

# State of the Global Climate Key Indicators and Impacts

30 November 2020, Earth Information Day

John Kennedy, UK Met Office



**WMO OMM**

World Meteorological Organization

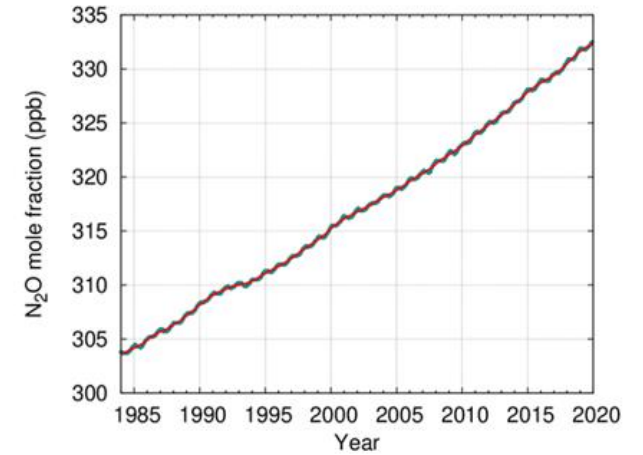
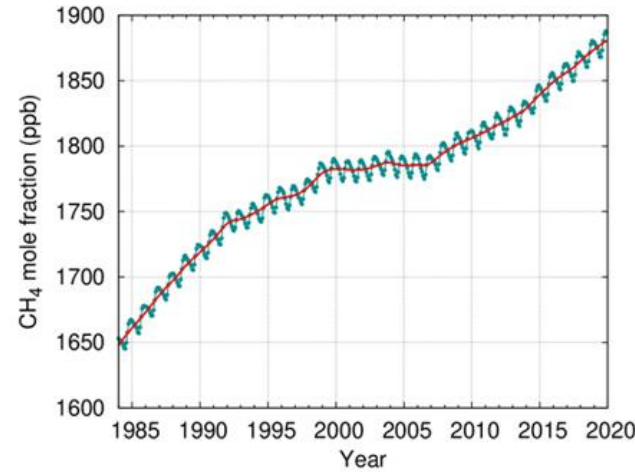
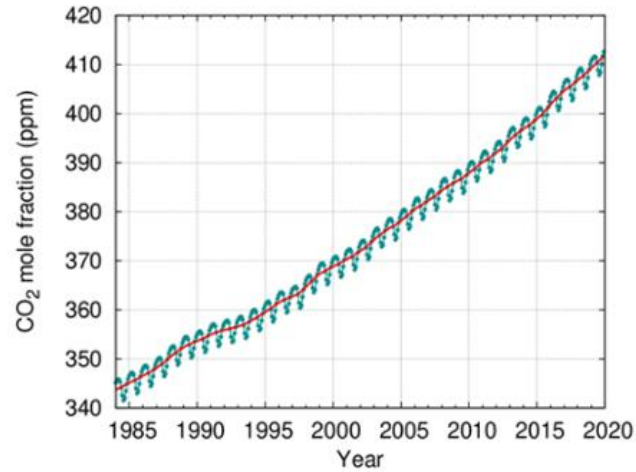
Organisation météorologique mondiale

# WMO State of the Climate Report

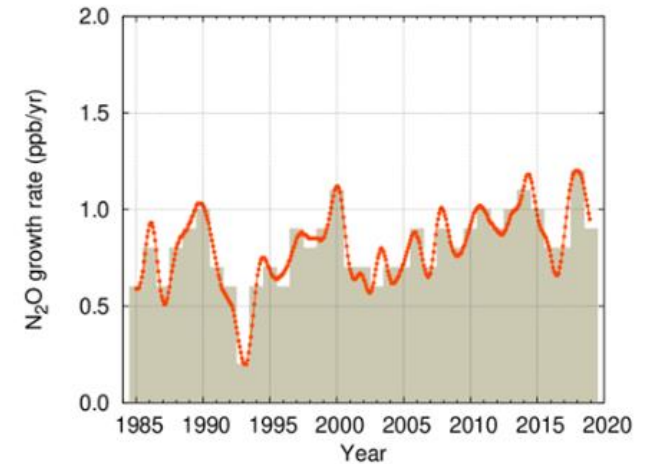
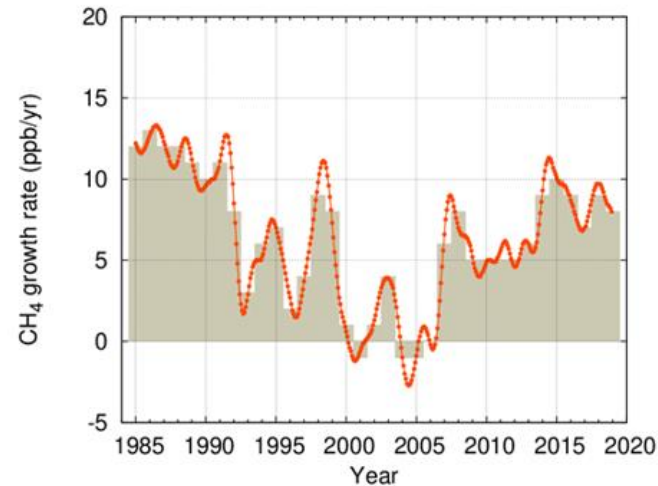
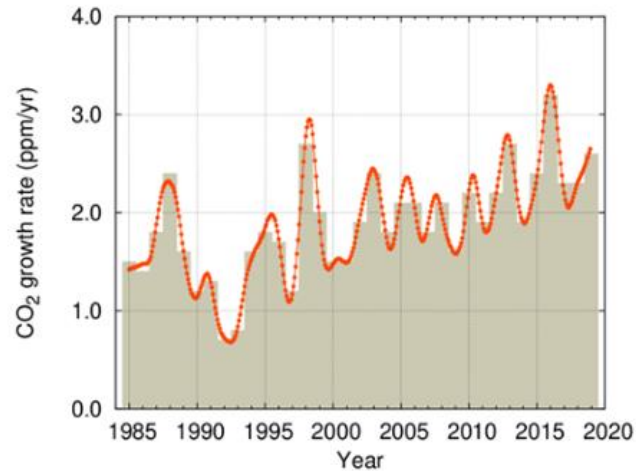
- WMO State of the Climate report will be released 2<sup>nd</sup> December
- Over 70 WMO Members provided detailed summaries of weather and climate events in their country or region
- 43 Scientific experts provided specific information on key indicators
- 17 contributors from 7 UN agencies provided information on impacts of weather and climate-related events:
  - UNEP, FAO, WFP, UNHCR, IOM, IOC-UNESCO, IMF

