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Listen to the ocean

The Special Report on Global Warming of 1.5°C: Impacts on ocean ecosystems and dependent societies

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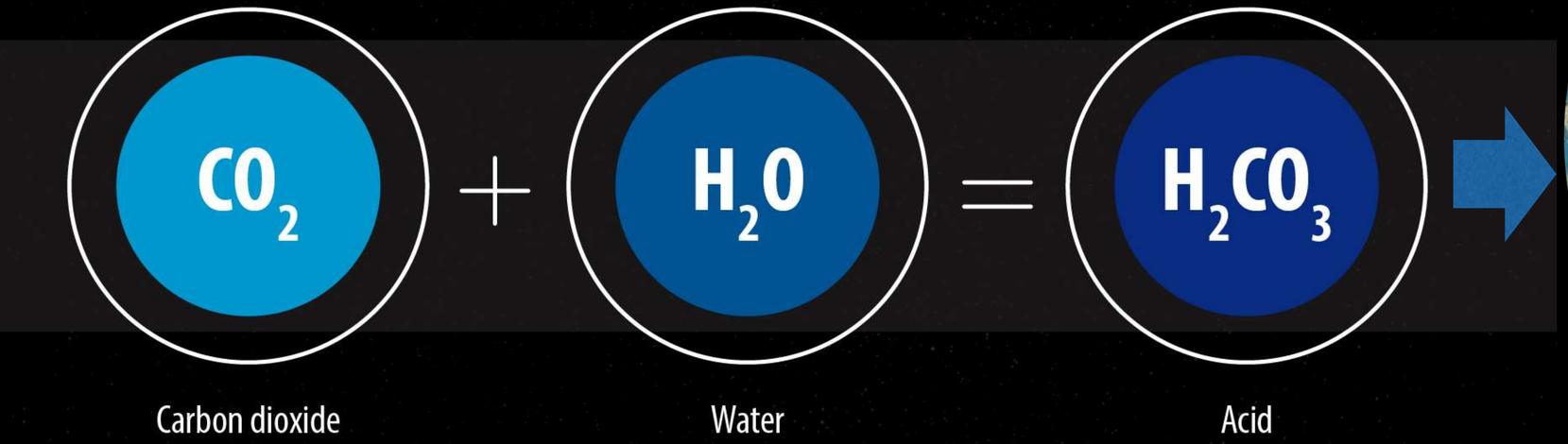
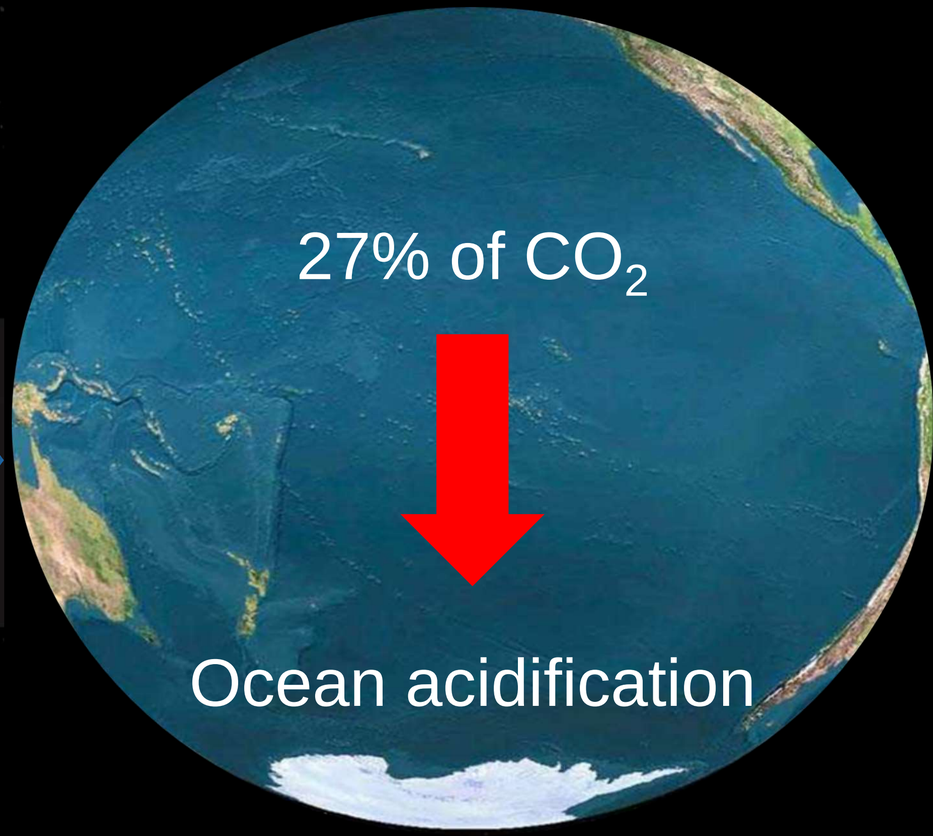
IPCC SR1.5 side event , 4th December 11:30-13:00, COP24

