

# State of the Climate 2019

3 December 2019, Earth Information Day, CoP25 Madrid

John Kennedy UK Met Office,  
Scientific Coordinator of WMO annual statement on the climate



**WMO OMM**

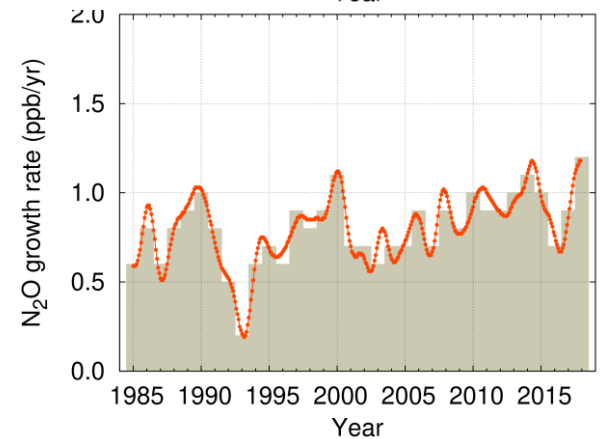
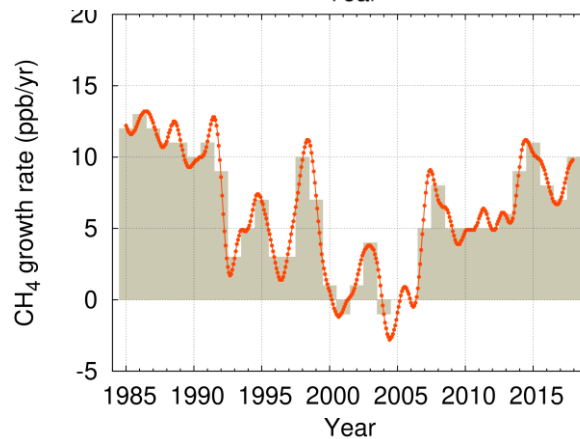
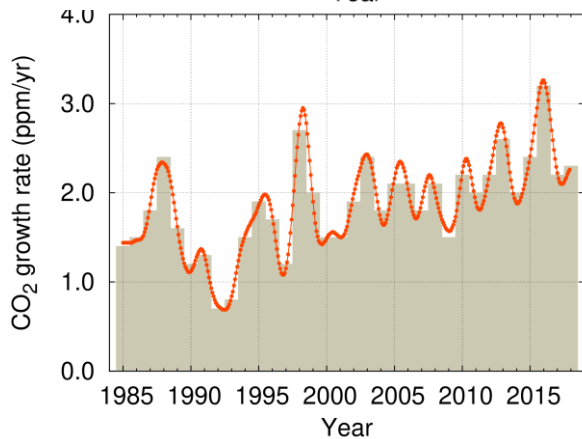
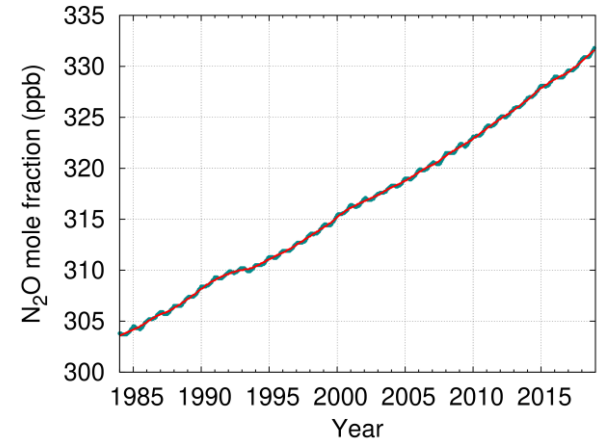
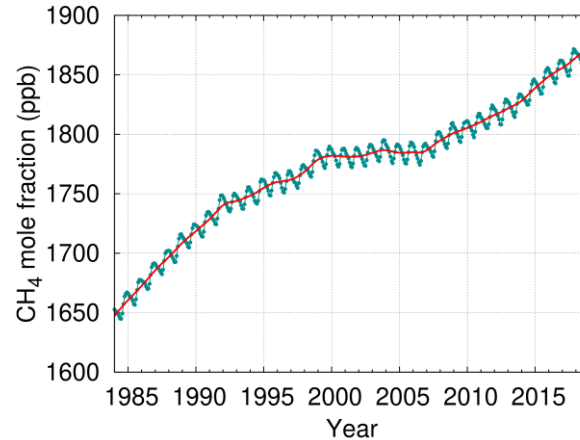
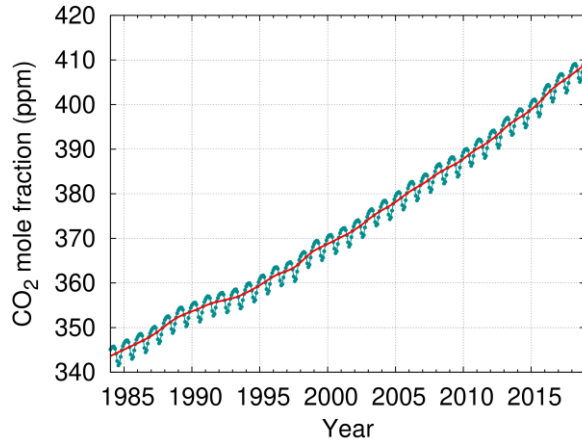
World Meteorological Organization