# Greenhouse gases reached record levels in 2019

## Concentration



## Growth Rate



CO<sub>2</sub> 410.5 ppm

148% of pre-industrial

CH<sub>4</sub> 1877 ppb

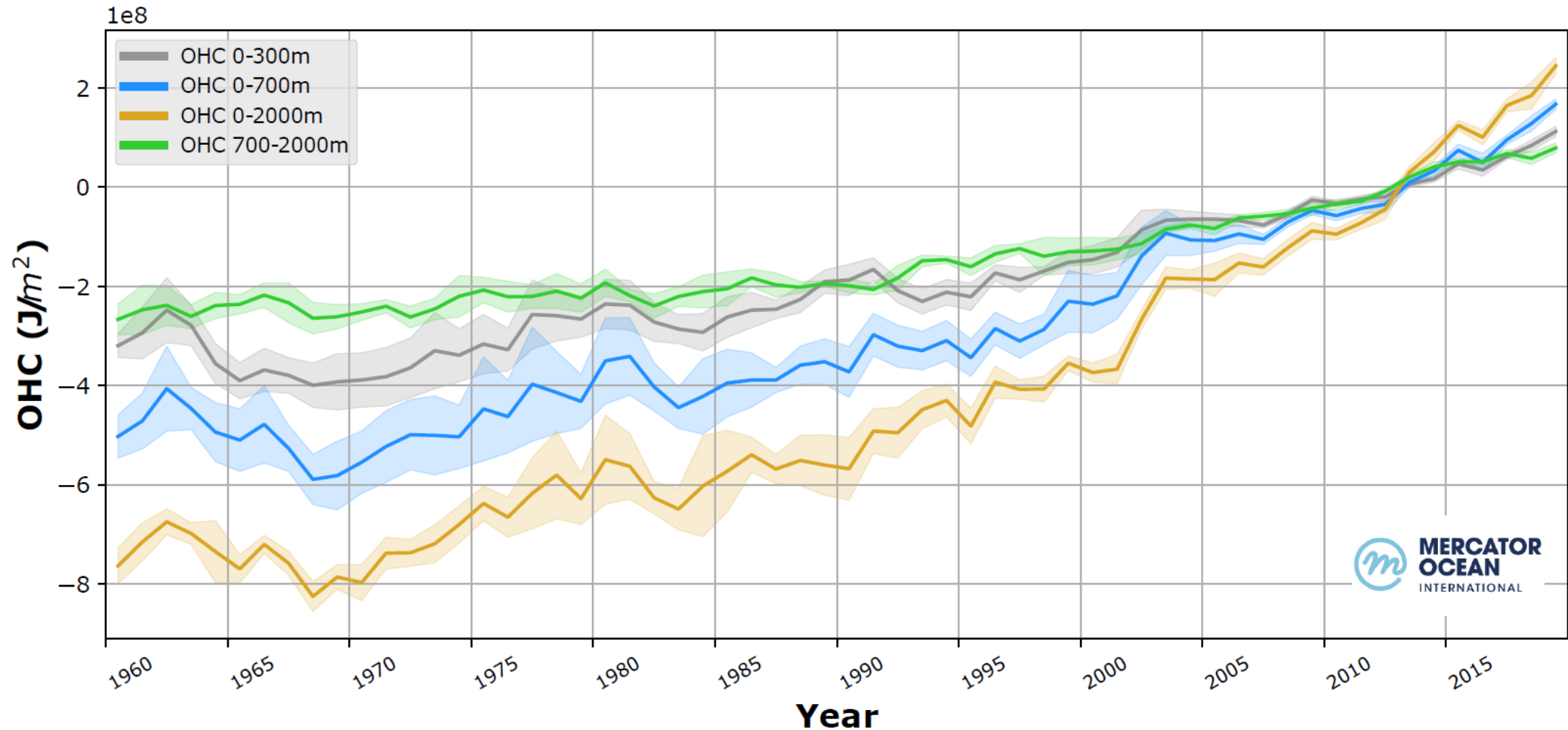
260% of pre-industrial