The ocean has taken up 27% of carbon dioxide emissions:

…. reducing atmospheric warming but causing ocean acidification

More atmospheric CO_2
means increased ocean acidity

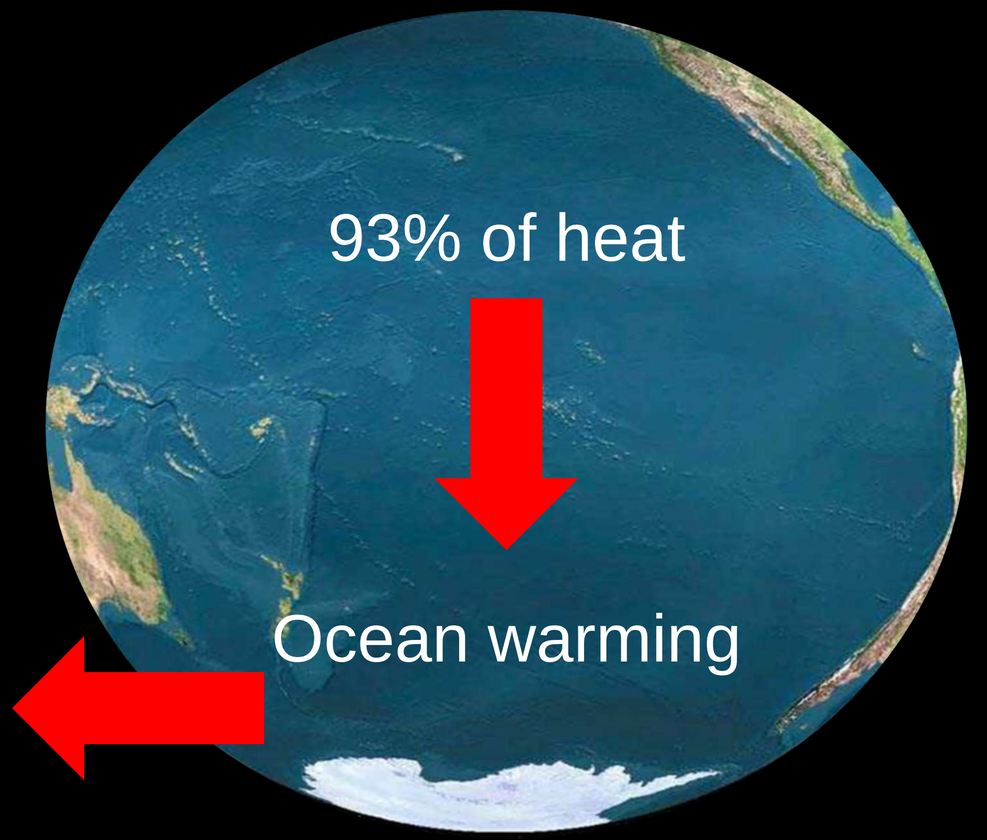




The ocean is absorbing nearly all the heat energy from global warming causing it to warm:

Ocean warming affects:

- Ocean deoxygenation
- Sea level rise
- Ocean circulation and mixing hence weather and extreme events (eg strength of hurricanes)



The ocean receives all the water from melting ice:

…. along with thermal expansion, resulting in sea level rise

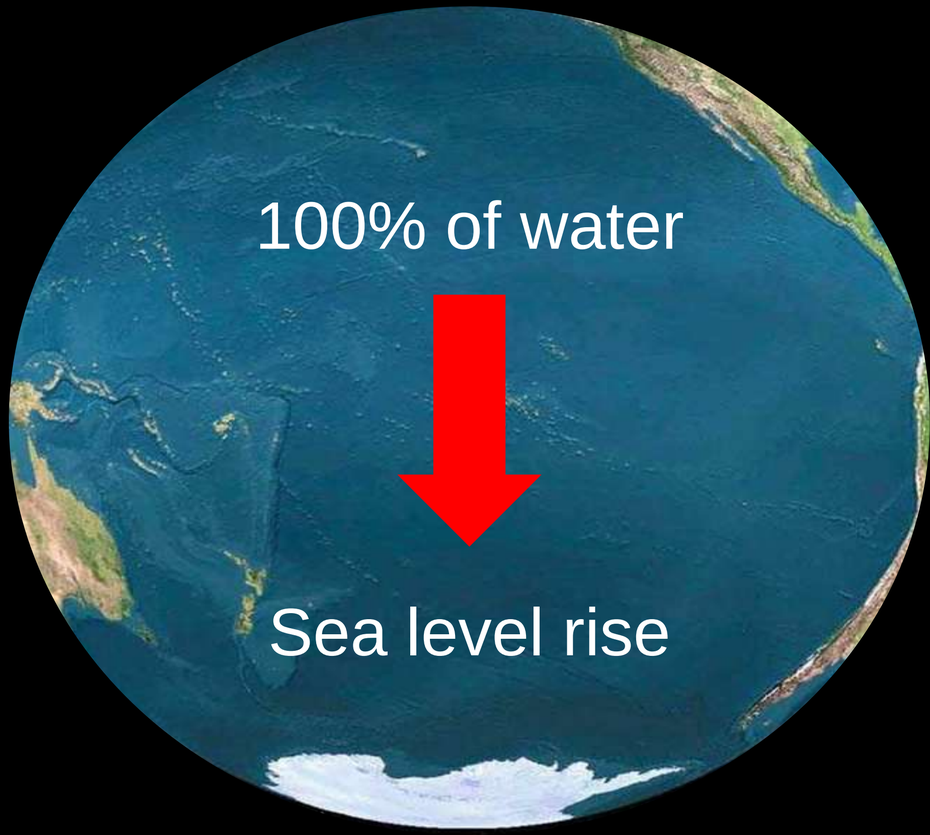


Image credit: UKOA, Sea Surface Consortium

Where are we now?

Credit: Seb Hennige

Since pre-industrial times, human activities have caused approximately:

- 0.83°C of ocean warming
- 30cm rise in sea level
- 30% increase in ocean acidity
- 2% loss of ocean oxygen (since 1960)
- Increased frequency and duration of marine heatwaves

Where could we be by 2100?