Organisation météorologique mondiale

# WMO annual statement

- WMO Members provide detailed summaries of weather and climate events
- Scientific experts provide specific information on key indicators
- UN agencies provide information on impacts of weather and climate-related events:
  - UNEP, WHO, FAO, UNHCR, IOM, IOC-UNESCO, UNDRR, UNCTAD

# Greenhouse Gases reached record global concentrations in 2018



**CO<sub>2</sub> 407.8 ppm**

147% of pre-industrial

**CH<sub>4</sub> 1869 ppb**

259% of pre-industrial

**N<sub>2</sub>O 331 ppb**

123% of pre-industrial

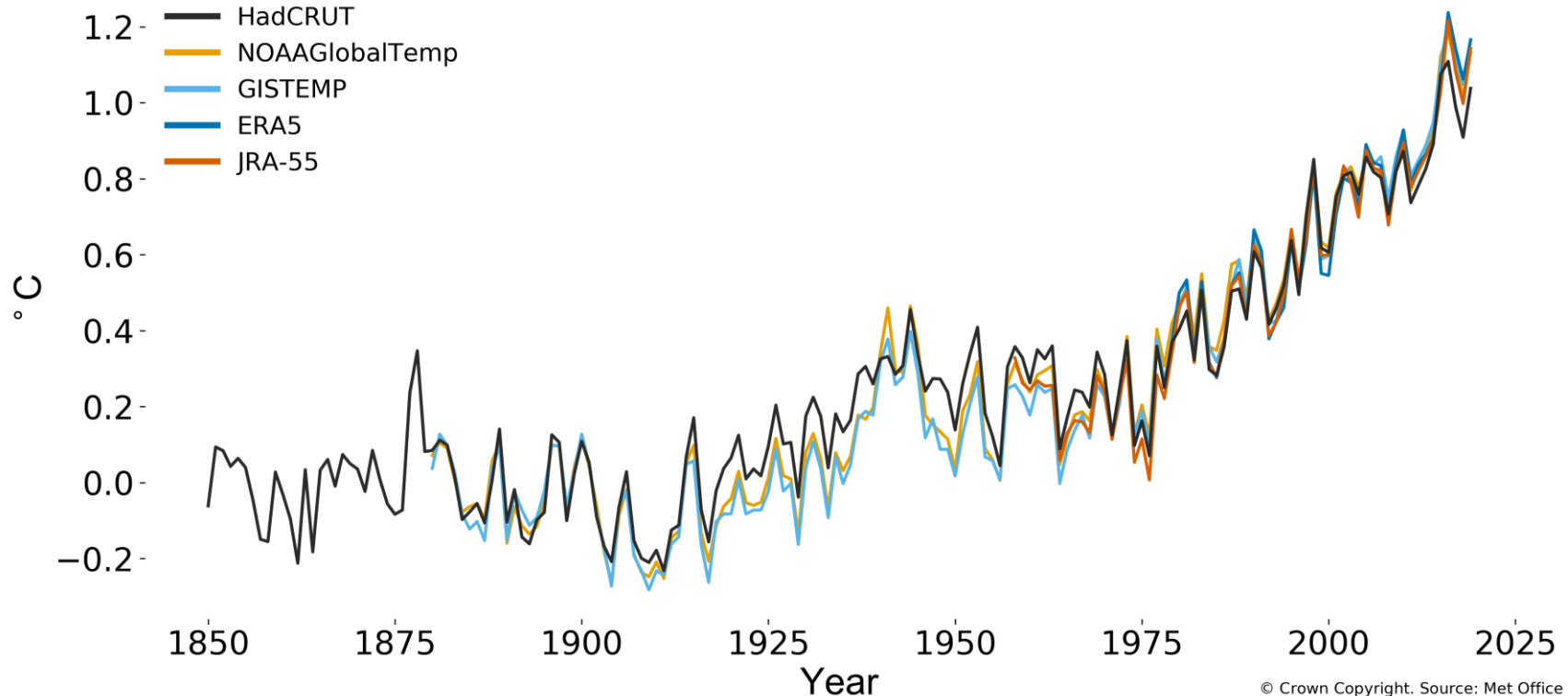


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# The past 5 years are the 5 warmest years on record