N<sub>2</sub>O 332 ppb

123% of pre-industrial

# Increased rate of ocean heat uptake in past two decades

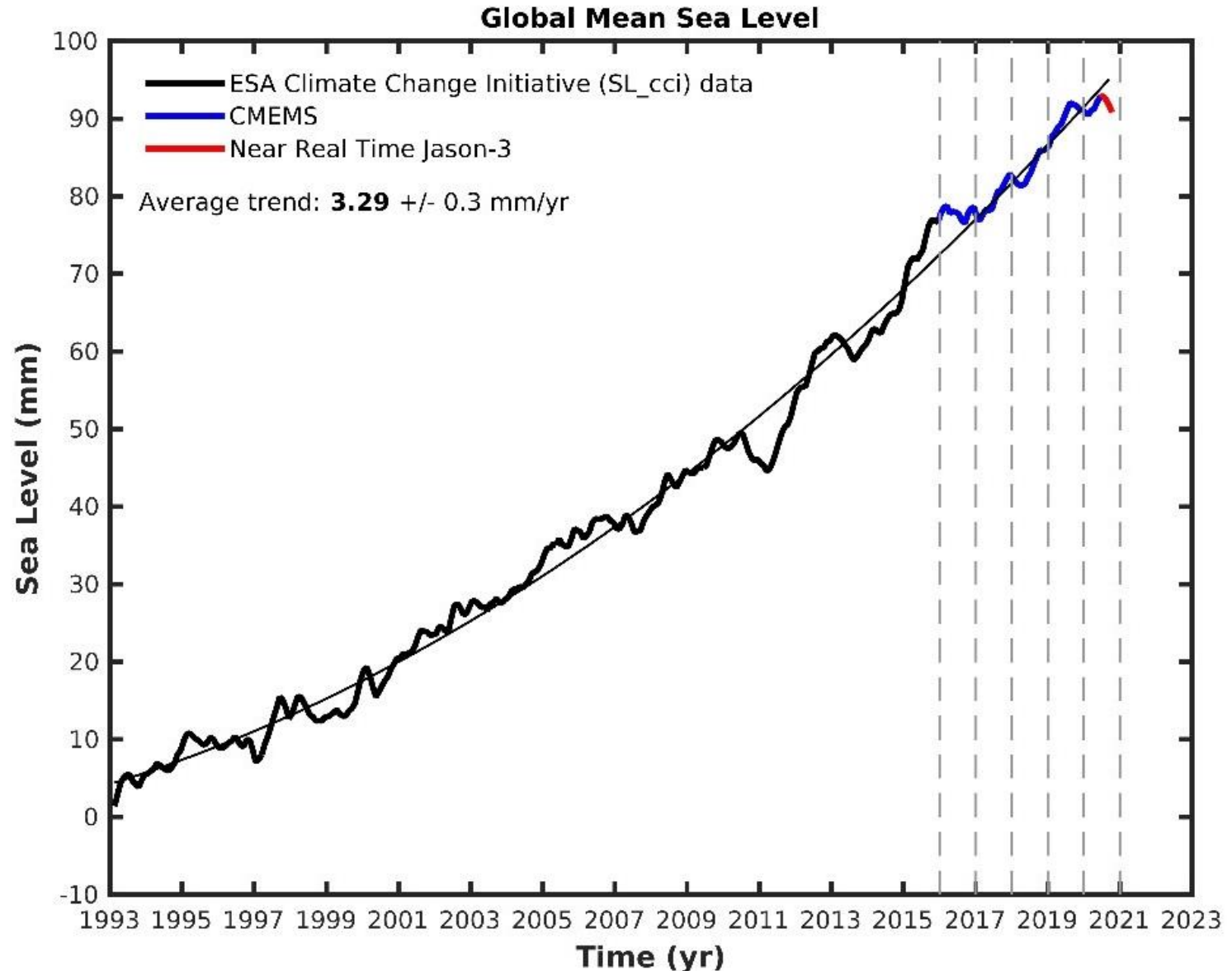
90% of the energy trapped by greenhouse gases goes into the ocean