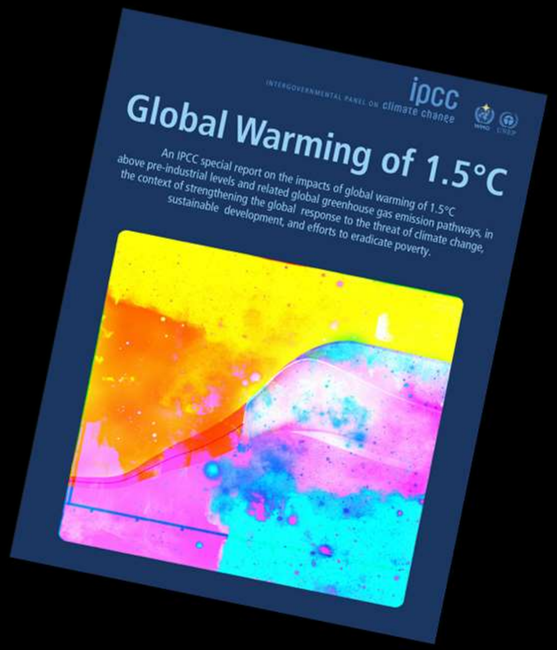
Credit: PML

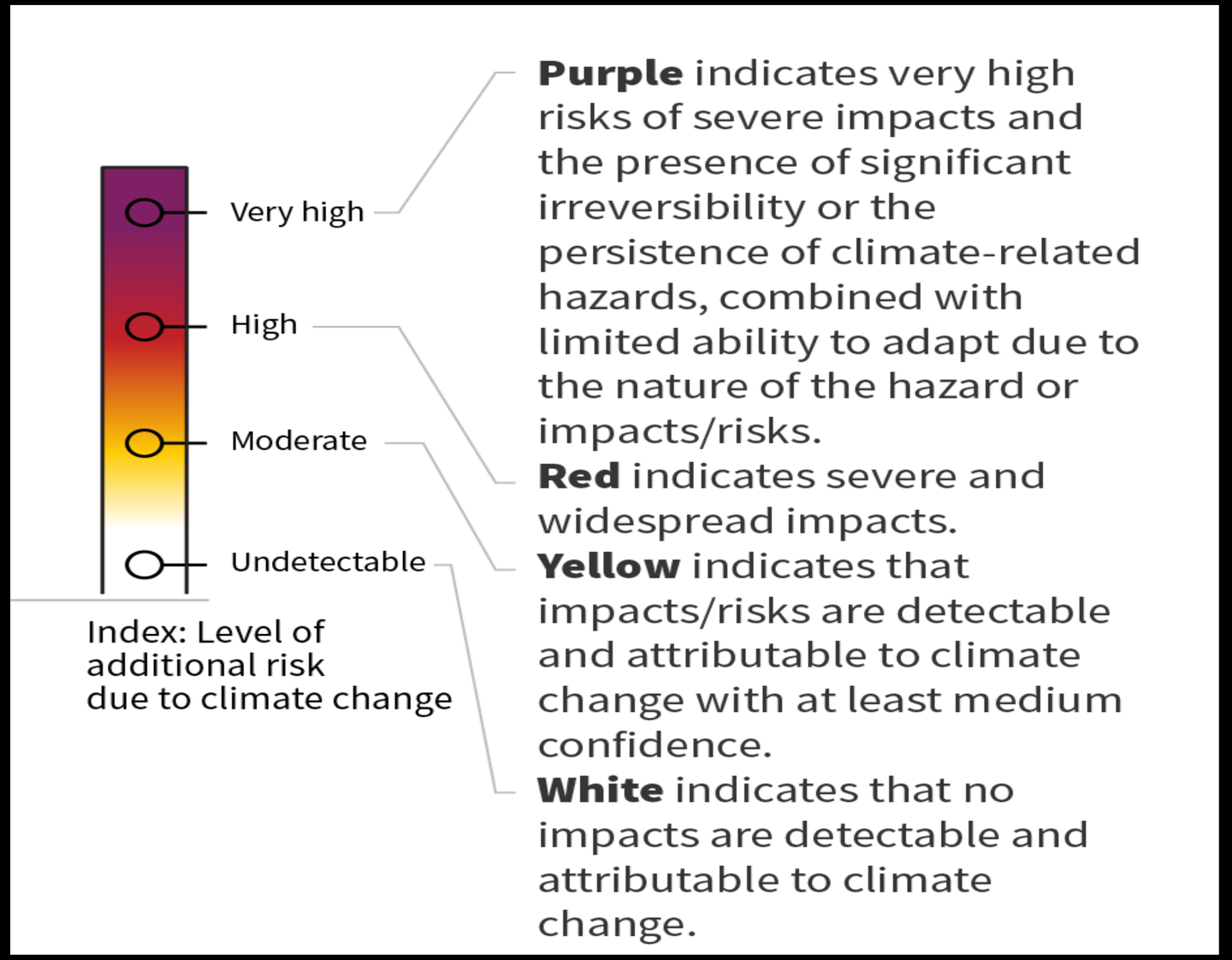
With current rates of emissions human activities could cause approximately:

- 3.17°C of ocean warming
- 86cm rise in sea level
- 150% increase in ocean acidity
- 3.5% loss of ocean oxygen (since 1960)
- Even more intense and more frequent marine heat waves
- Stronger storms/hurricanes