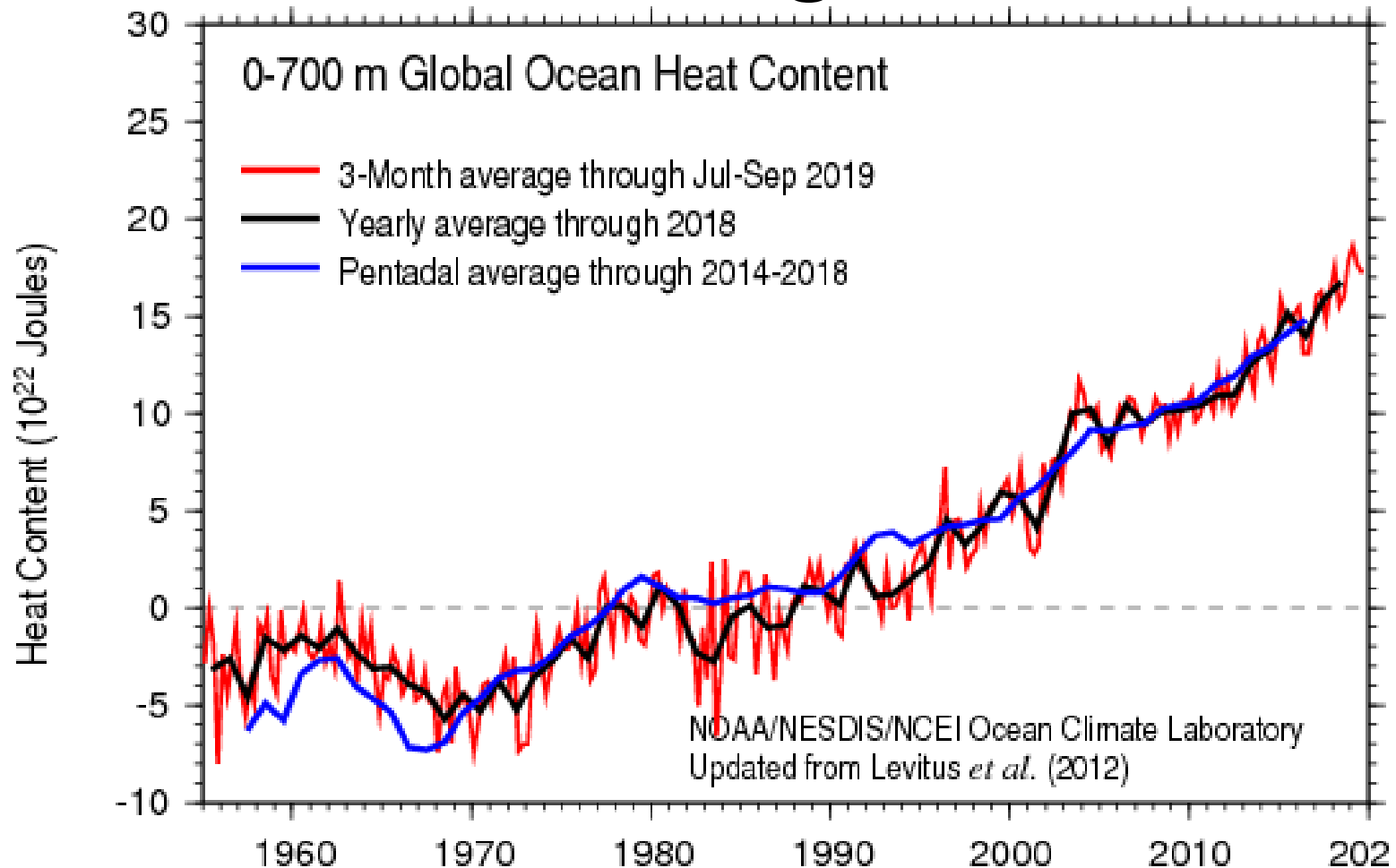
Met Office

Global mean temperature difference from 1850-1900 ( ° C)



- 2019  $1.1 \pm 0.1$  °C above pre-industrial
- 2<sup>nd</sup> or 3<sup>rd</sup> warmest year on record
- 2010-2019 warmest decade