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# Global mean sea level

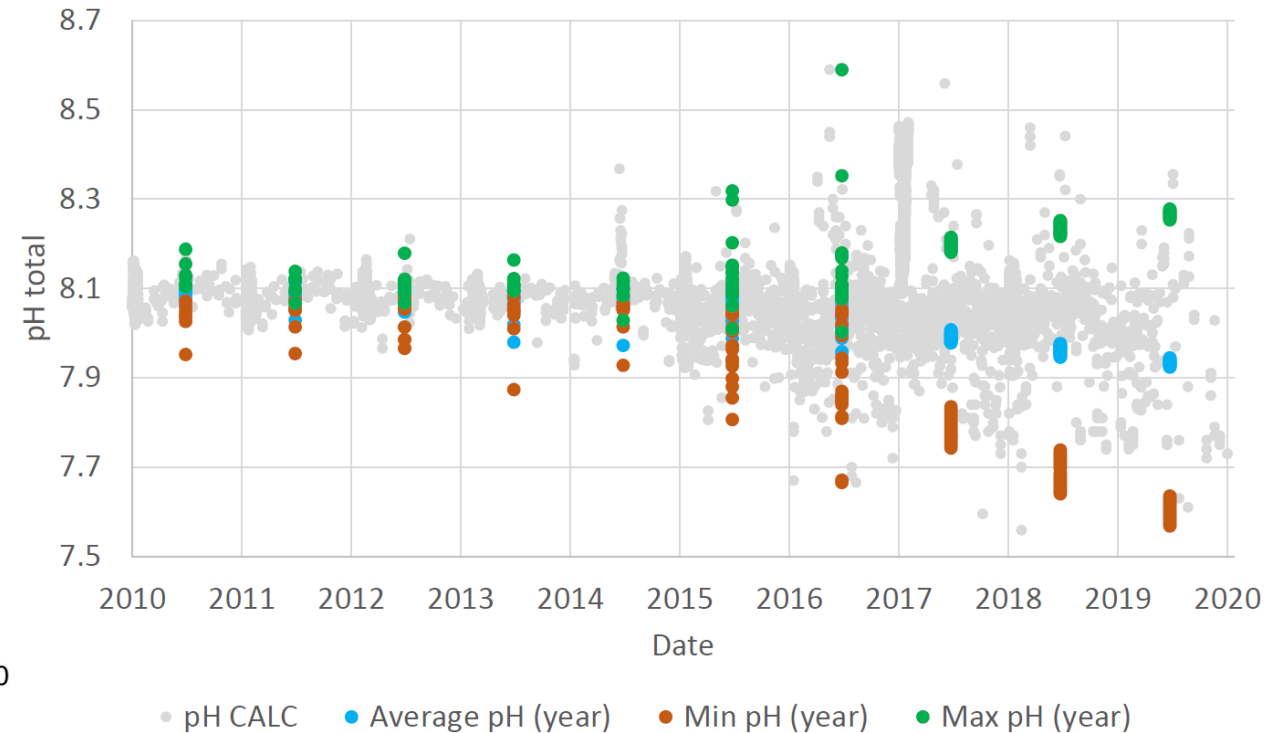
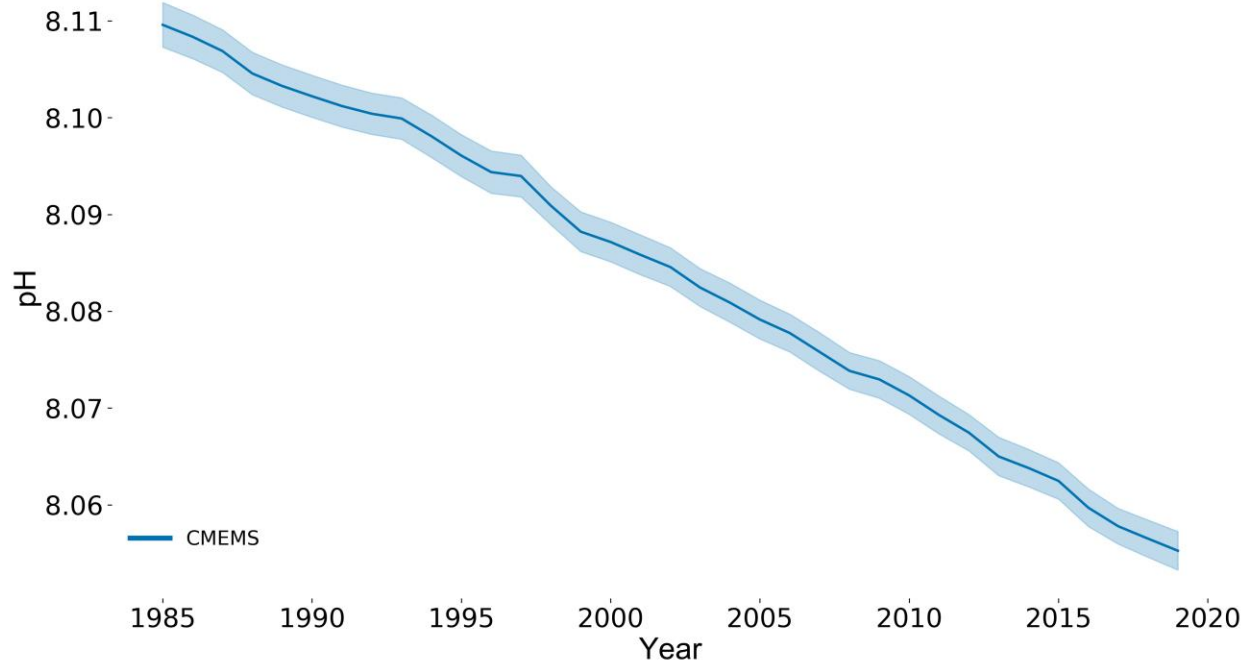
- Sea-level rise has accelerated over the past 27 years
- Due to increased rate of ice loss from Greenland and Antarctica
- El Niño and La Niña can temporarily raise or lower sea-level
- Current La Niña likely associated with recent small drop





