

WMO, disasters and climate

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

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Secretary-General



WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

World Meteorological Organization



- UN Specialized Agency on weather, climate & water
- 191 Members, HQ in Geneva
- 2nd oldest UN Agency, 1873-
- Coordinates work of > 200 000 national experts from meteorological & hydrological services, academia (& private sector)
- Co-Founder and host agency of IPCC (1st World Climate Conference)
- Co-Founder of UNFCCC (2nd World Climate Conference)
- One of UN Climate Principals (1/4)



WMO Mission/key activities

1. **World climate**
2. **Weather, disasters & safety**
3. **Water resources**
4. **Data & technology**
5. **Strengthening of the national service capabilities**
6. **Earth system research**
7. **Efficient governance**



Actual WMO issues

- Weight of WMO and NMHSs on the global agenda growing
- Demand of our expertise high: COP-23/24, UNSG, UN Security Council, UN High Level Climate Summit 9/2019
- Additional emphasis on EWS/Climate adaptation by development agencies, new alliances with Green Climate Fund and World Bank
- Increase of project financing, e.g. CREWS & GFCS/ACP
- Concept for private sector engagement
- 2018 Lui Che Woo Prize



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WMO/Africa

- Tripling of external funding for development projects: CREWS, EU/GFCS etc. Development activities in large amount African countries.
- African directors appointed: IPCC, ETR, RAF + expert for service capacity building
- Ethiopia office operational in 2019, strengthening of Kenya & Nigeria offices
- NMHS advocacy among ministers/heads of state



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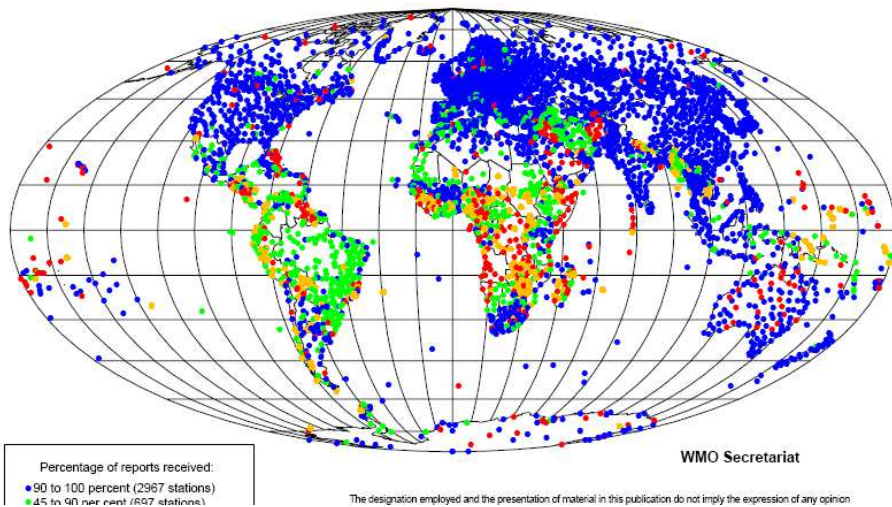
WMO/Africa

- 1 M USD of Lui Woo Prize for fellowships & management training
- Opportunity for wider developing country participation in technical commissions and WMO meetings & closer link to Regional Activities
- Country Profile Database for identification of development needs
- Global Meteoalarm System to support the NMHS safety authority role

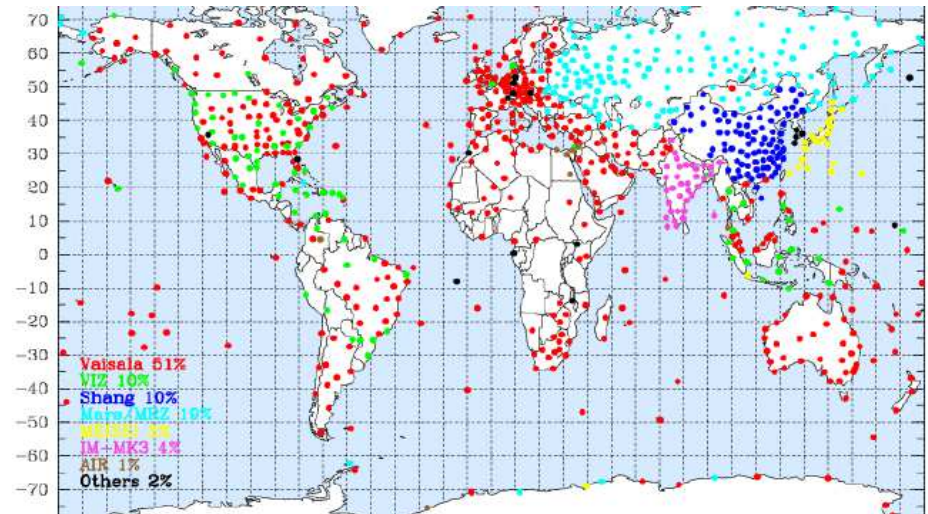


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WMO Global Observing Networks >10000 stations



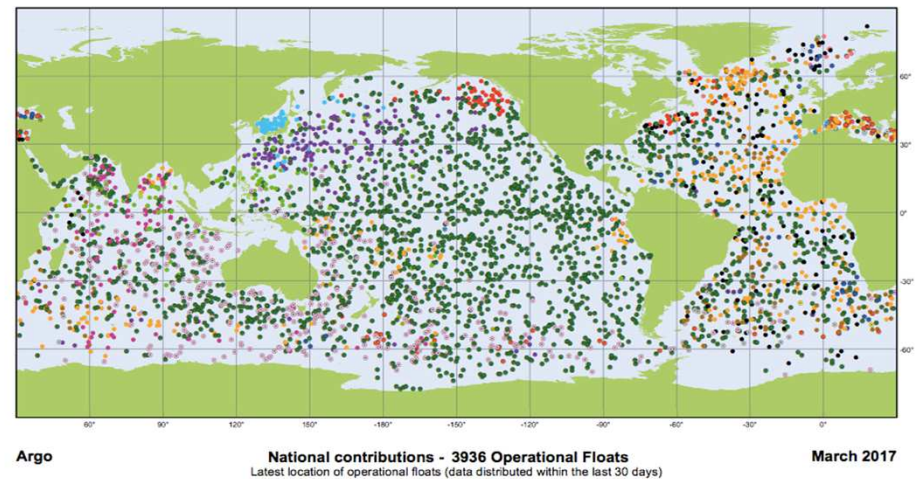
Surface observations



Balloon soundings



Air quality and greenhouse gases



Ocean weather (with IOC UNESCO)



Figure 3.17. <https://www.wmo.int/pages/programmes/observing/argofloats/>



10/04/2017
 national

CONSTITUENT BODIES REFORM (CBR)



1873



2050

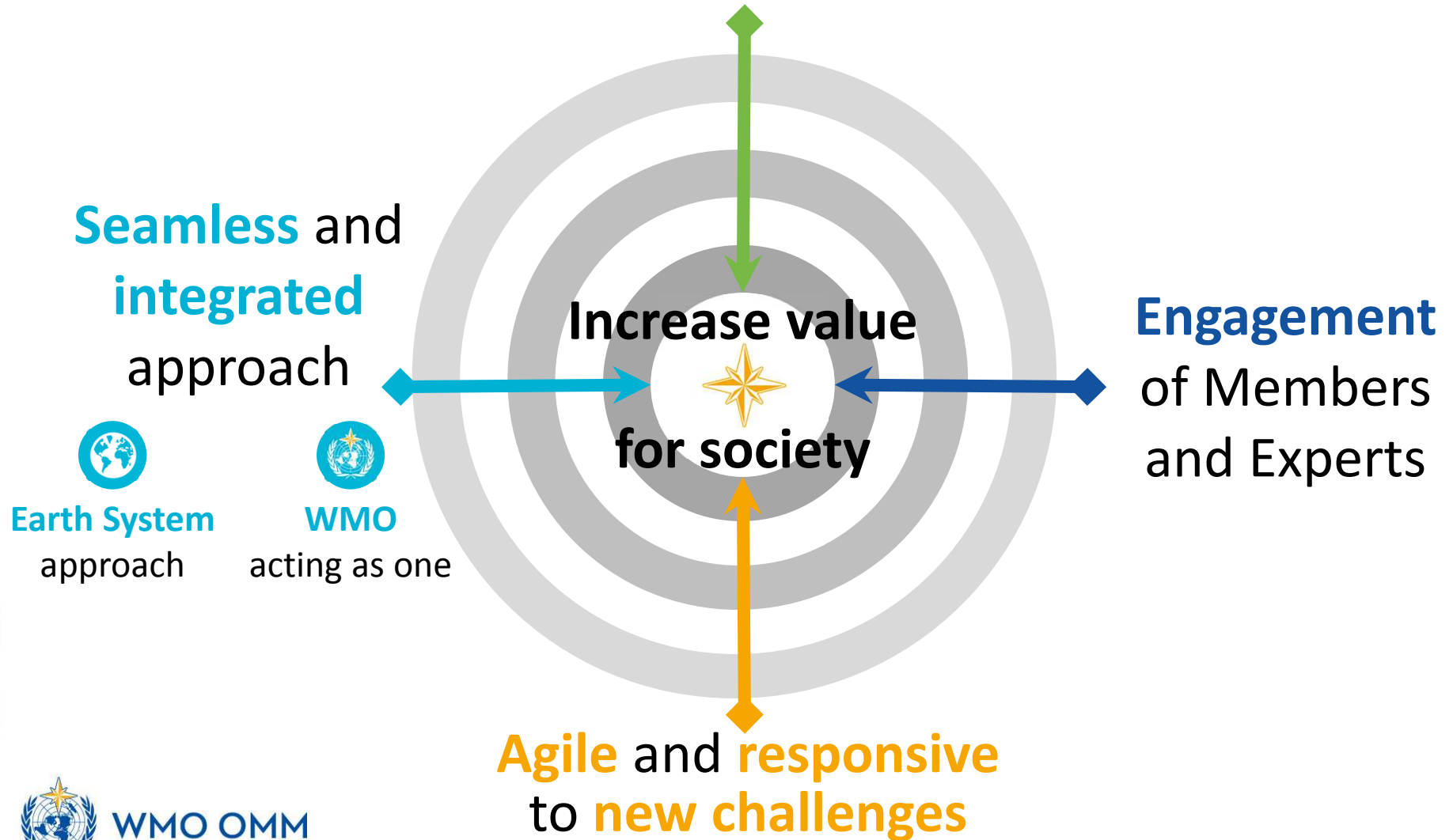
WMO for the 21st Century



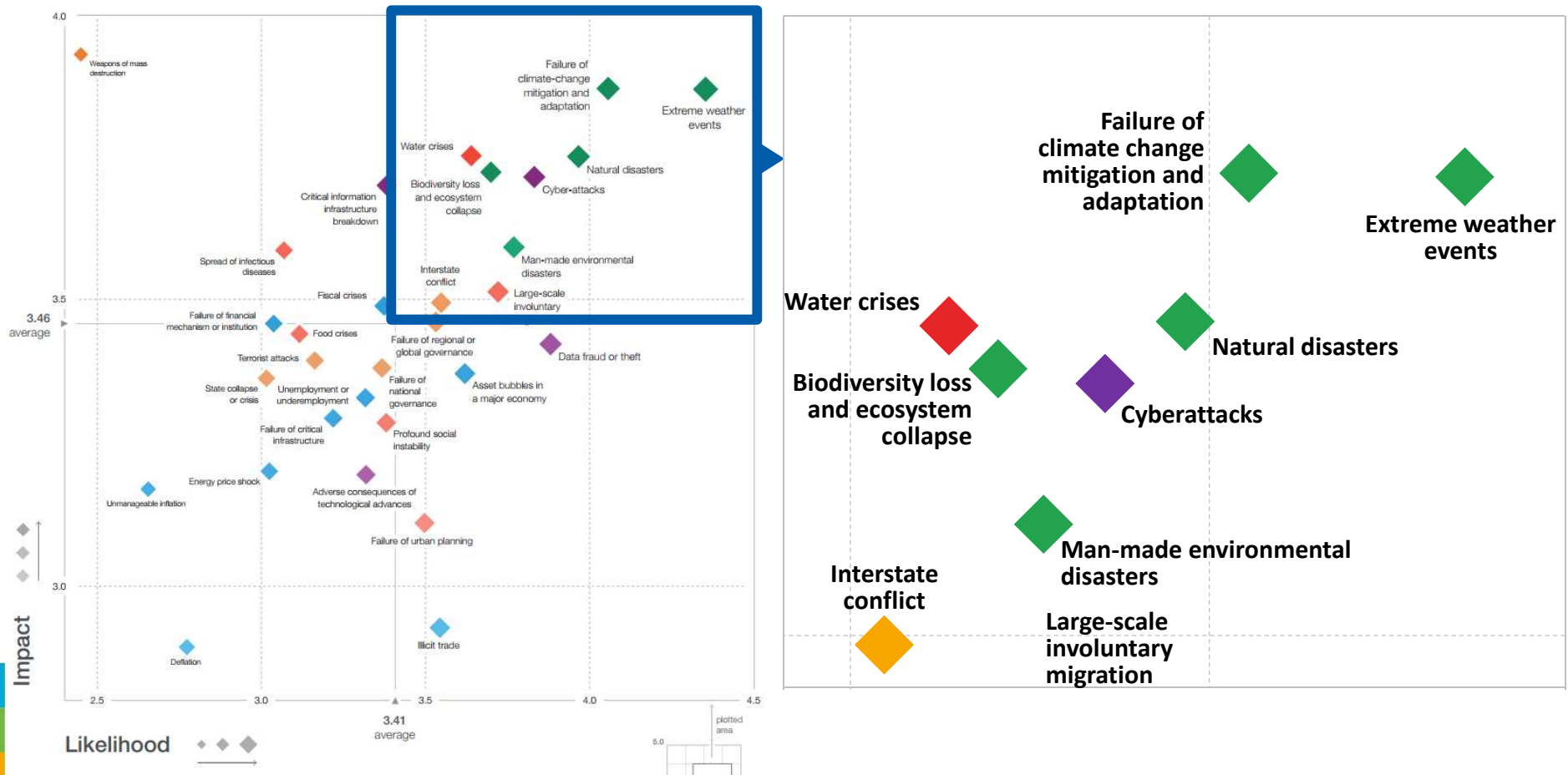
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REFORM OBJECTIVES