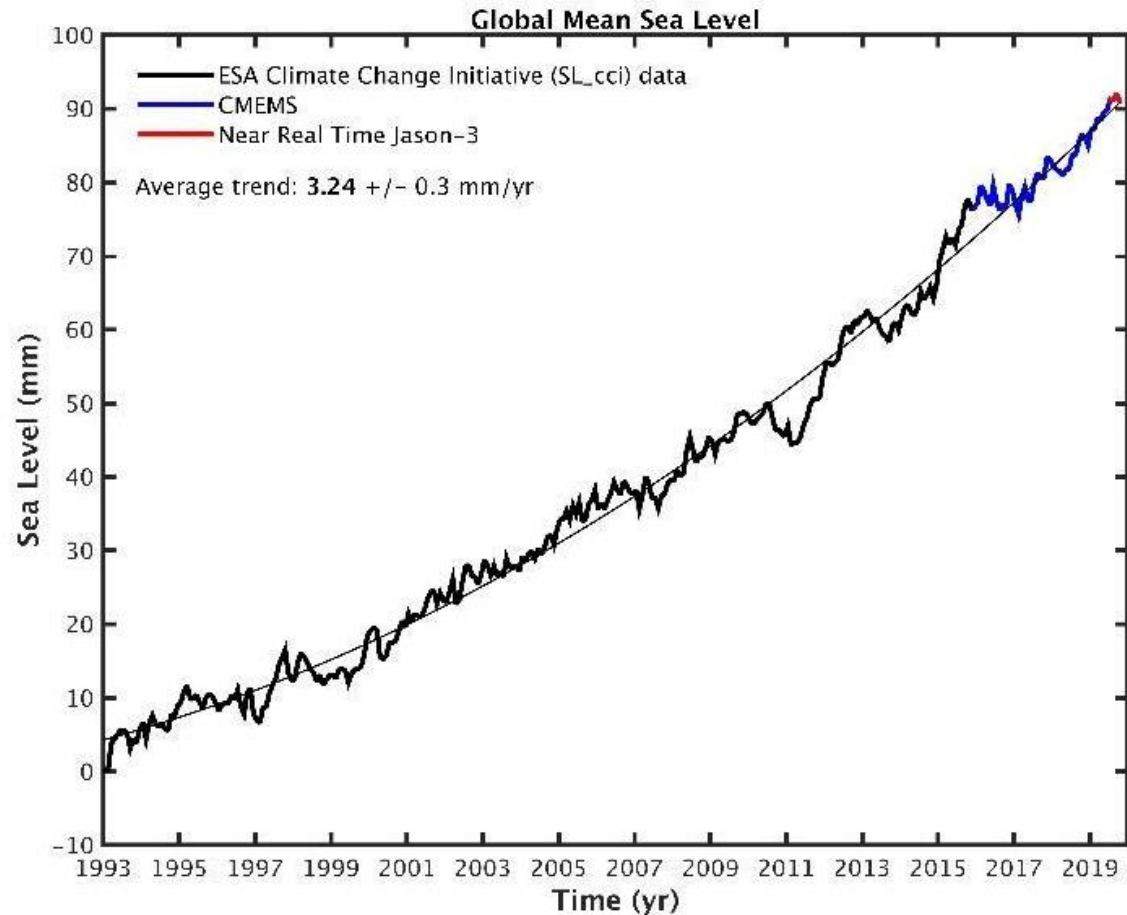
# Continued warming of the oceans



- 90% of the energy trapped by greenhouse gases
- Ocean heat reached a new high in 2019