# Ocean acidification – pH of the oceans had declined

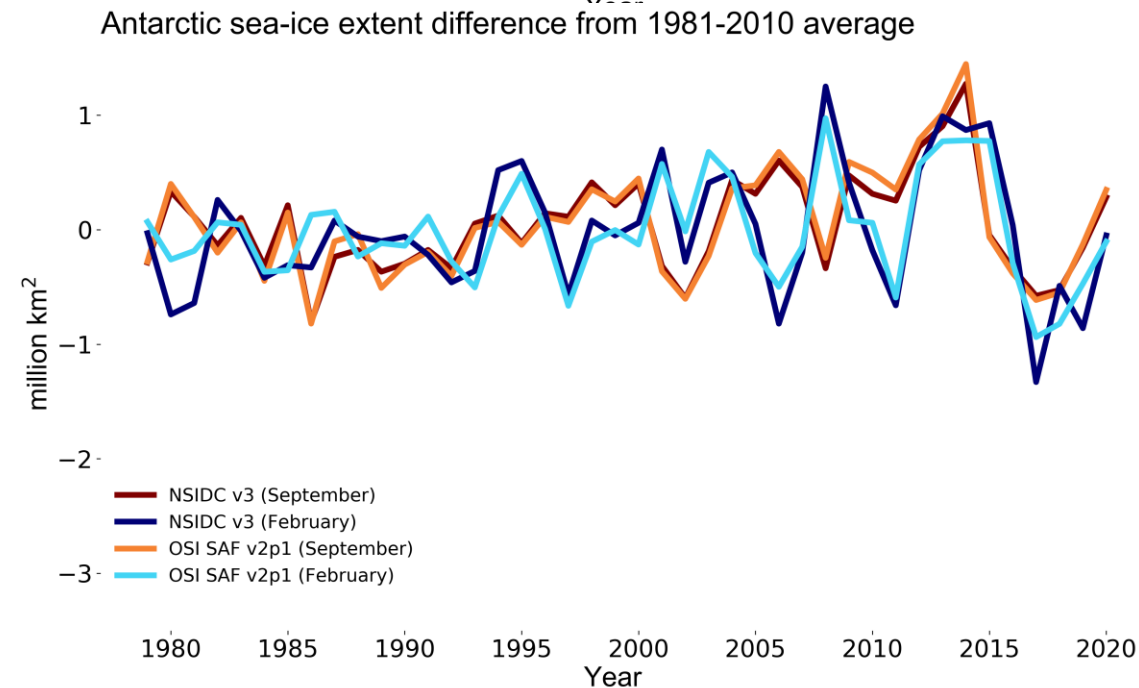
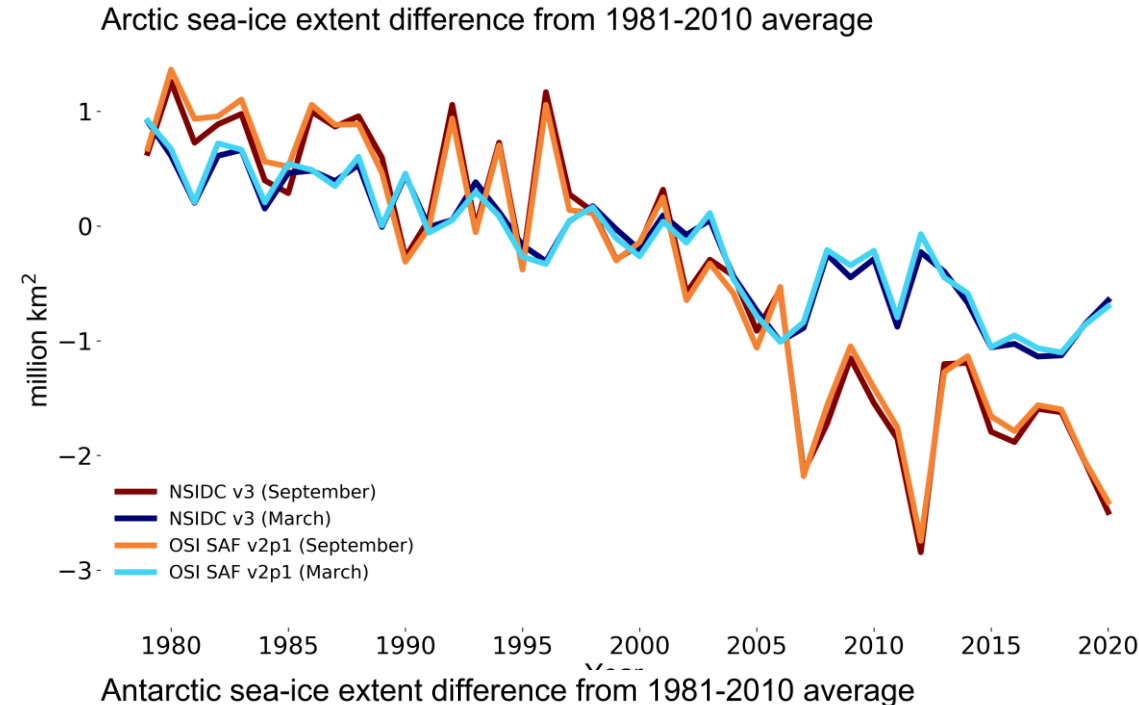
Global mean ocean pH (pH)



- Around 22% of CO<sub>2</sub> emissions in the past decade absorbed by the ocean
- The pH of the water has decreased
- High variability in local pH points to need for increased monitoring.