IPCC SR1.5: Risk level assessed between 1.5 and 2℃

Level of additional risk due to climate change

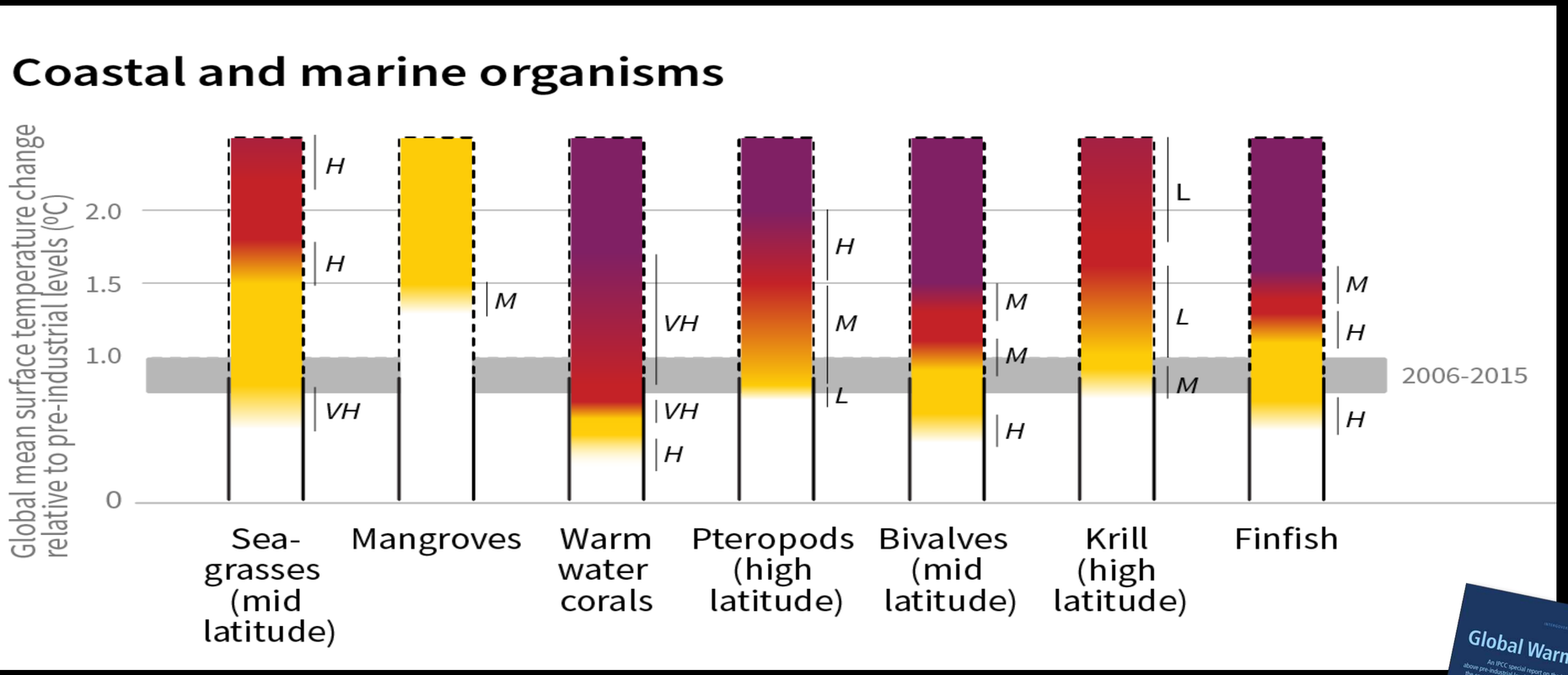




Risk level assessed between 1.5 and 2℃

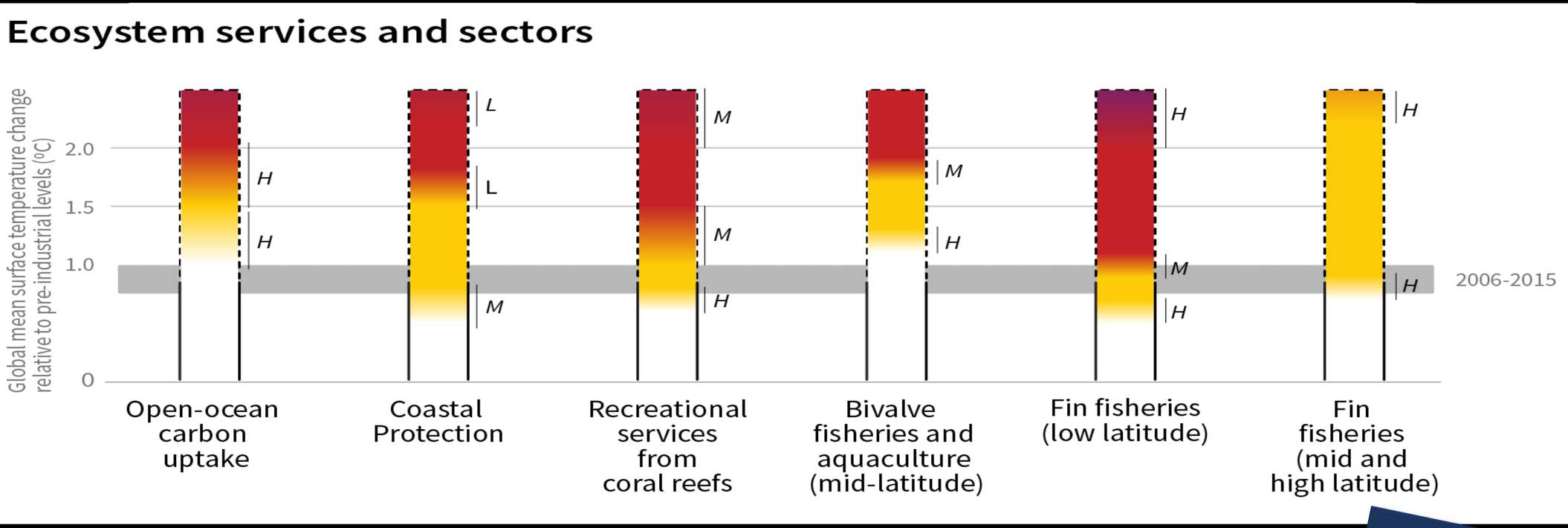

Image: Clara Manno

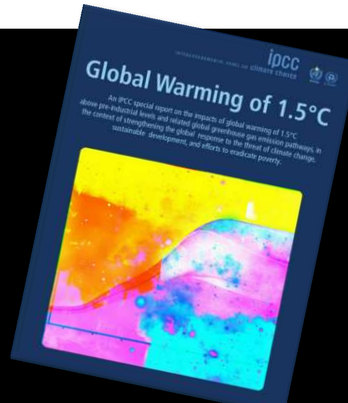

Image: Seb Hennige



Risk level assessed between 1.5 and 2℃?


Image: Dan Exton

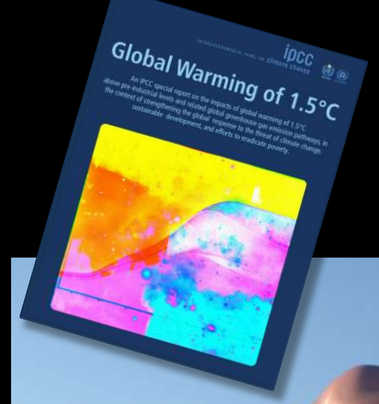




What are the benefits to coral reefs of avoiding 2℃?

- 70–90% of the warmer water coral reefs that exist today will disappear when global warming exceeds 1.5°C (very high confidence)

Conclusions: What are the benefits of avoiding 2℃?



Limiting global warming to 1.5°C compared to 2°C is projected to:

- Reduce increases in ocean temperature as well as associated increases in ocean acidity and decreases in ocean oxygen levels (high confidence)
- Reduce risks to marine biodiversity, fisheries, and ecosystems, and their functions and services to humans (high confidence)
- Expose 10.4 million fewer people to the impacts of sea level globally in 2100

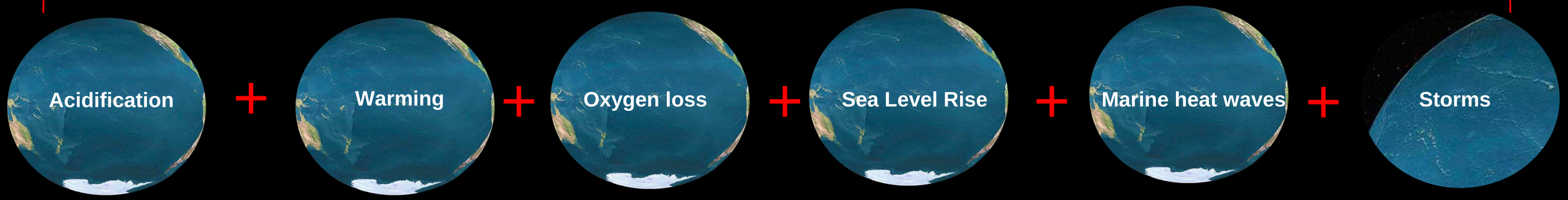
Societal Impacts

- Impacts will be strongest in coastal communities relying on marine productivity and coastal protection
- Many of these are highly vulnerable and less able to adapt

The ocean is at the frontline of climate change

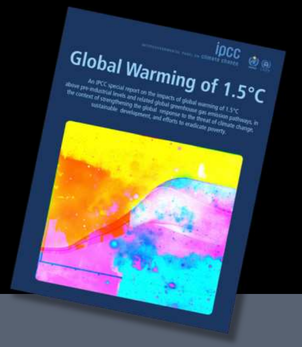
… multiple stressors often occurring at the same time and place

Directly relevant to CO_2 emissions and the UNFCCC [Article 2, UNFCCC]