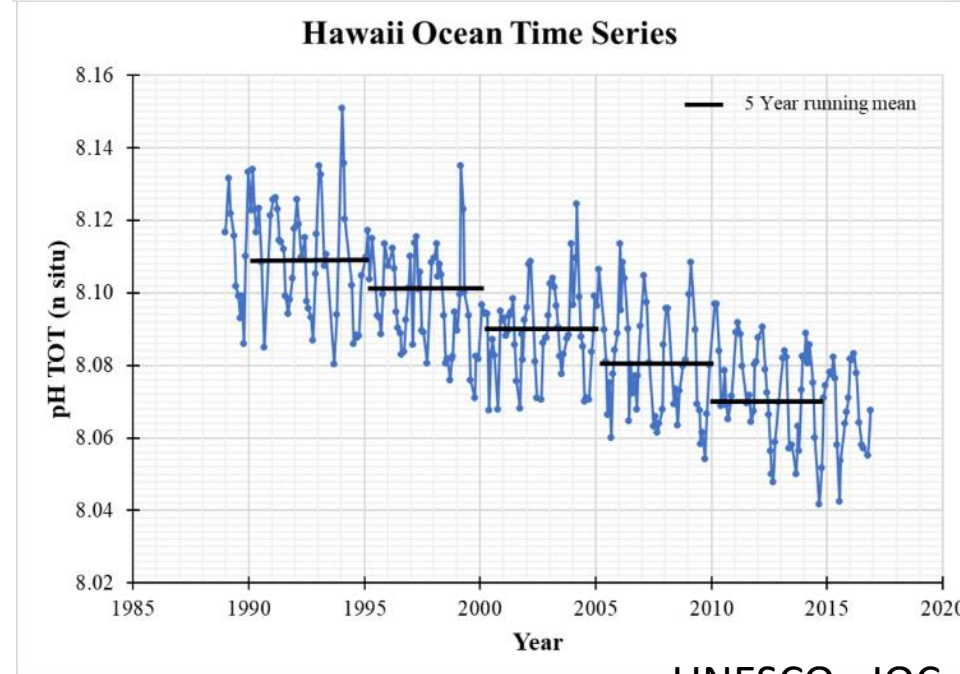
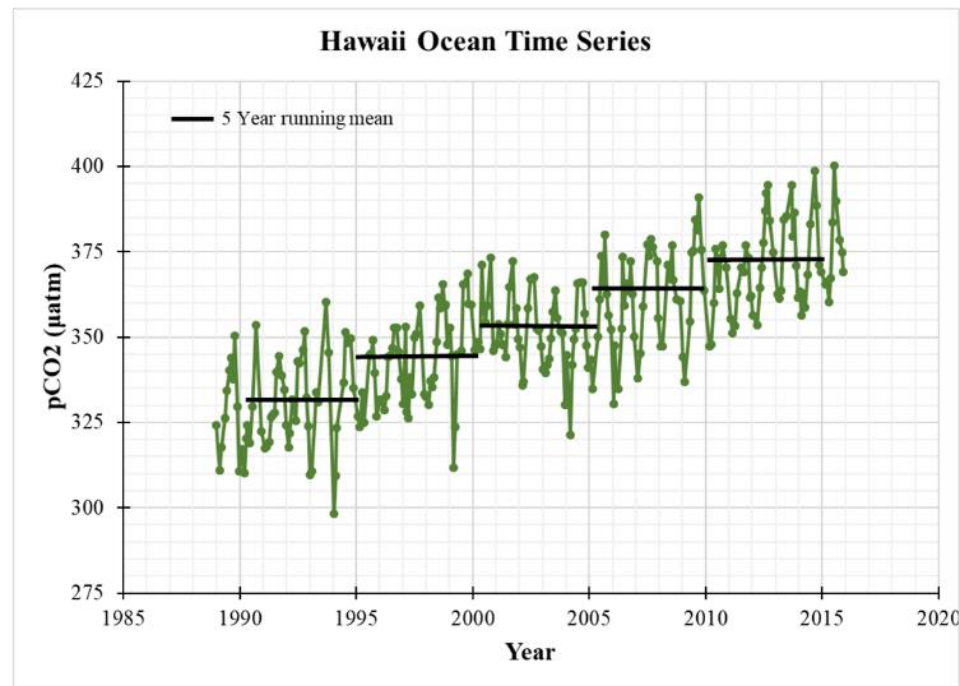
# Global mean sea-level record high in 2019

- Sea-level rise has accelerated over the past 27 years
- Due to increased ice loss from Greenland and Antarctica
- El Niño and La Niña can temporarily raise or lower sea-level



# Ocean acidification

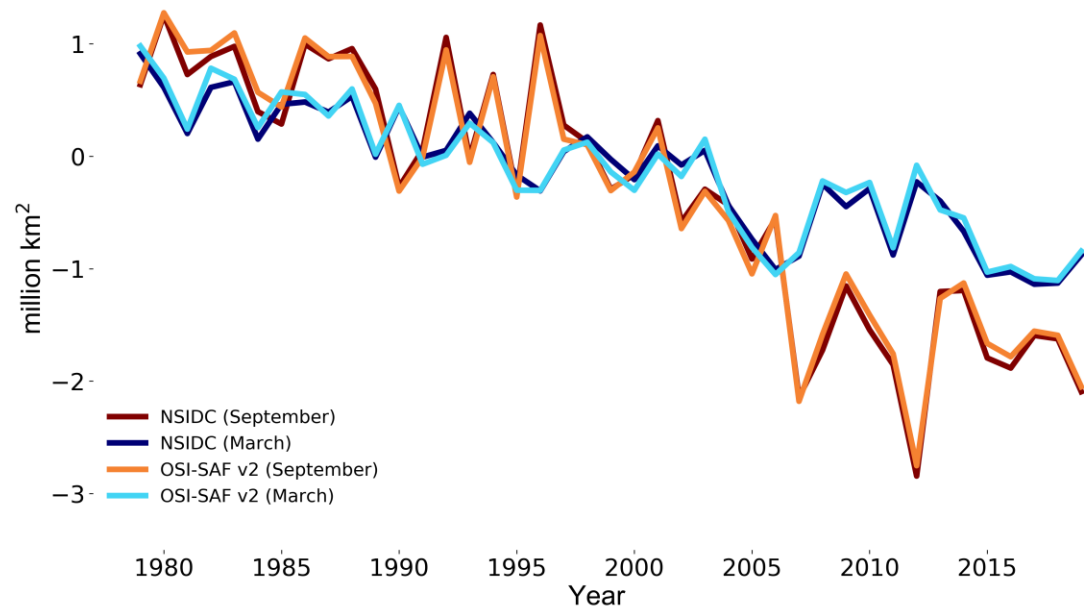
- 22% of CO<sub>2</sub> emissions in the past decade absorbed by the ocean
- The pH of the water has decreased
- Over the past 20-30 years clear decrease in pH at open ocean sites.
- A 26% increase in Hydrogen ion concentration since pre-industrial



