How climate change is affecting sea levels

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Why is sea level rise important?
Sea level rise increases the frequency and severity of storm surges and coastal flooding, causing serious damage to critical infrastructure and leading to the displacement of coastal communities around the world. Globally, more than 600 million people live in low-lying coastal areas at less than 10m elevation, and the population of these regions is expected to exceed 1 billion by 2050 (Neumann et al., 2015). In the United Kingdom, current annual damages from coastal flooding are estimated at over £500 million per year (Edwards, 2017), and costs of damage are likely to increase under projections of future sea level rise.

How much will sea level rise in future?
The Intergovernmental Panel on Climate Change (IPCC) projected, in its recent Special Report on the Ocean and Cryosphere in a Changing Climate, that GMSL rise by 2100 will likely lie within the ranges of 29–59cm or 61–110cm (relative to 1986–2005) for a low- or high-emissions scenario, respectively (Oppenheimer et al., 2019). In addition, the IPCC Special Report on Global Warming of 1.5°C stated that GMSL rise by 2100 will likely be around 10cm less in a 1.5°C warmer world when compared with a 2°C warmer world (Hoegh-Guldberg et al., 2018). The latest regional projections for the United Kingdom were published in the UKCP18 report, with 2100 ranges of 8–49cm (low-emissions scenario) or 30–90cm (high-emissions scenario) for Edinburgh and 29–70cm (low) or 53–115cm (high) for London (Palmer et al., 2018). The largest source of uncertainty in all these projections is currently associated with quantifying the additional sea level rise contribution due to instabilities of the West Antarctic Ice Sheet, which remains the subject of ongoing research.

Beyond 2100, sea level will continue to rise for many centuries, even if GHG emissions are reduced to net zero in line with the 2015 Paris Agreement targets to limit global warming to 1.5°C or 2°C. However, the magnitude and the rate of this committed long-term sea level rise depend strongly on near-term emissions reductions in the coming decades. The sooner net-zero or net-negative GHG emissions are achieved, the more the rate of long-term sea level rise can be limited. If GHG emissions are left unchecked, the rate of sea level rise will further accelerate.

Acknowledgements
This paper was developed in collaboration with the Royal Meteorological Society’s Climate Change Communications Group. The society thanks Matt Palmer, Jonathan Gregory and Tamsin Edwards for reviewing the paper.

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doi:10.1002/wea.3716