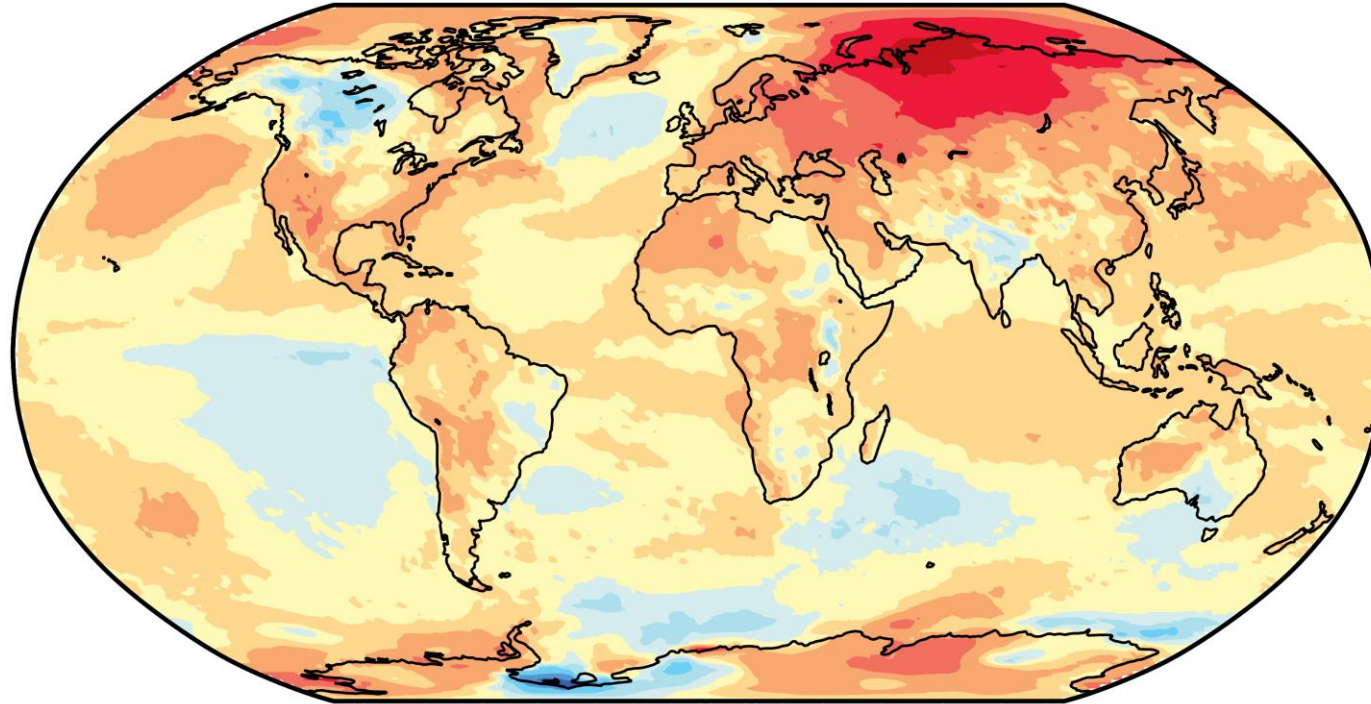
# Arctic sea minimum second lowest on record

- Arctic sea ice has declined in all months
- 2020 saw the 2<sup>nd</sup> lowest monthly minimum and 10<sup>th</sup> or 11<sup>th</sup> lowest maximum
- Antarctic sea ice is more variable, a slight long-term increase offset by a large drop
- 2020 was near to long-term average



# Temperatures around the world

Temperature difference between Jan-Oct 2020 and 1981-2010



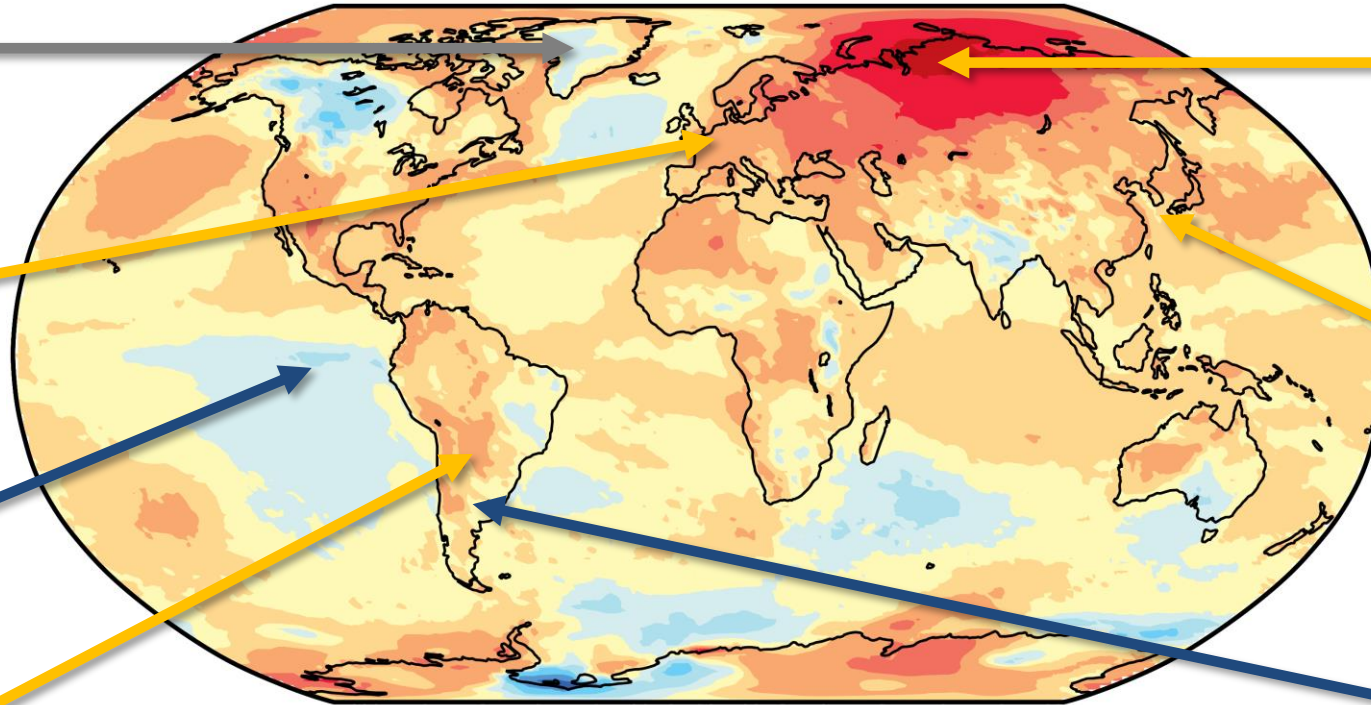
Data: ERA5. Reference period: 1981-2010.  
Credit: C3S/ECMWF