Effectiveness and efficiency



Biggest risks for world economy 2019



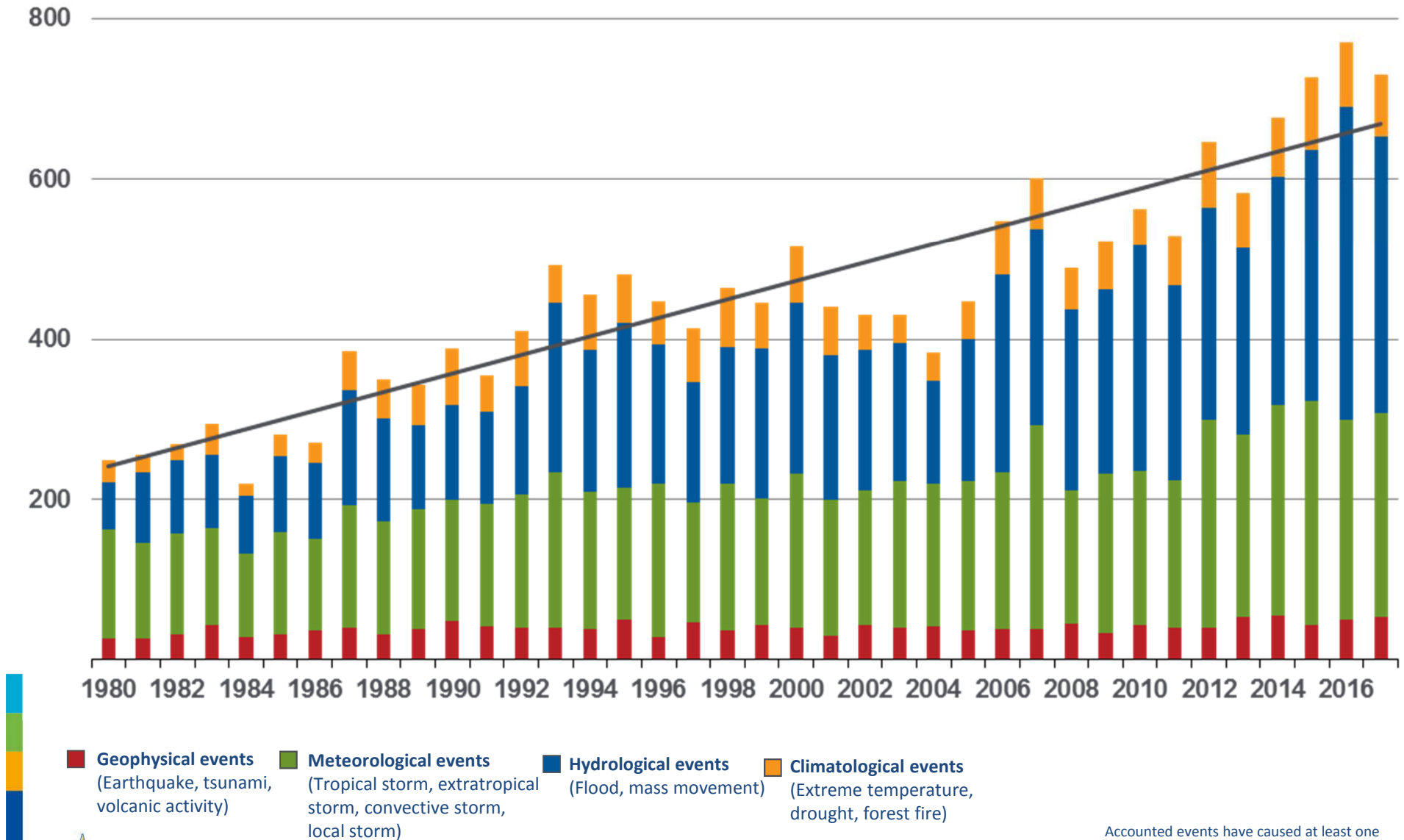
World Economic Forum Global Risks Landscape 2019



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Loss events worldwide 1980 – 2017

Number



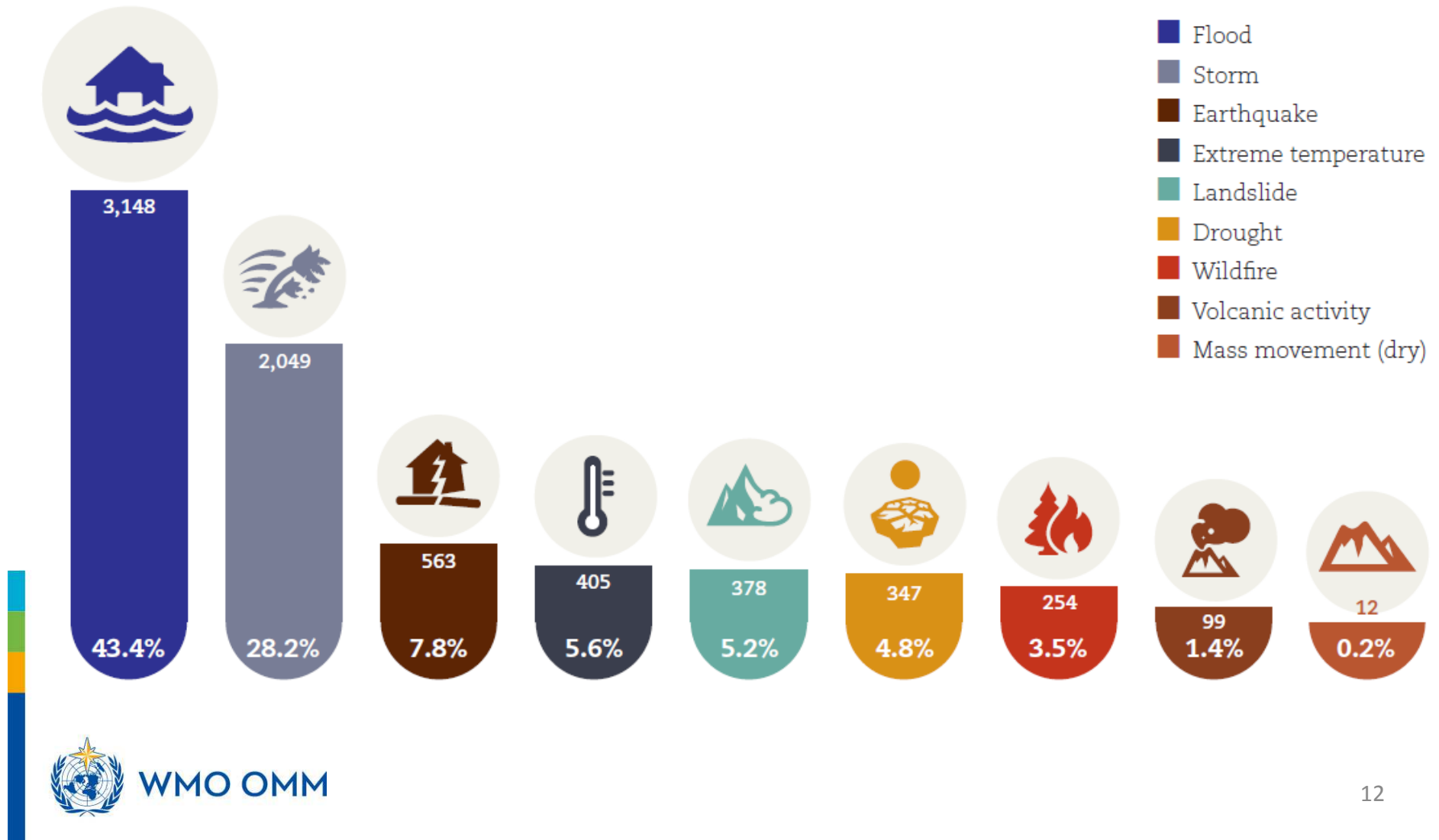
Accounted events have caused at least one fatality and/or produced normalized losses \geq US\$ 100k, 300k, 1m, or 3m (depending on the assigned World Bank income group of the affected country).



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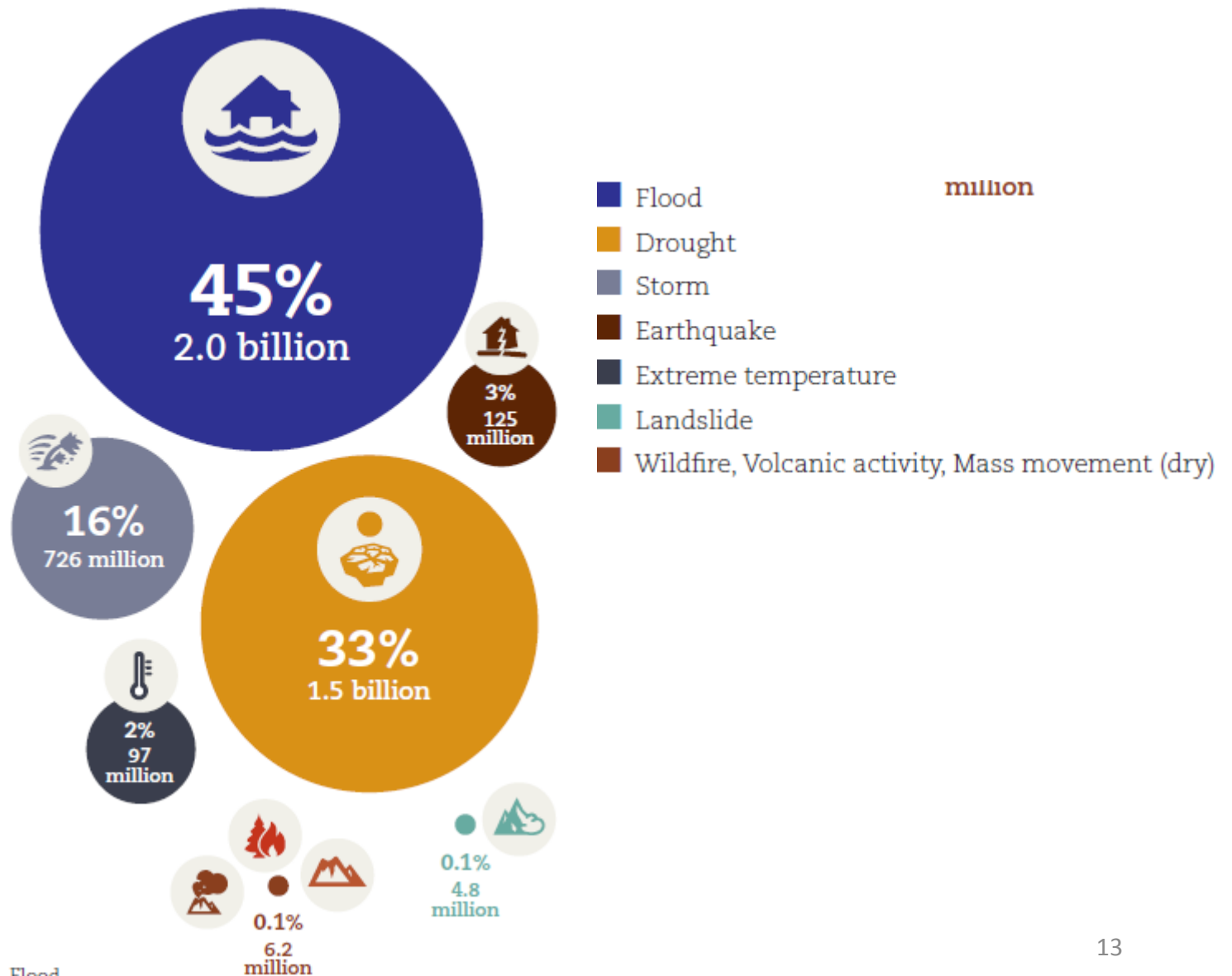
Distribution on natural disasters 1998-2017

