



Basics of climate change science

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INTERGOVERNMENTAL PANEL ON climate change



Planet Earth; Our home



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Challenges of the Earth

- ✓ **The Challenge: Sustainable Management of an Ever-Changing Planet**
- ✓ **The Challenge: Sustainable Energy**
- ✓ **The Challenge: Food Security**
- ✓ **The Challenge: Sustainable Forestry**
- ✓ **The Challenge: Water Security**
- ✓ **The Challenge: Sustainable Fisheries**
- ✓ **The Challenge: Sustainable use & conservation of biodiversity**
- ✓ **The Challenge: Global climate change**

Global Climate change is Significant long-term changes in the climate parameters

- **Global** Climate Change → **Global** warming

A changing climate leads to changes in **extreme weather** and **climate events**



These extreme weather events are just the tip of the iceberg.
And that iceberg is also rapidly melting,”
[Antonio Guterres](#) (after record-breaking heat in July2019)



"What we do over the next 10 years will determine the future of humanity for the next 10,000 years.



“THAWING PERMAFROST is one of the TIPPING POINTS for CLIMATE BREAKDOWN and it’s HAPPENING before our very eyes,” “This premature thawing is another clear signal that WE MUST DECARBONISE our economies, and IMMEDIATELY.”

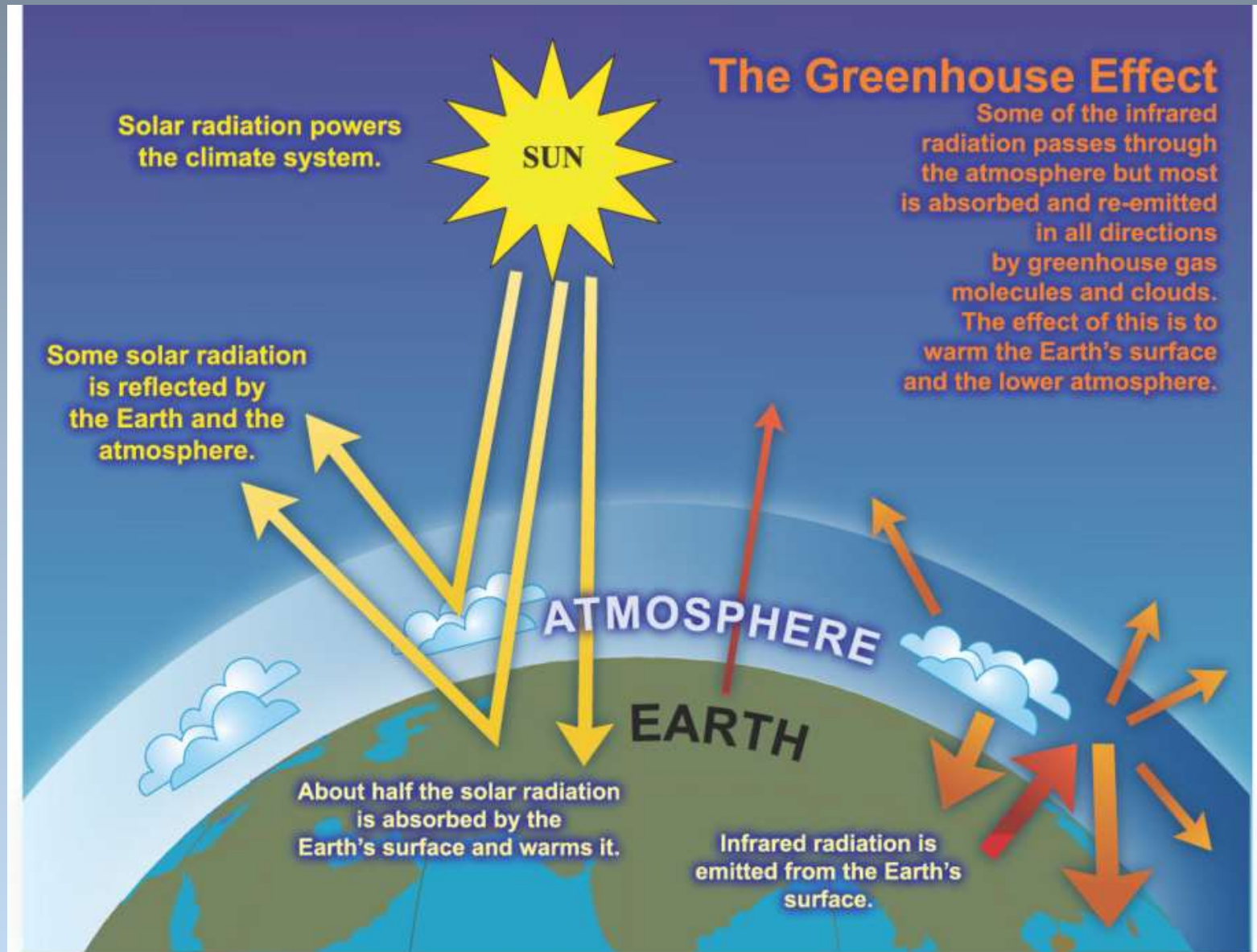


The main reason people are moving is because they don't have anything to eat. This has a strong link to climate change – we are seeing tremendous climate instability that is radically changing food security



**The
Guardian**

What is Greenhouse effect?