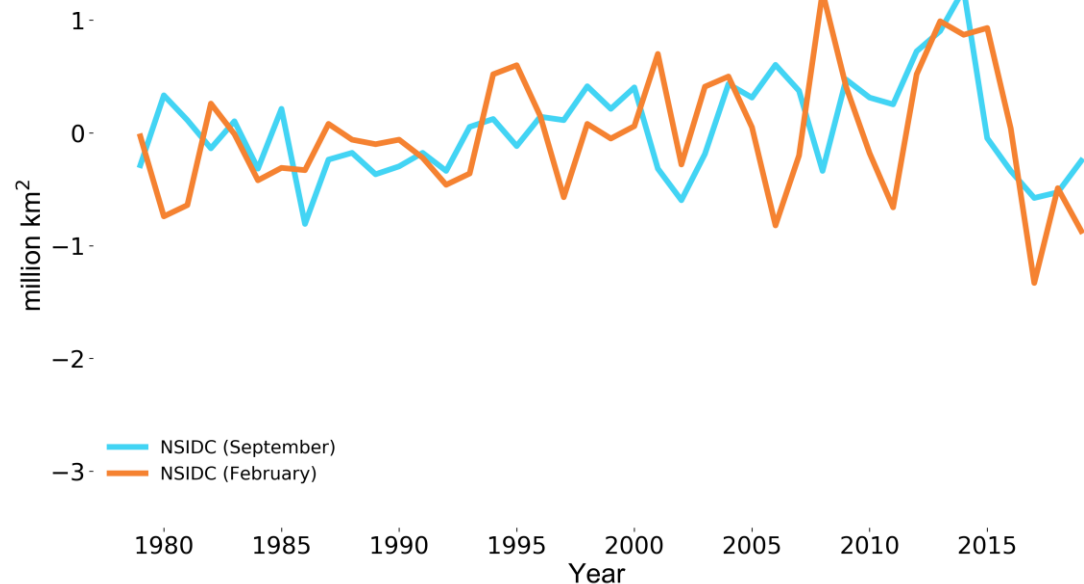
# Sea-ice

- Arctic sea ice has declined in all months
- 2019 saw the 3<sup>rd</sup> lowest monthly minimum and 7<sup>th</sup> lowest maximum
- Antarctic sea ice is more variable, a slight long-term increase offset by a large drop
- 2019 was relatively low

Arctic sea-ice extent difference from 1981-2010 average (million km<sup>2</sup>)