90.6 % weather related



~4.5 billion people affected 1998-2017

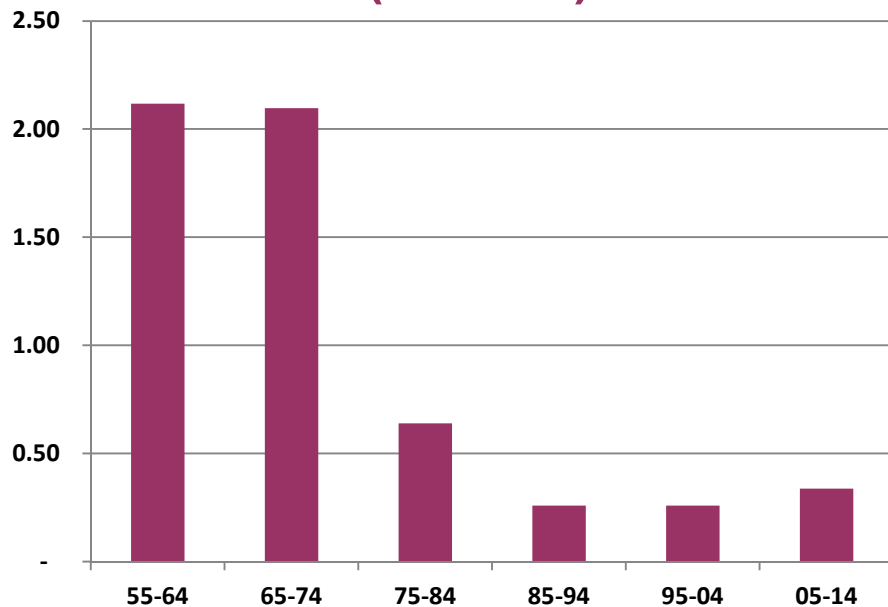
96 % weather related



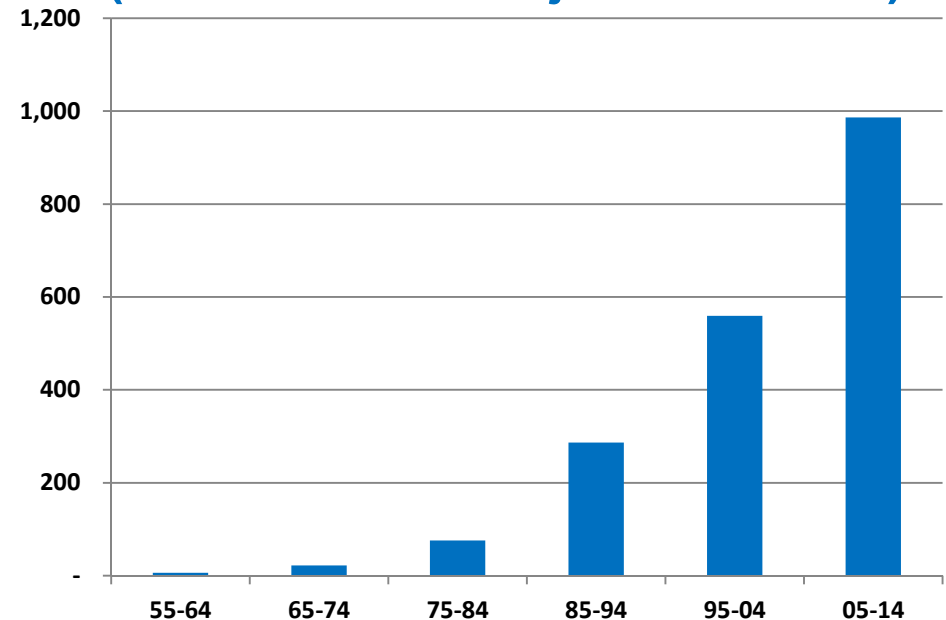
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Impacts of hydrometeorological and climatological hazards (1955–2014)

Human losses by decade
(millions)



Economic losses by decade
(billions of US\$ adjusted to 2013)



Reduction of the number of victims thanks to greater effectiveness of early warning systems and prevention measures



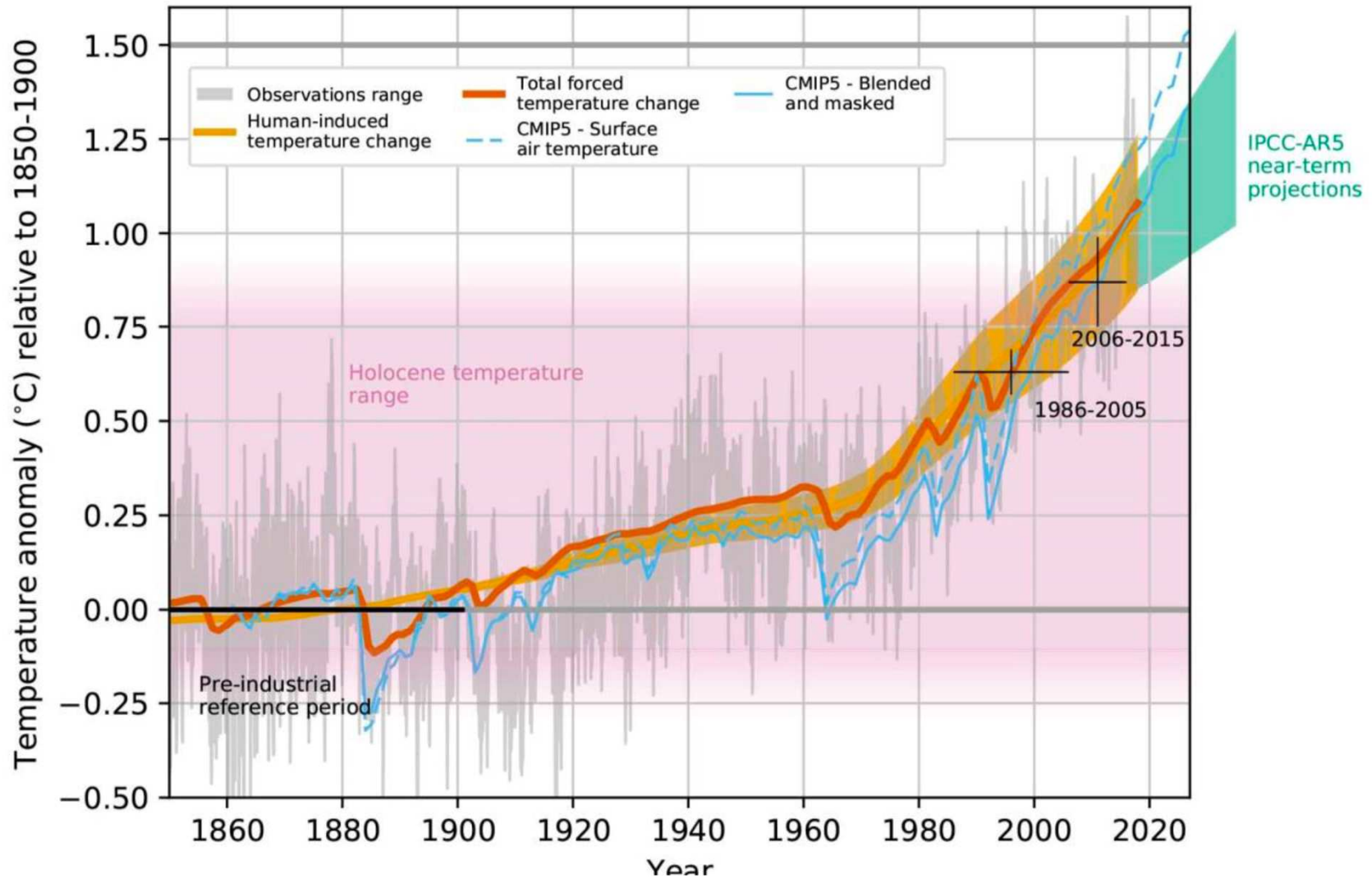
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Global adaptation index



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Global temperature

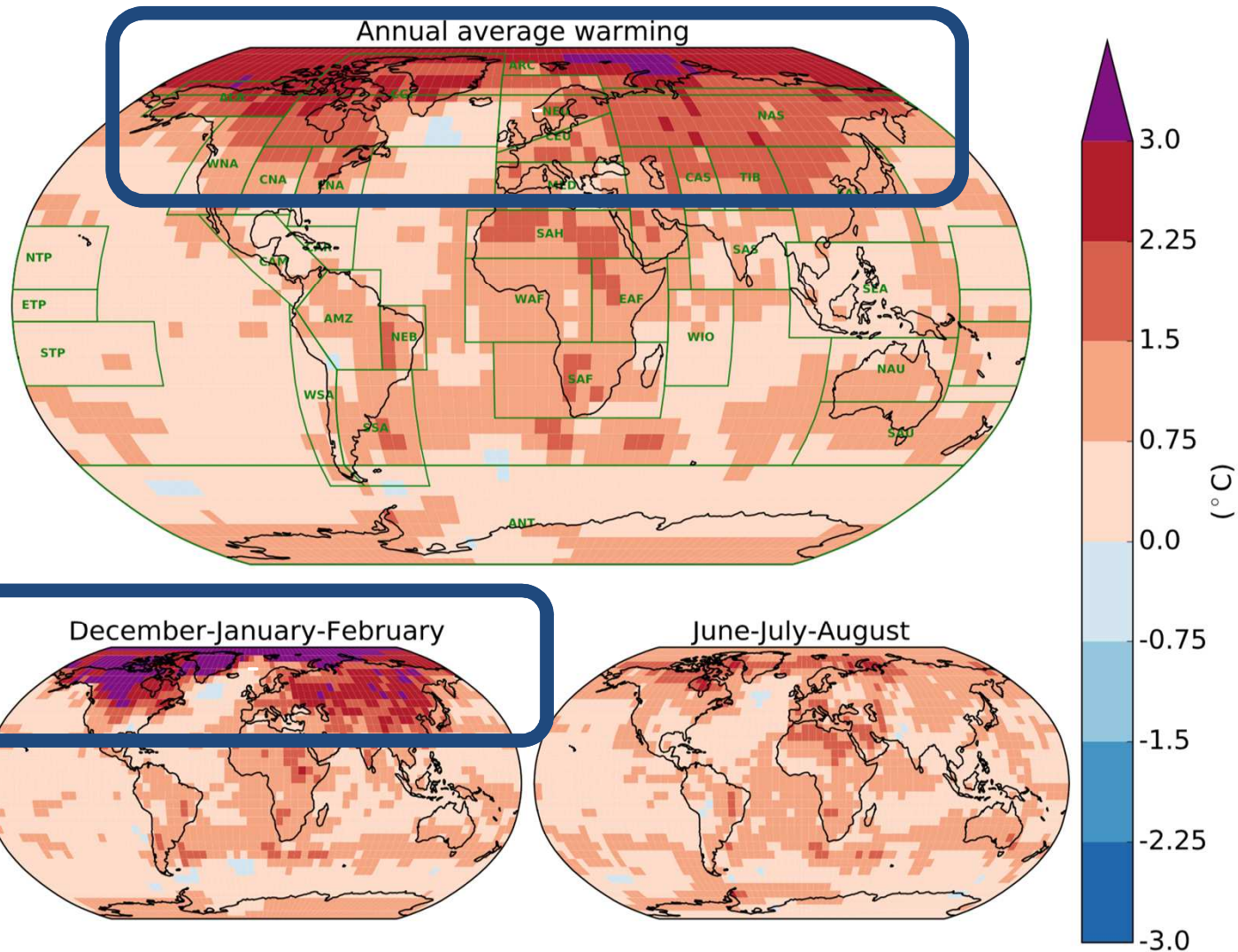


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Source: IPCC Special Report on Global Warming of 1.5°C