# Temperatures around the world

Temperature difference between Jan-Oct 2020 and 1981-2010



Greenland continued to lose ice

Unusual warmth in Russia

Europe exceptionally warm Jan-Oct

Heatwaves Jun-Aug

La Niña developed in latter half of 2020

Coldwave Jun-Aug

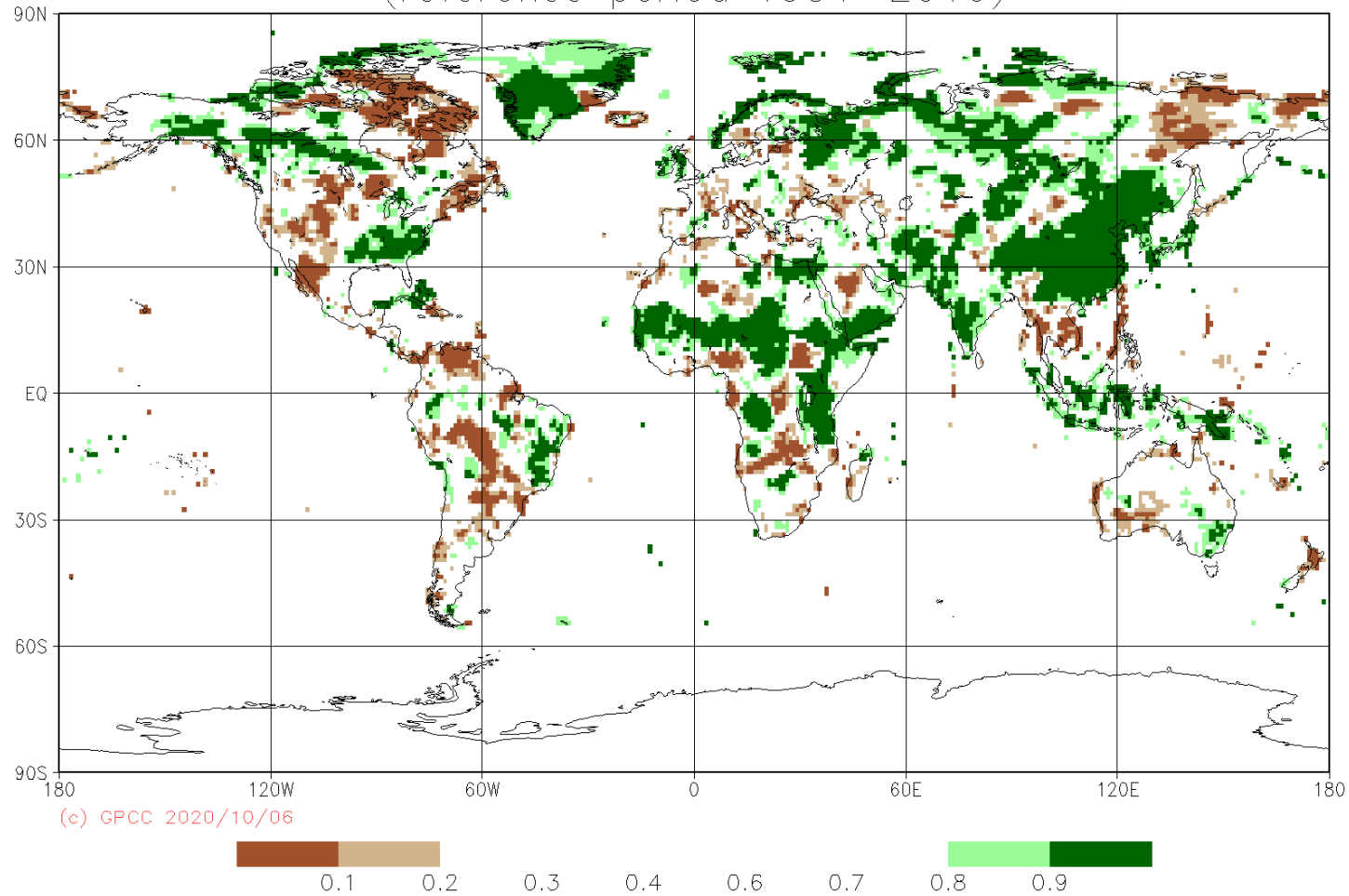
Heatwaves Sep/Oct

Data: ERA5. Reference period: 1981-2010.  
Credit: C3S/ECMWF



# Precipitation around the world

GPCC Precipitation Percentile  
January 2020 – September 2020  
(reference period 1951–2010)