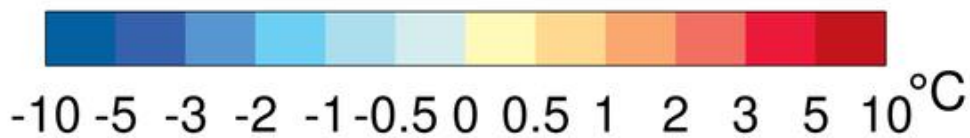
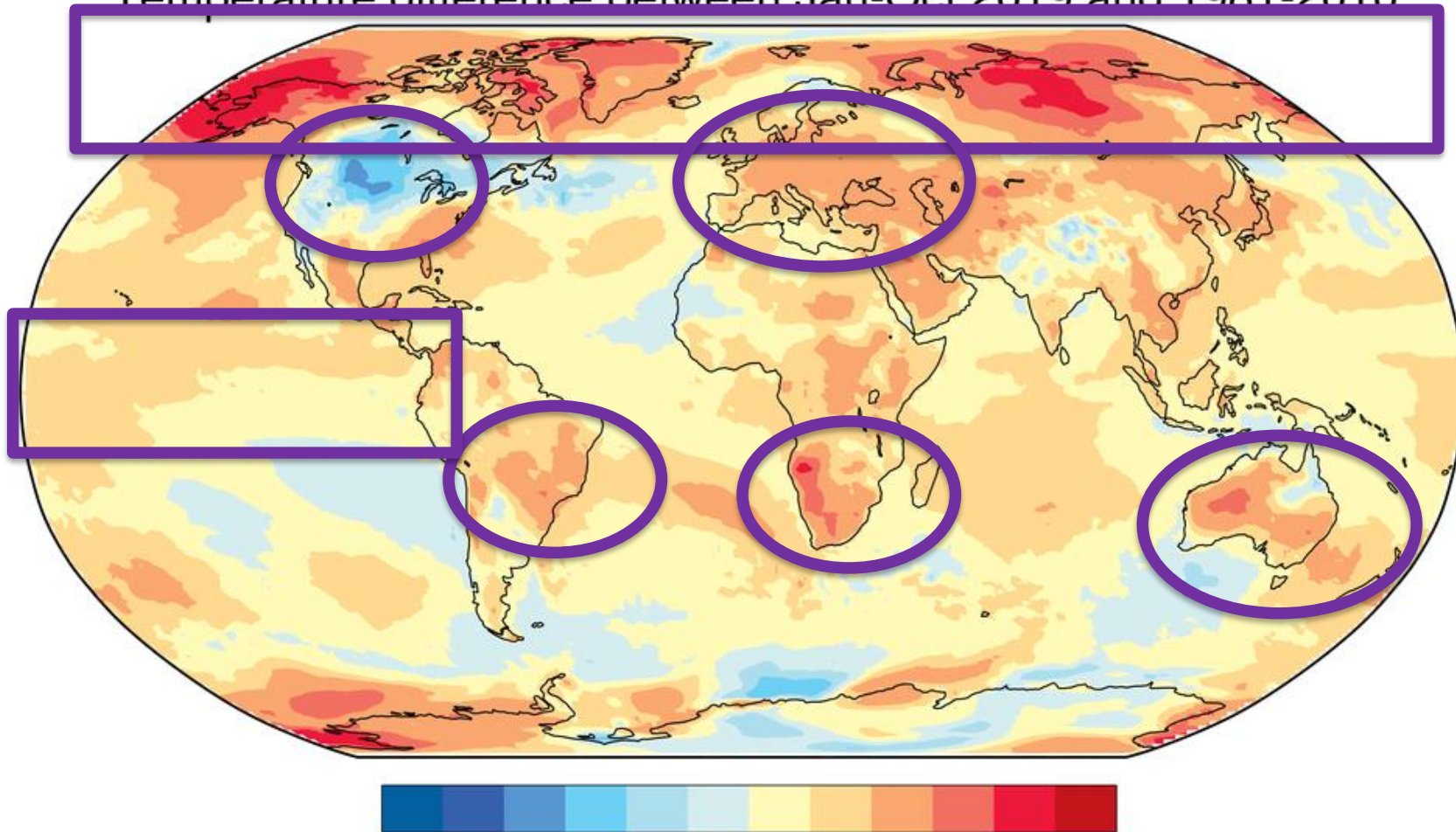


Antarctic sea-ice extent difference from 1981-2010 average (million km<sup>2</sup>)





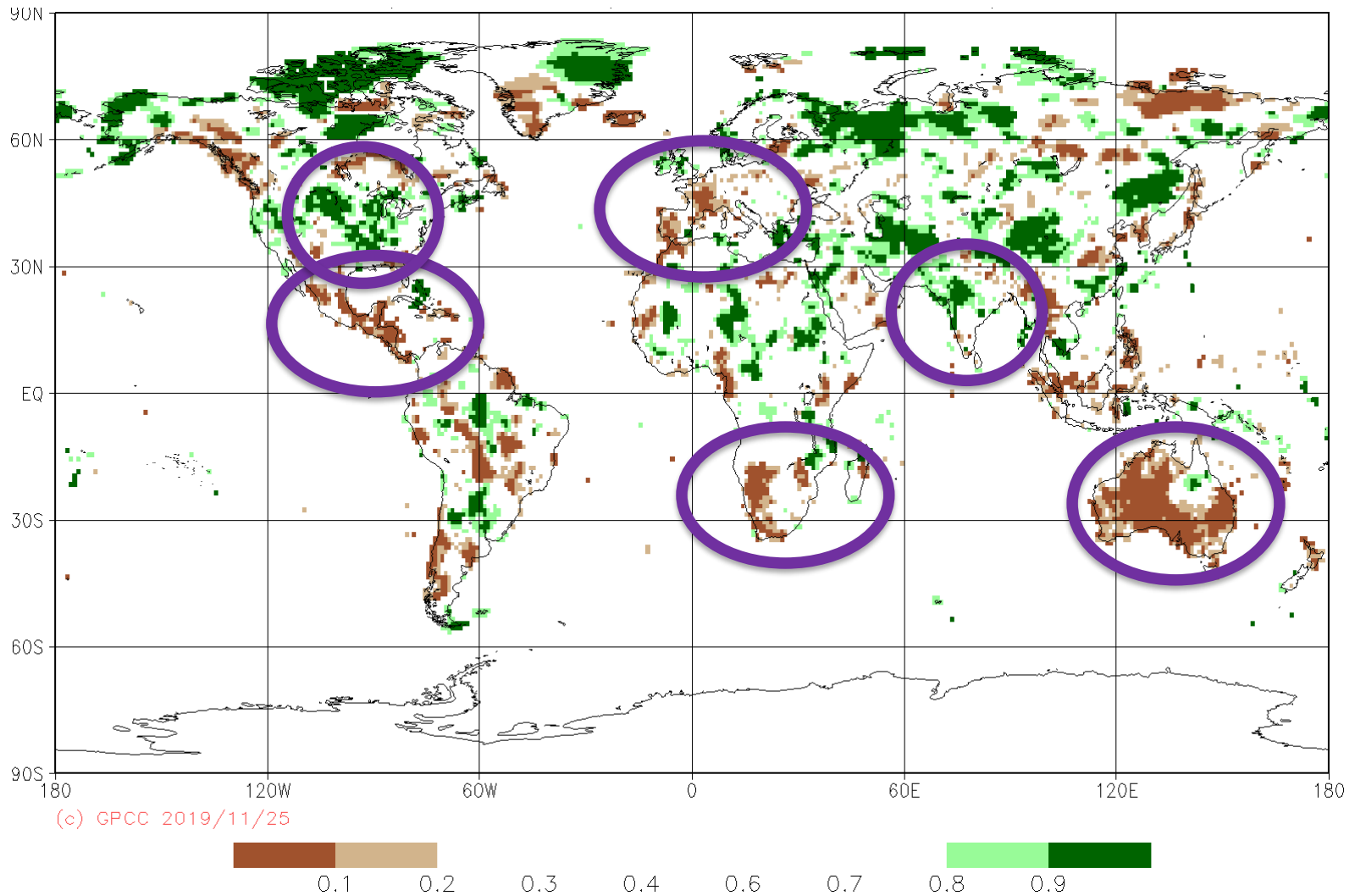
# Temperature difference between Jan-Oct 2019 and 1981-2010