Warming so far

Regional warming in the decade 2006-2015 relative to preindustrial

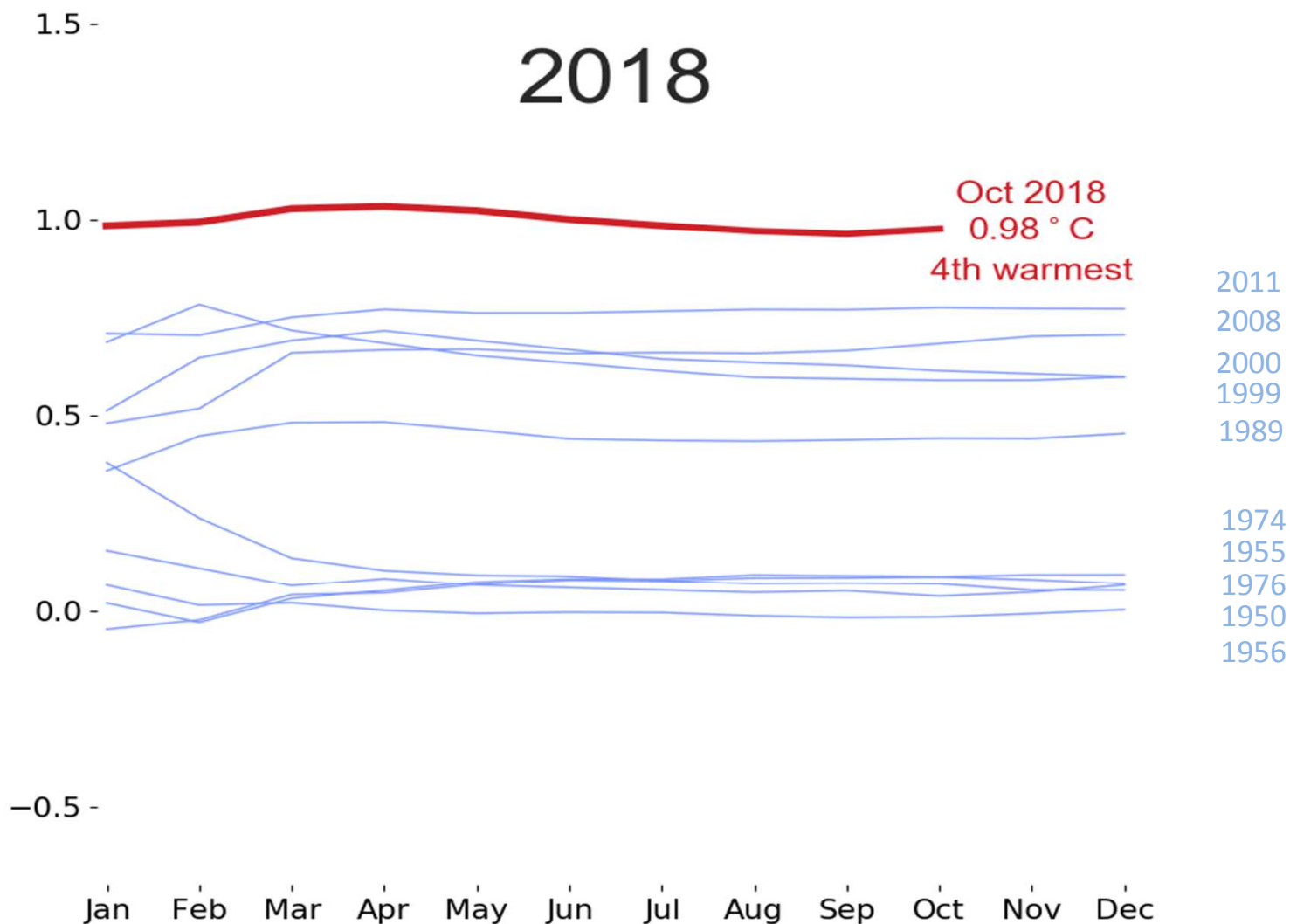


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Source: IPCC Special Report on Global Warming of 1.5°C

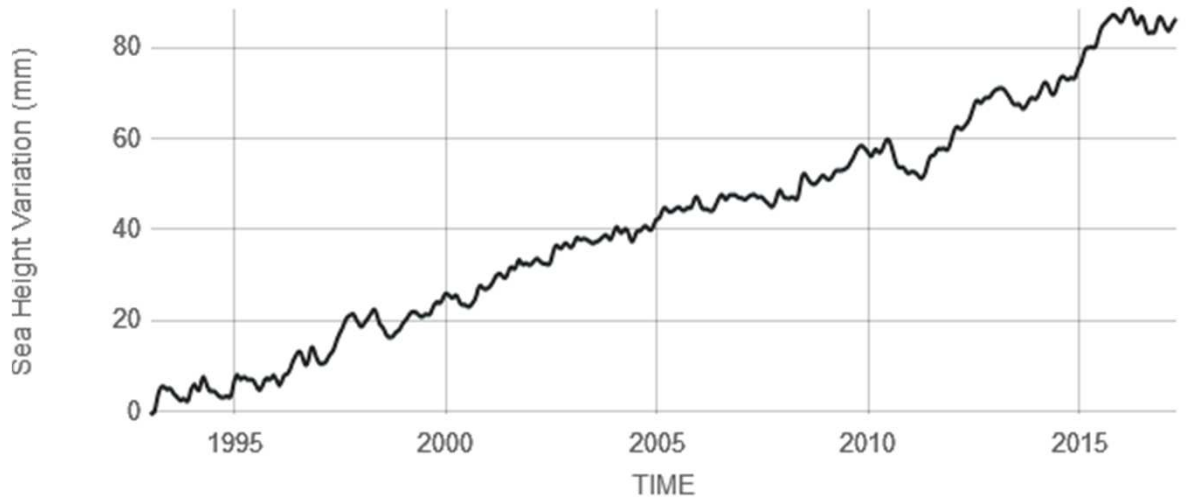
Warmest La Niña year

Global temperature difference from pre-industrial (° C)
1850 - 2018

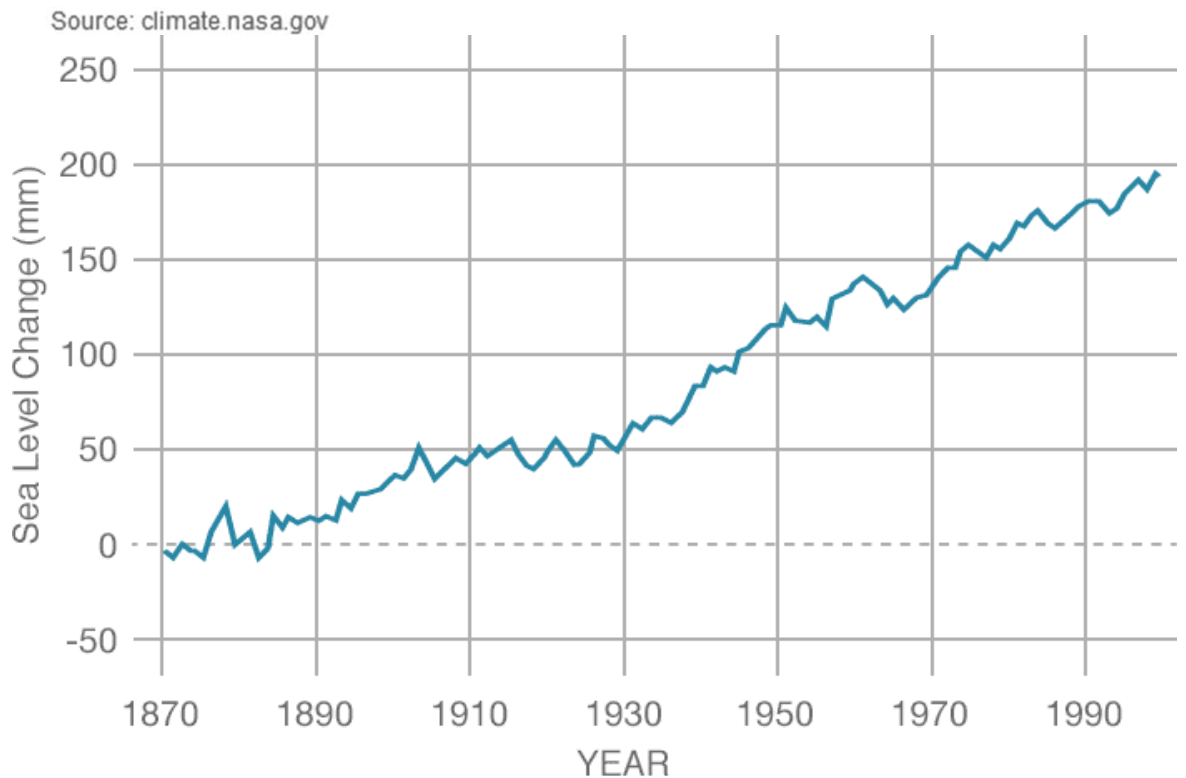


Global sea level rise: + 26 cm 1870-2017

NASA-EUMETSAT
Satellites
(1993-present)

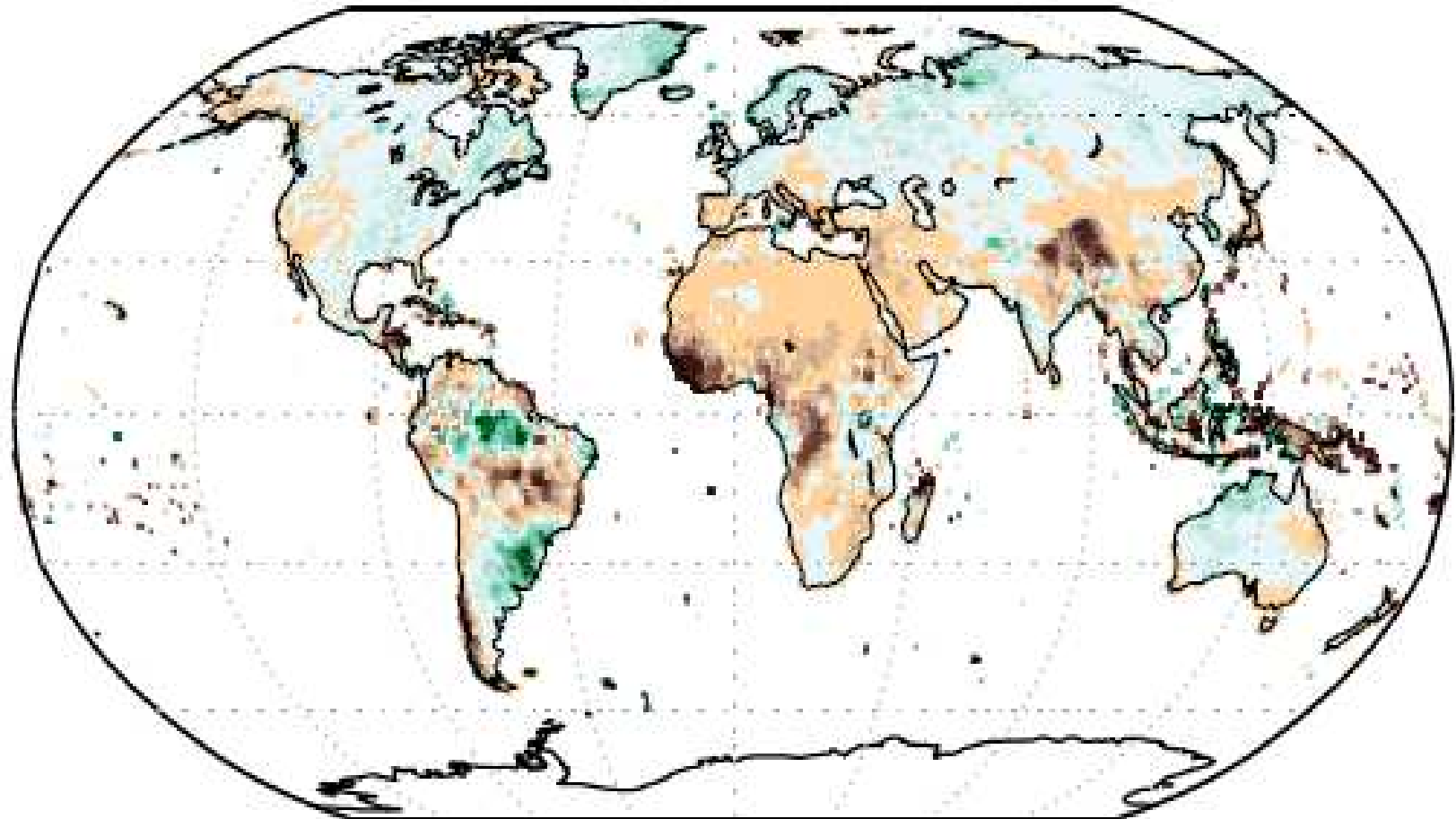


Tide gauges
(1870-2000)