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GPCC Precipitation Percentile  
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Wildfires

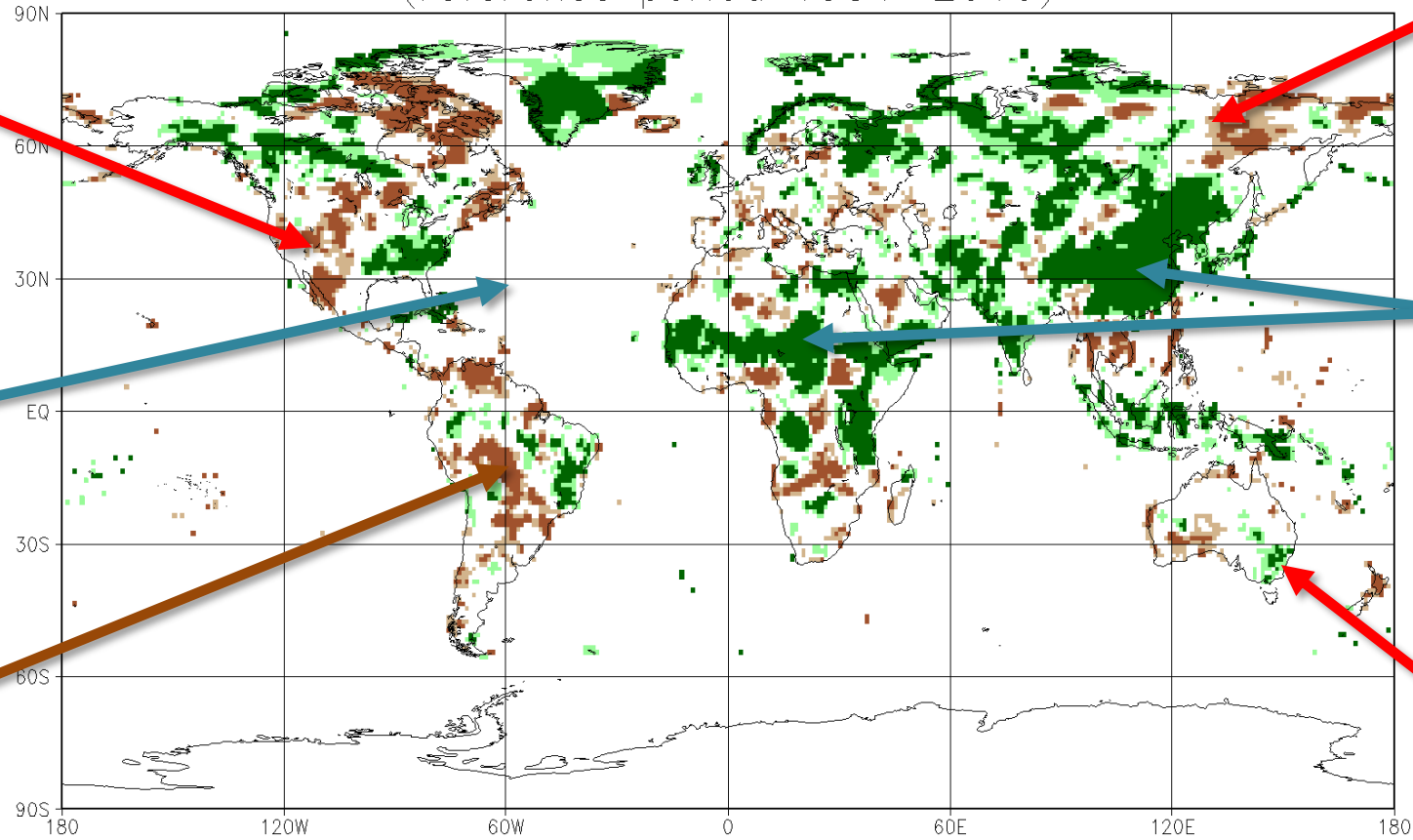
Record hurricane season in North Atlantic

Drought Jan-Aug

Wildfires

Heavy rain and flooding

Wildfires



(c) GPCC 2020/10/06



# Severe impacts from weather and climate events compounded by COVID-19

- Human displacement (UNHCR, IOM)
  - 2010-2019 weather-related events triggered an estimated 23.1 million displacements each year.
  - 9.8 million displacements, largely due to hydro-meteorological hazards recorded in first half 2020 concentrated in South and South-east Asia and the Horn of Africa.
- Hunger and food security (FAO, WFP)
  - Heavy rains in the Arabian Peninsula and East Africa.
  - Largest desert locust outbreak in 25 years across the Horn of Africa.
  - In Ethiopia alone, 200 000 hectares of cropland were damaged and over 356 000 tons of cereals were lost, leaving almost one million people food insecure.



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