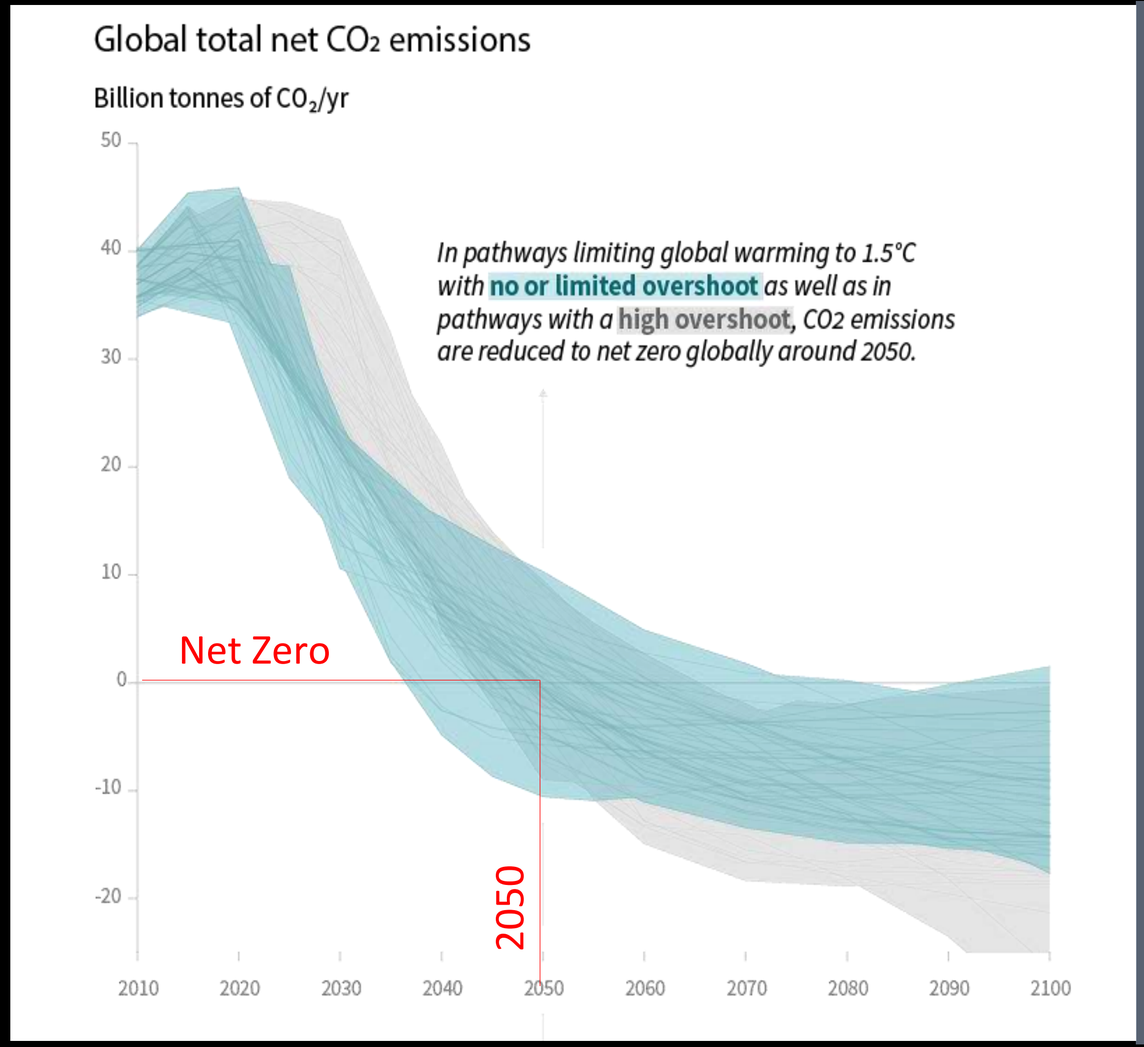


- There are large benefits for ocean ecosystems and dependent societies of avoiding 2℃
- Impacts to the ocean brings clear, undisputable additional rationale for countries to reduce CO_2 emissions urgently and avoid 2℃

Can we stop global warming exceeding 1.5°C?



Multiple pathways modelled



- The answer is **yes** but only with unprecedented action on greenhouse gas emissions over next 10 years
- The report concludes that remaining at 1.5°C will require reducing CO_2 emissions by at least 45% by 2030, and net-zero by 2050
- By 2050, 70-85% of electricity globally will need to be supplied by renewables
- All scenarios require some direct capture of CO_2 (i.e. needing innovation), as well as changing patterns of production, consumption and lifestyle