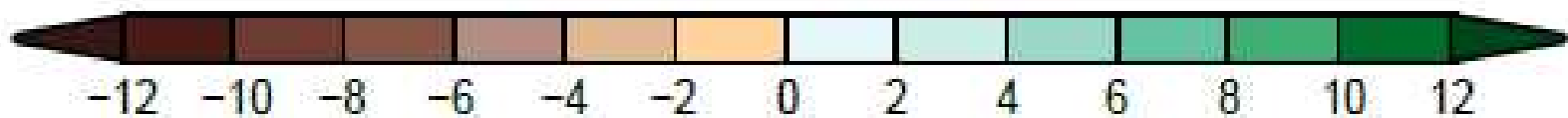


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Global precipitation 1986–2015 vs. 1901–1960



Change in Precipitation (inches)



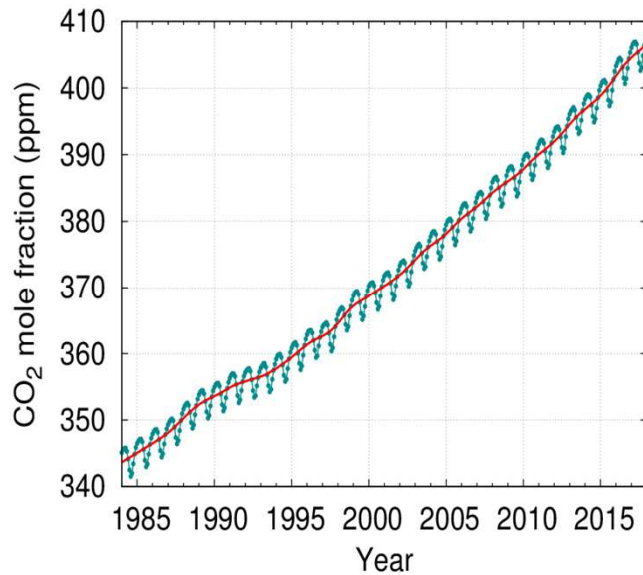
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Carbon dioxide level highest in 3 million years

CO₂

CH₄

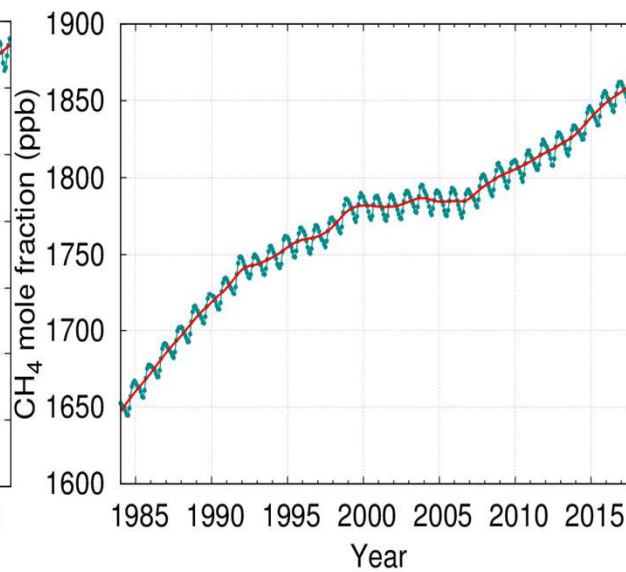
N₂O



Increase 146 %

Lifetime several
thousands years

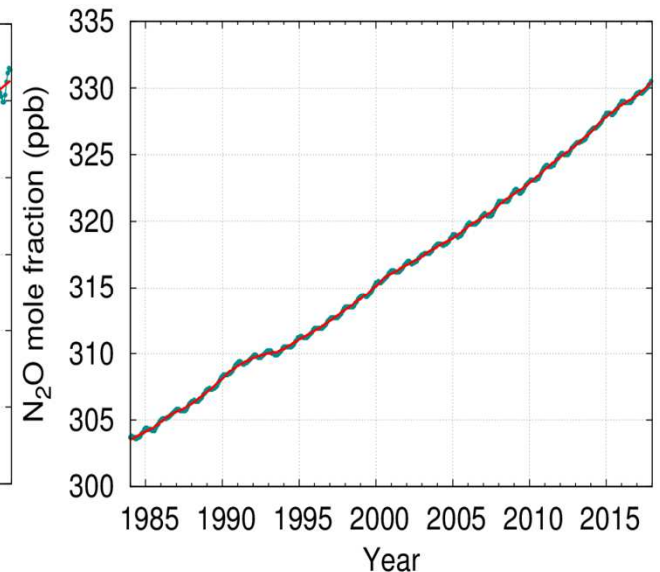
Contribution to
warming 66 %



Increase 257 %

Lifetime 12 years

Contribution to
warming 17 %



Increase 122%

Lifetime 114 years

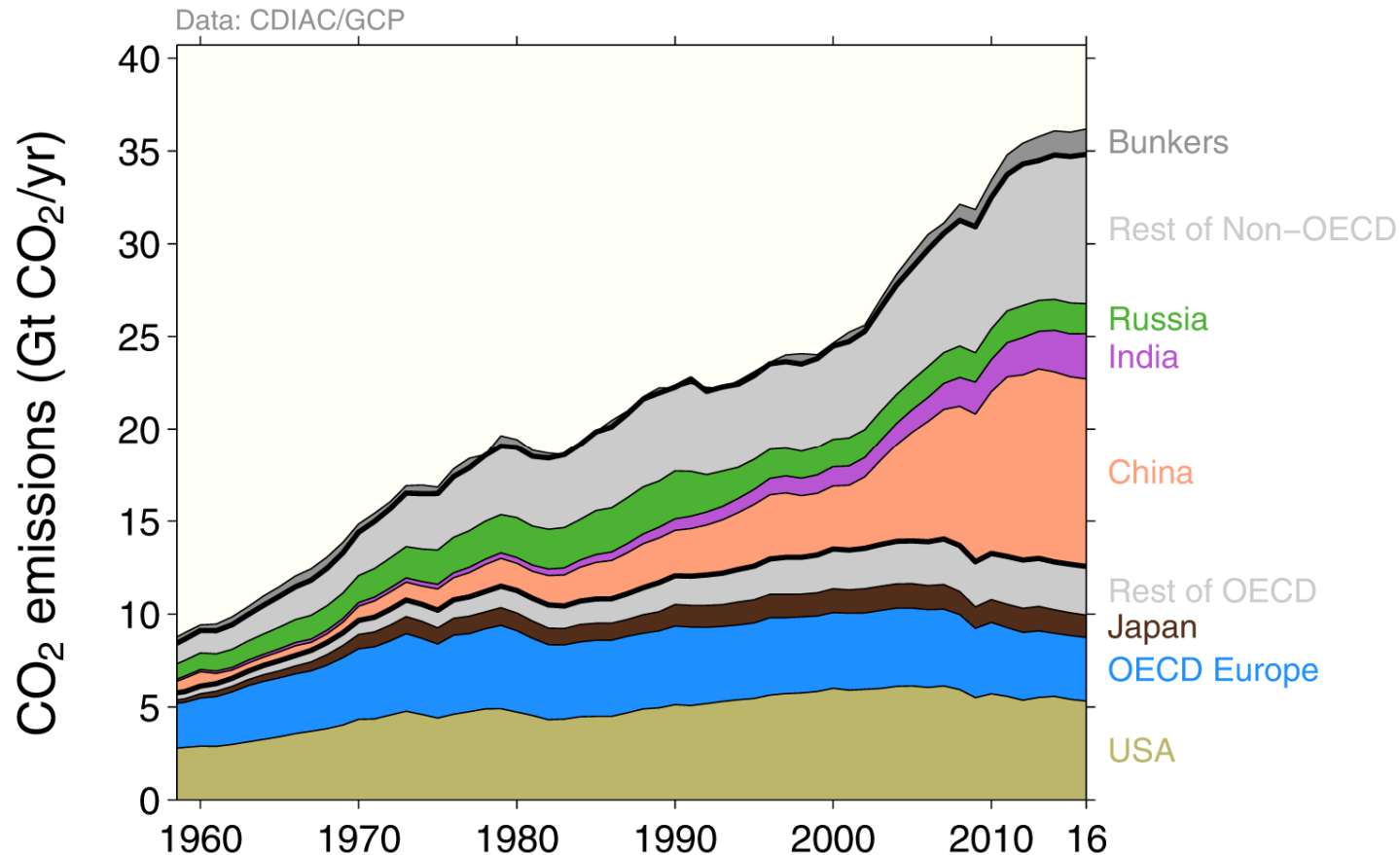
Contribution to
warming 6 %



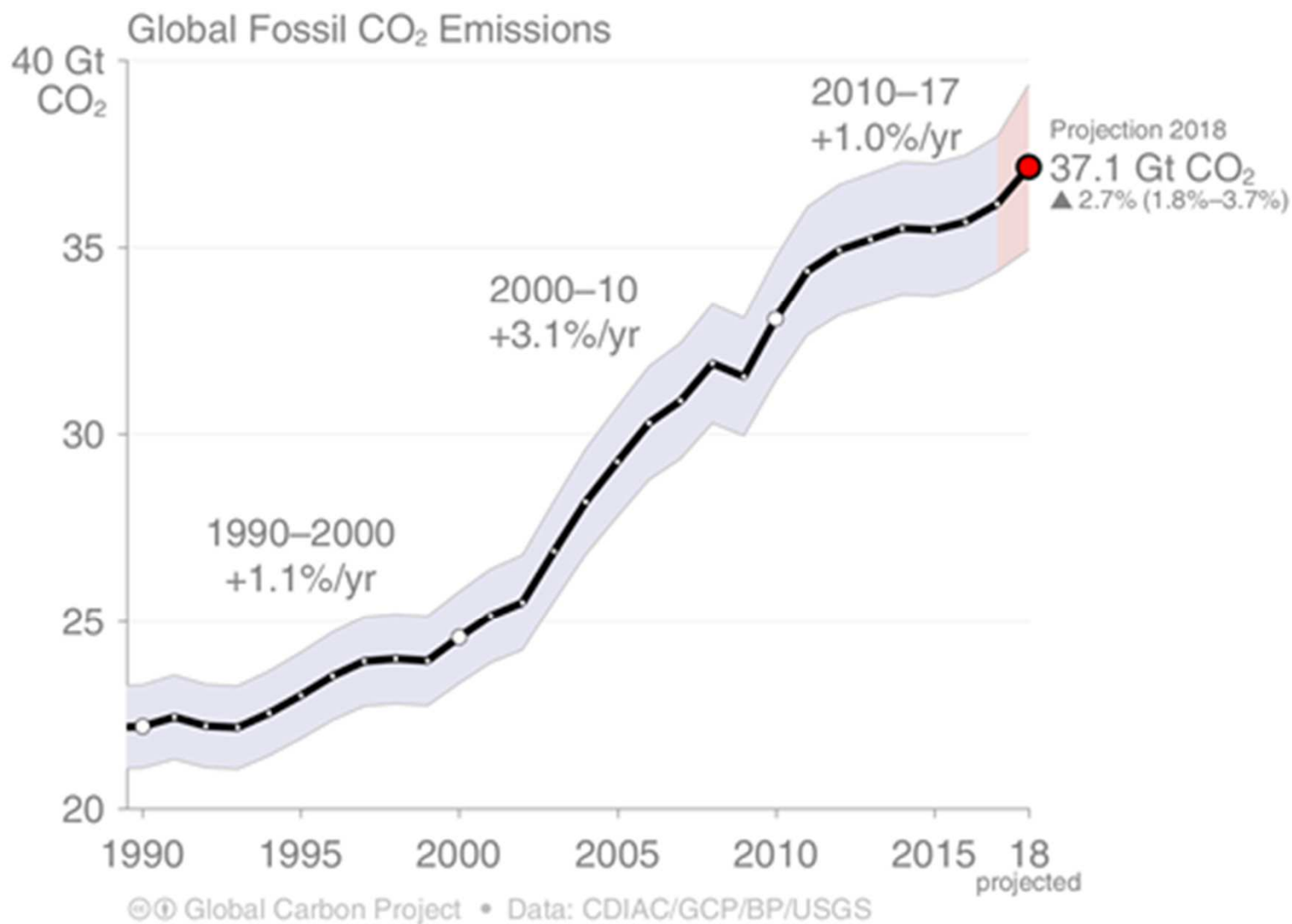
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Global CO₂ emissions by country

Emissions from OECD countries are about the same as in 1990
Emissions from non-OECD countries have increased rapidly in the last decade



CO₂ Emissions 1990-2018



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Fate of anthropogenic CO₂ emissions (2007–2016)

