land or ocean reduces this cooling and so amplifies climate change. Thawing permafrost releases significant amounts of greenhouse gases, causing further warming.

The ocean and cryosphere support ecosystems and the human population, both of which will be affected by impacts of climate change. As well as the many communities who depend on the sea for resources such as food, around 680 million people live less than 10 metres above sea level and many of them are therefore vulnerable to sea level rise. A similar number live in high mountain regions where changes in snow and ice cover affect their water supply.

Where we are and where we are going
Ocean
The ocean has warmed throughout its depth and is continuing to do so at an increasing rate. At the surface, marine heatwaves have doubled in frequency and become more intense. By absorbing carbon dioxide, the ocean has also become more acidic.

Marine ecosystems have been affected by warming and increased acidity, as well as by reduced oxygen content and changes in sea ice, which floats over the polar oceans. All these trends are predicted to continue, causing polar habitats to shrink and warm water species to move into previously temperate waters. Almost all warm-water coral reefs will suffer significant losses and local extinction, even under a low-emissions scenario.

Changes in ocean fish stocks and their distribution are likely to lead to significant changes in fisheries and challenges to

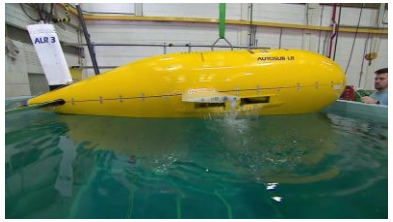
THE ROYAL SOCIETY

New public interest in the Ocean

BBC earth

BLUE PLANET II

Michael Gove 'haunted' by plastic pollution seen in Blue Planet II

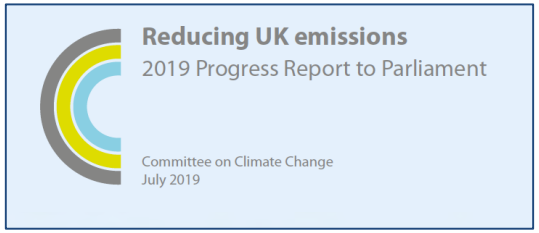


Public engagement in the naming of a polar ship

Image: BBC

The science – policy interface is evolving

the IPCC



scientific methods at the service of public policy

photo credits: Laure t Bleyennec

ipcc
INTERGOVERNMENTAL PANEL ON climate change

The Ocean and Cryosphere in a Changing Climate

This Summary for Policymakers was formally approved at the Second Joint Session of Working Groups I and II of the IPCC and accepted by the 51th Session of the IPCC, Principality of Monaco, 24th September 2019

Summary for Policymakers

WG I × WG II

WMO UNEP

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