Data source: ERA5



# Precipitation percentiles between Jan-Oct 2019 and 1951-2010



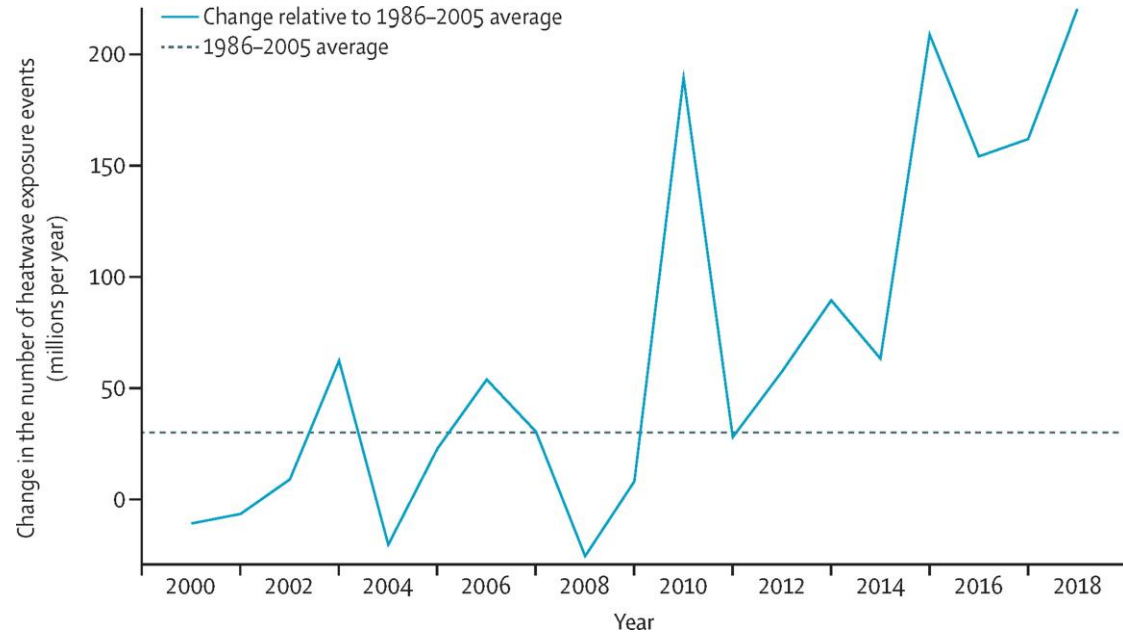
(c) GPCP 2019/11/25

# Impacts

- Human displacement (UNHCR and IOM)
- 10 million new internal displacements Jan-Jun 2019
- Of these, 7 million triggered by events such as Cyclone Idai, Cyclone Fani, Hurricane Dorian
- Floods and storms contributed most to these displacements then droughts.

## Extreme heat (WHO)

- 220 million more heatwave exposures in vulnerable people over 65 than baseline in 2018
- Watts et al. 2019



- Hunger (FAO)
- Over 820 million people suffered from hunger in 2018
- Among 33 countries affected by food crises in 2018, climate and weather were a compounding driver in 26

# Thank you



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