Sources = Sinks



34.4 GtCO₂/yr
88%



12%
4.8 GtCO₂/yr

17.2 GtCO₂/yr
46%



30%
11.0 GtCO₂/yr



24%
8.8 GtCO₂/yr

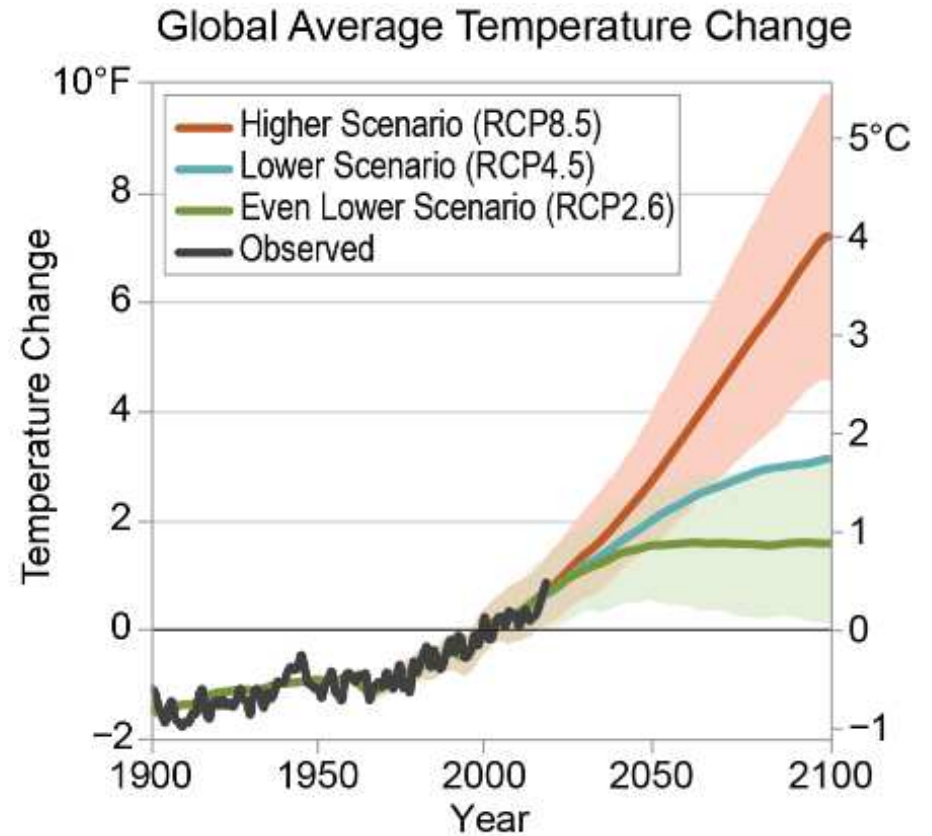
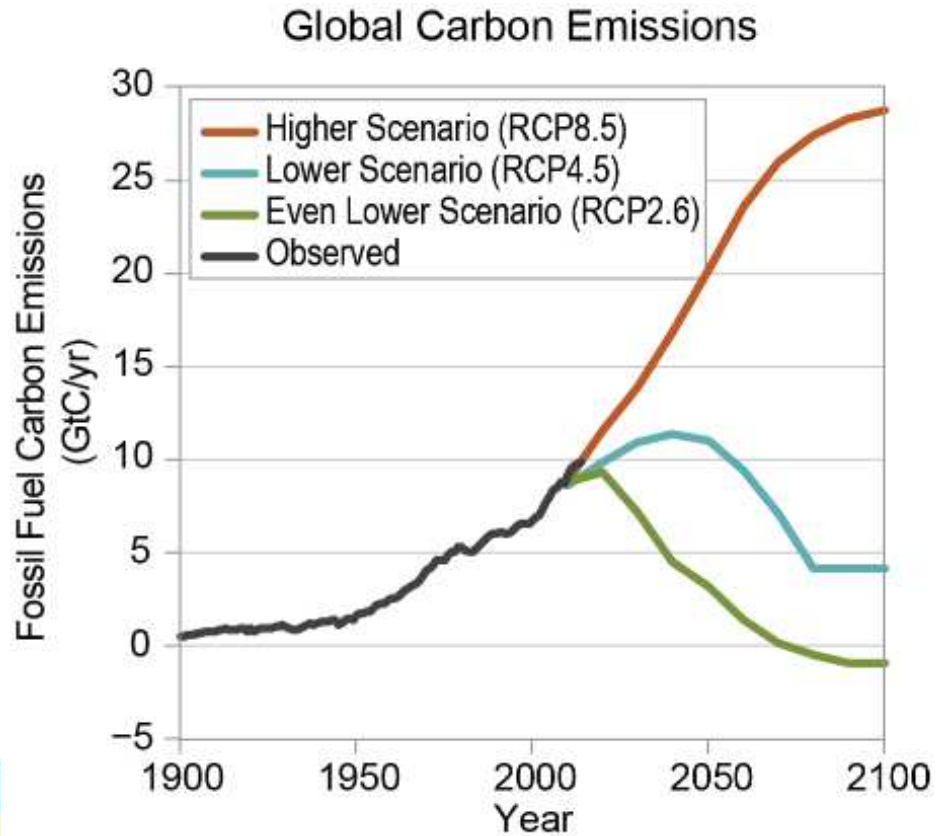


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Budget Imbalance:
(the difference between estimated sources & sinks)

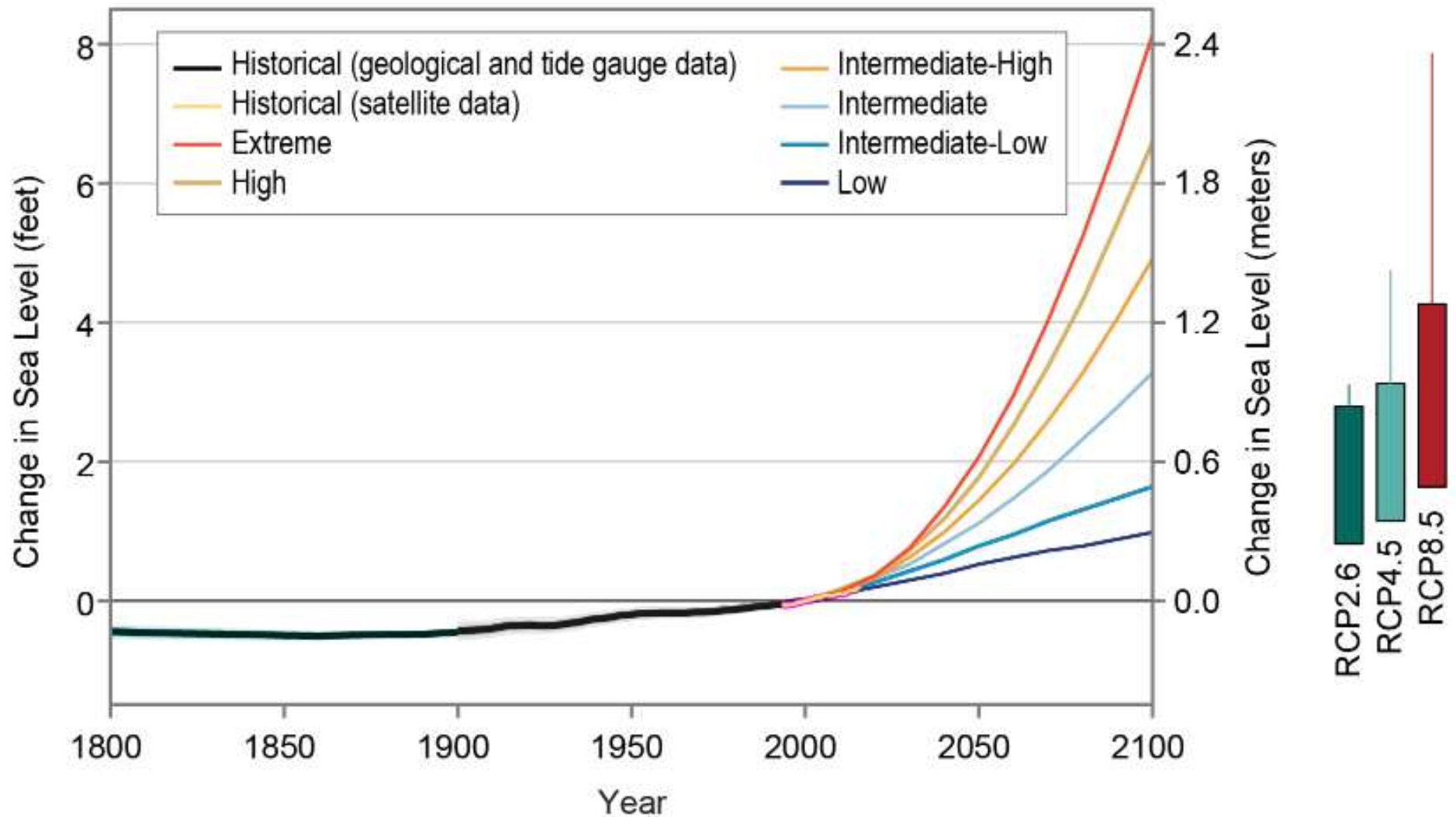
6%
2.2 GtCO₂/yr

Carbon emissions-temperature



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Emissions-sea level rise 1800-2100