SR1.5 IPCC 2018

Thank you

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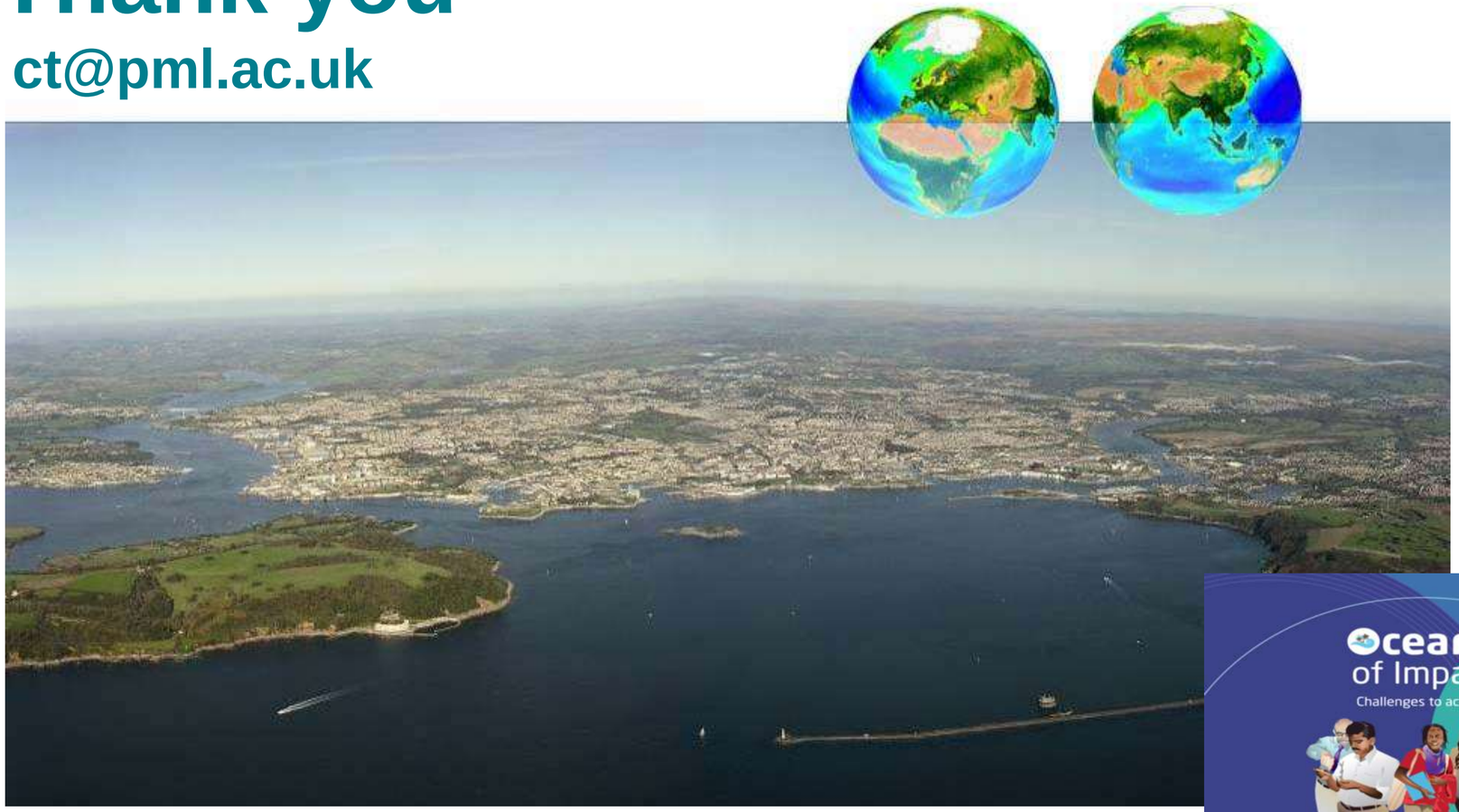

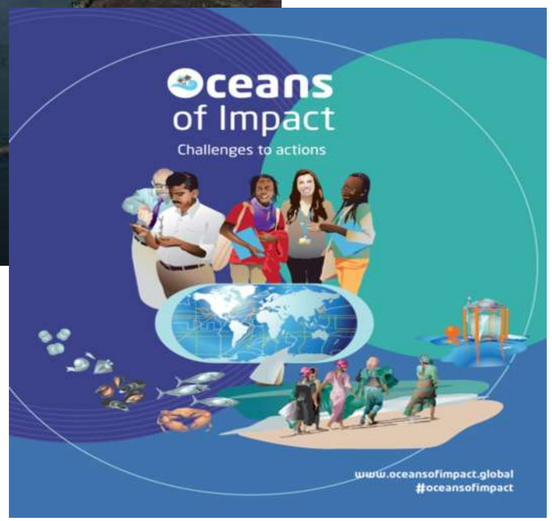

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UK Ocean Acidification Research Programme

NERC SCIENCE OF THE ENVIRONMENT

Department for Environment Food & Rural Affairs

[More information see: www.oceansofimpact.global](http://www.oceansofimpact.global)