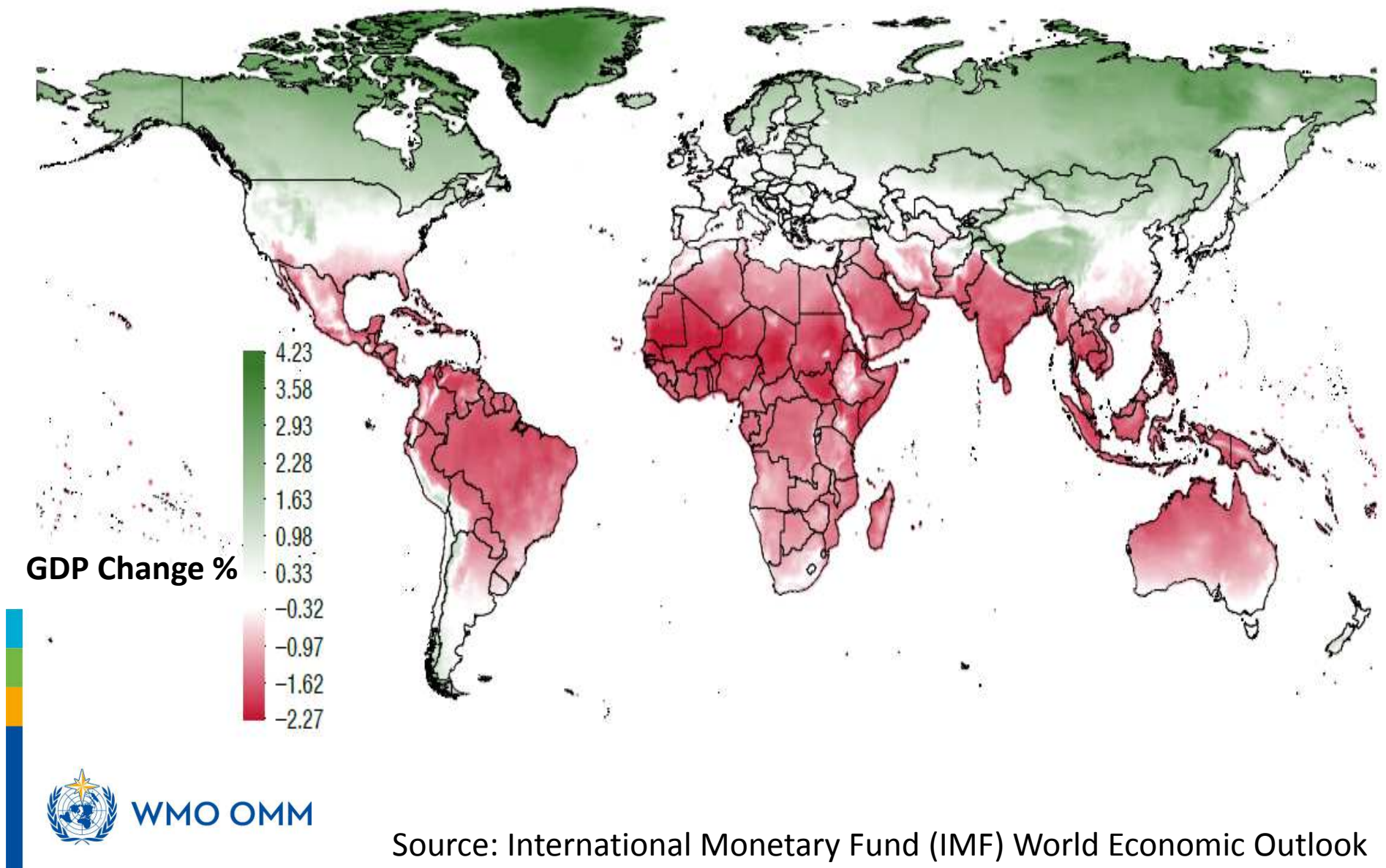
RCP2.6
RCP4.5
RCP8.5



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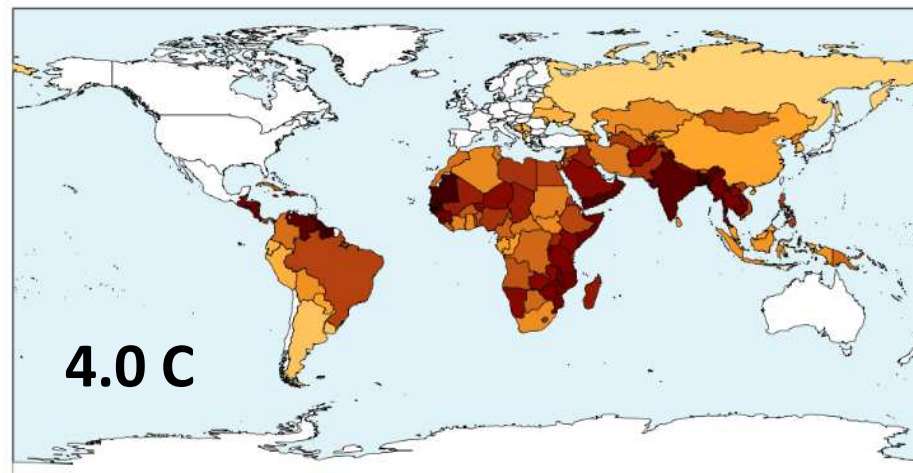
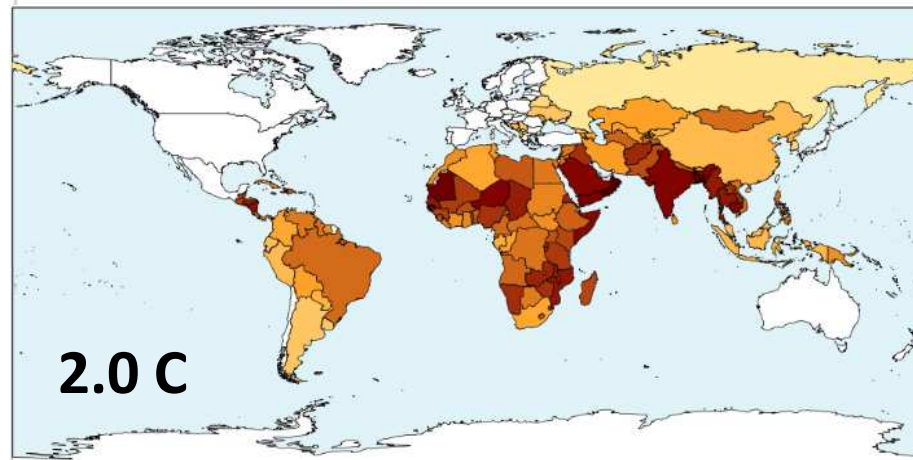
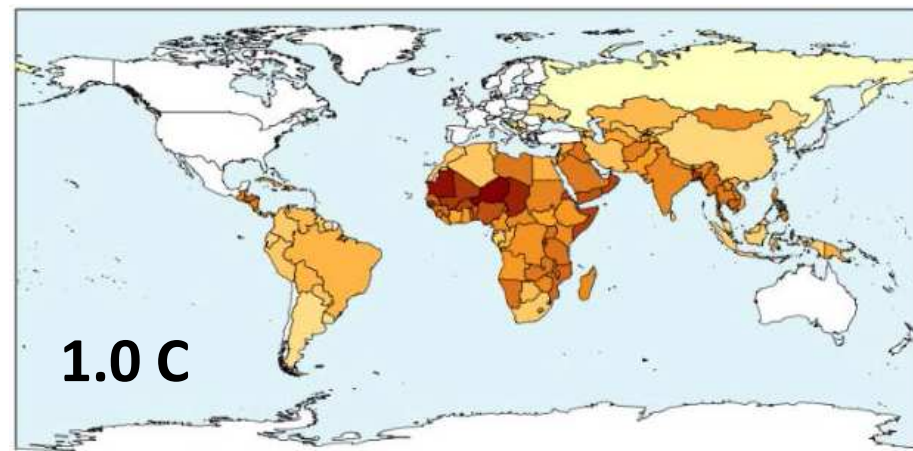
Uneven economic impact of current warming

Effect of 1°C temperature increase on per capita output



Source: International Monetary Fund (IMF) World Economic Outlook

Warming/food insecurity

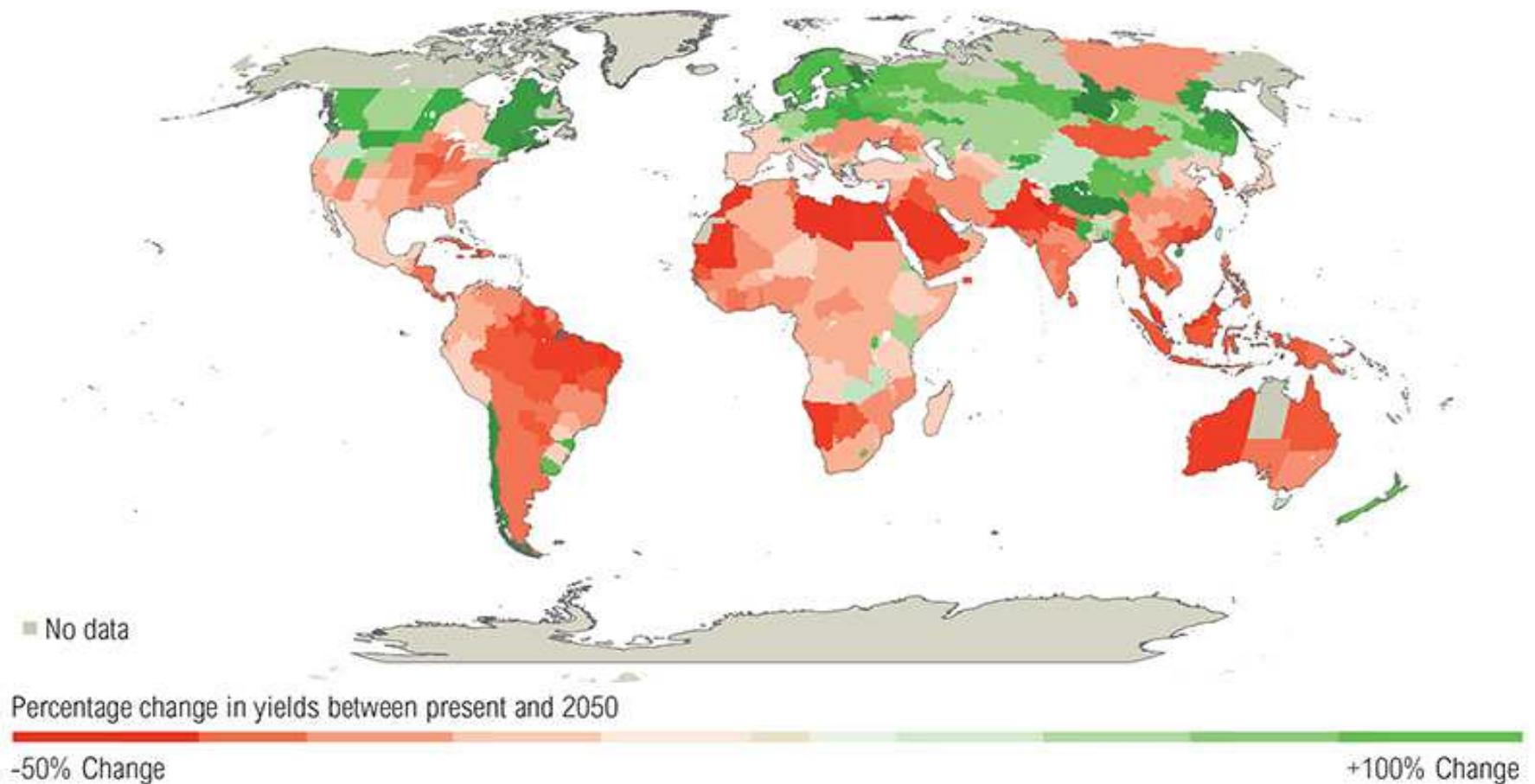


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3 C warming is a major risk for global food security

Loss of crop yield in most parts of the world

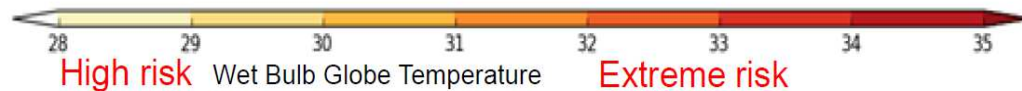
Most studies now project adverse impacts on crop yields due to climate change (3°C warmer world)



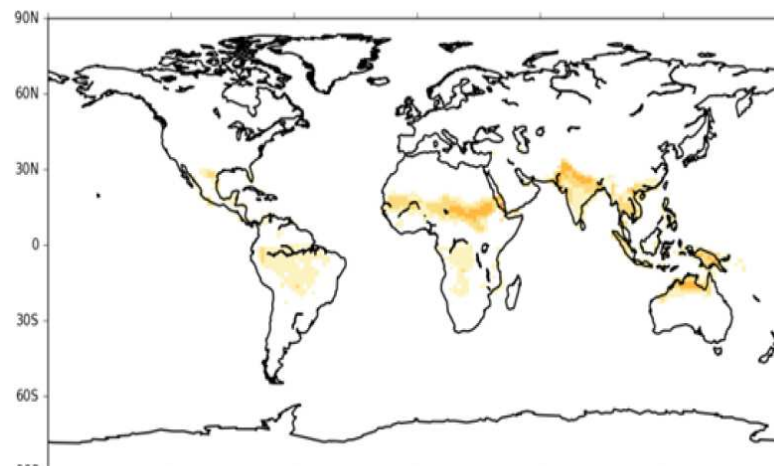
WORLD RESOURCES INSTITUTE

Sources: <http://ow.ly/rpfMN>

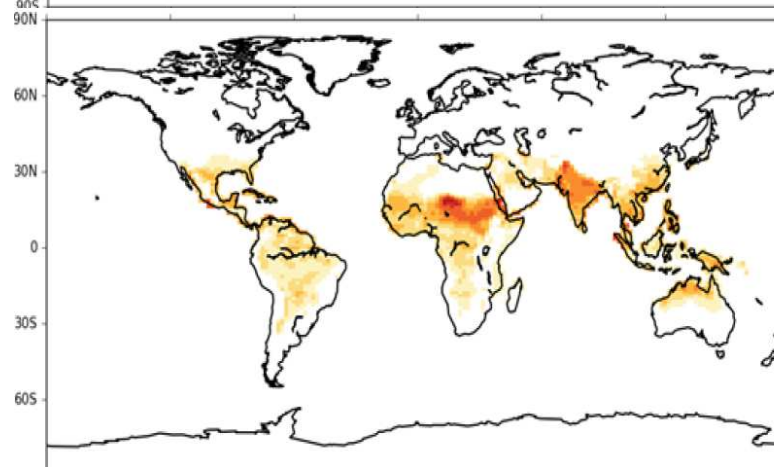
Warming/heat stress of warmest month



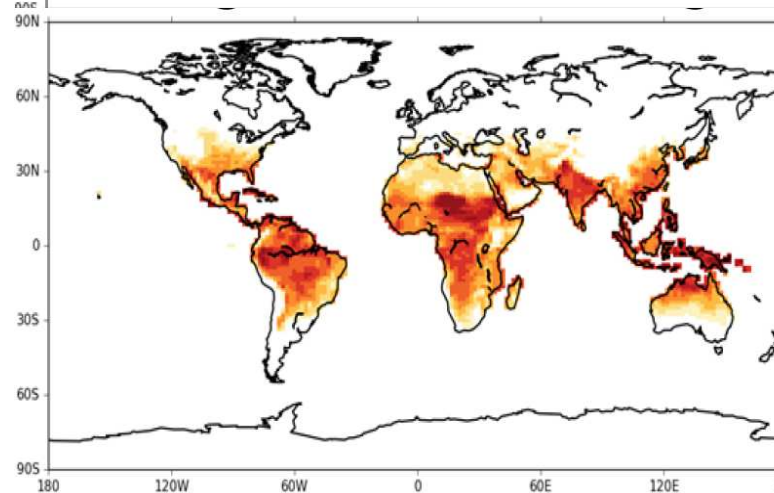
1.0 C



2.0 C

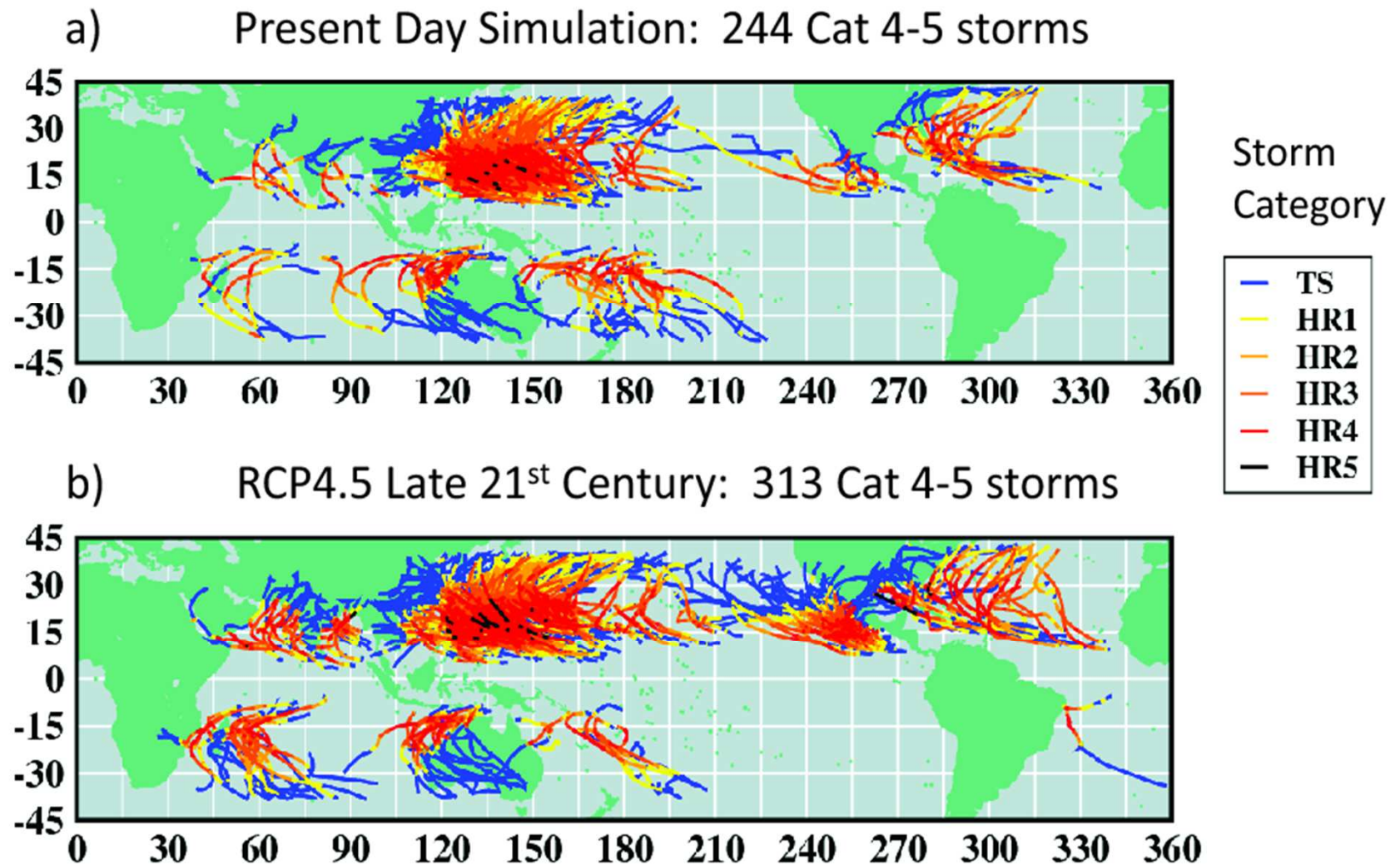


4.0 C



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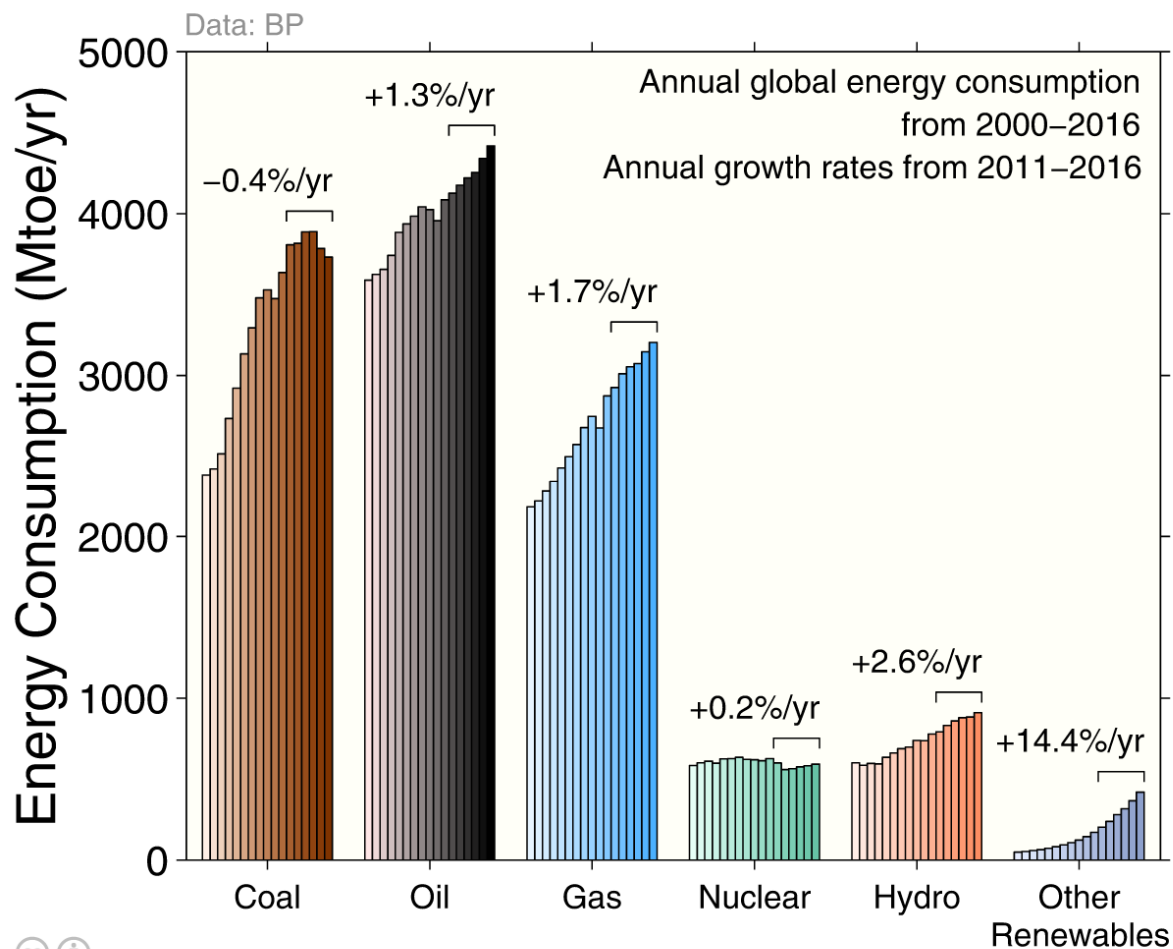
Tropical storms today and in 2 C warmed climate



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Today 85 % of energy fossil, should be replaced with renewable, hydro and nuclear during coming decades

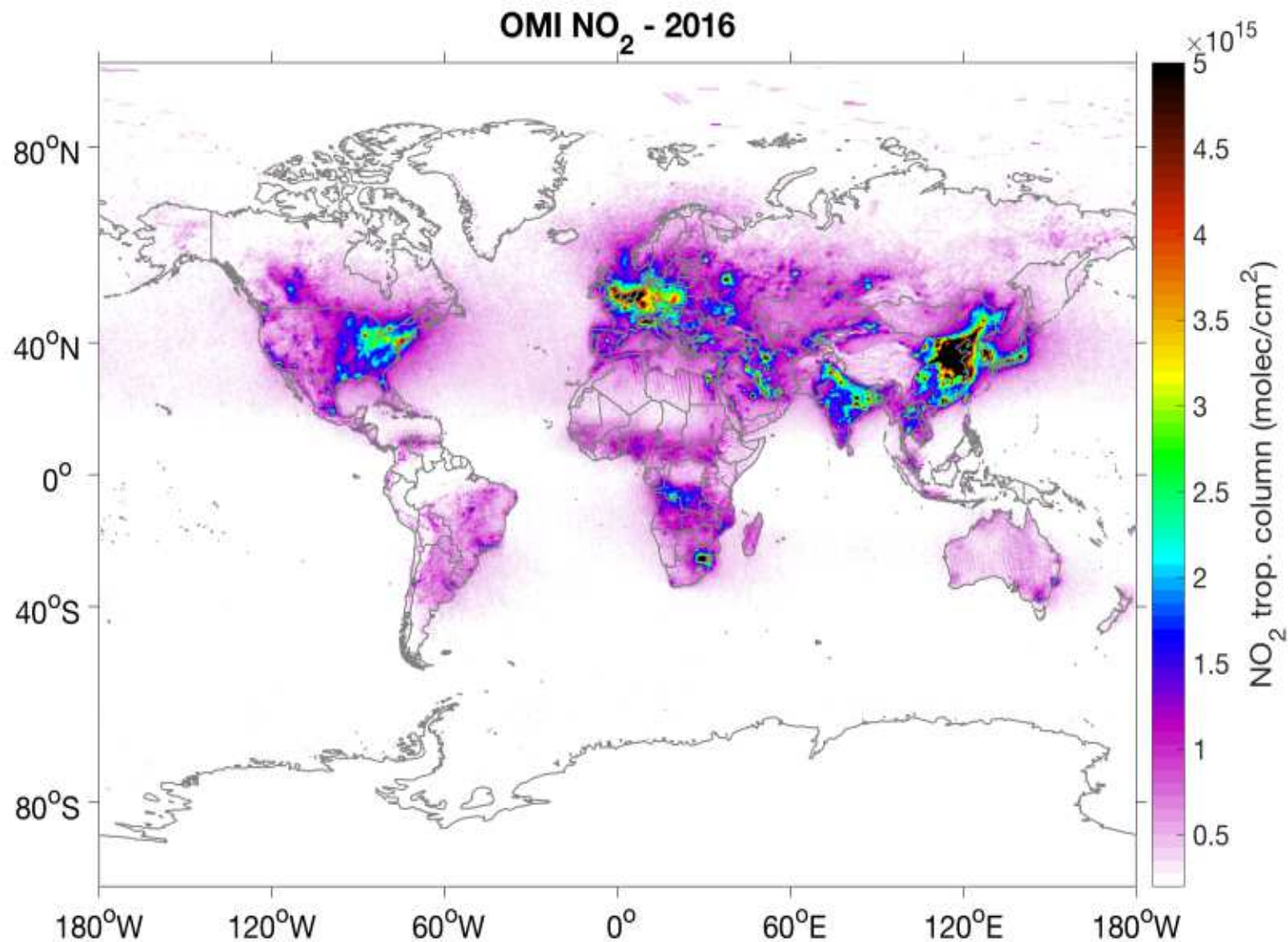
Energy consumption by fuel source from 2000 to 2016, with growth rates indicated for the more recent period of 2011 to 2016



Global Carbon Project
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Source: [BP 2017](#); [Jackson et al 2017](#); [Global Carbon Budget 2017](#)

Air pollutants, NO₂



SUSTAINABLE DEVELOPMENT GOALS



WMO contributions to the SDGs



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Climate change/security policy

1. **Agriculture:** great difficulties in Africa, Mediterranean region, Americas, India, China. High northern latitudes are gaining, but can not compensate losses in more fertile areas.
2. **World economy.** Climate mitigation to reach 1.5-2.0 C ~twenty fold cheaper than inaction. Economic losses rapidly growing, island and African economies hit hardest. Absolute losses greatest in USA & Eastern Asia.
3. **Oil & gas dependent economies.** E.g. Russia, Arabic countries and Norway highly dependent on fossil energy income. Risk for destabilization related to climate mitigation and/or cessation of oil/gas resources.
4. **Africa.** Economies, employment and food security highly dependent on rain-fed agriculture. Population growth 1 => 4 billion by 2100 expected: source of crisis, refugees and death of hunger.
5. **Europe.** Mediterranean countries will suffer. Potential for immigration great, political impacts already visible; threat for European Union.

شكر

Thank you
Gracias
Merci
Спасибо
谢谢



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