Question

**Is greenhouse effect useful
or not?**

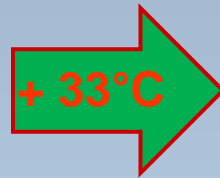
If the world had no atmosphere, it would be very cold

-18°C

+15°C



Earth without air

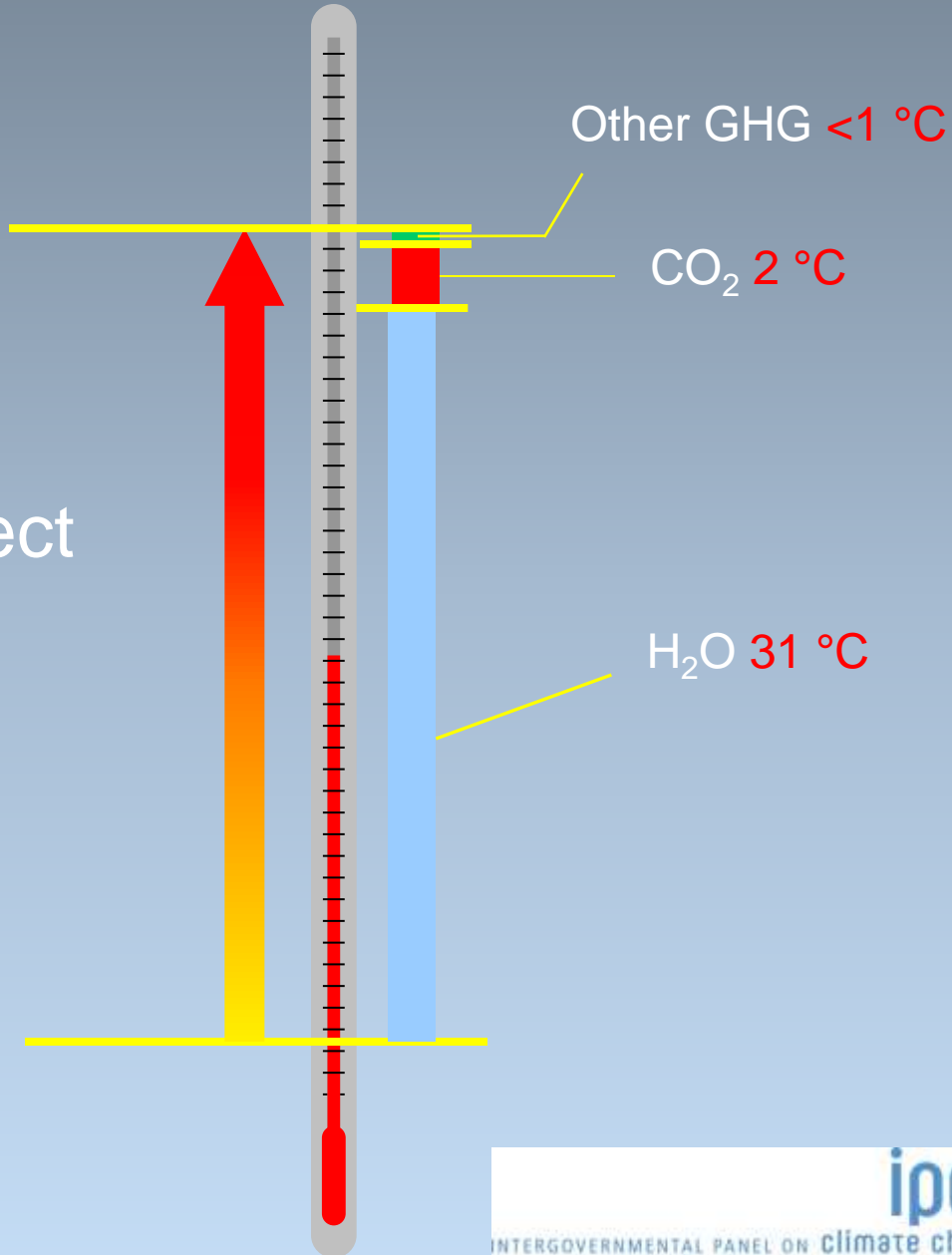


Our planet

Natural GHG effect
33 °C

+15°C

-18°C



But the atmosphere is changing fast because of all the things people are doing (putting gases into the air)

Energy production remains the primary driver of GHG emissions

35%

Energy Sector



24%

Agriculture, forests and other land uses



21%

Industry



14%

Transport



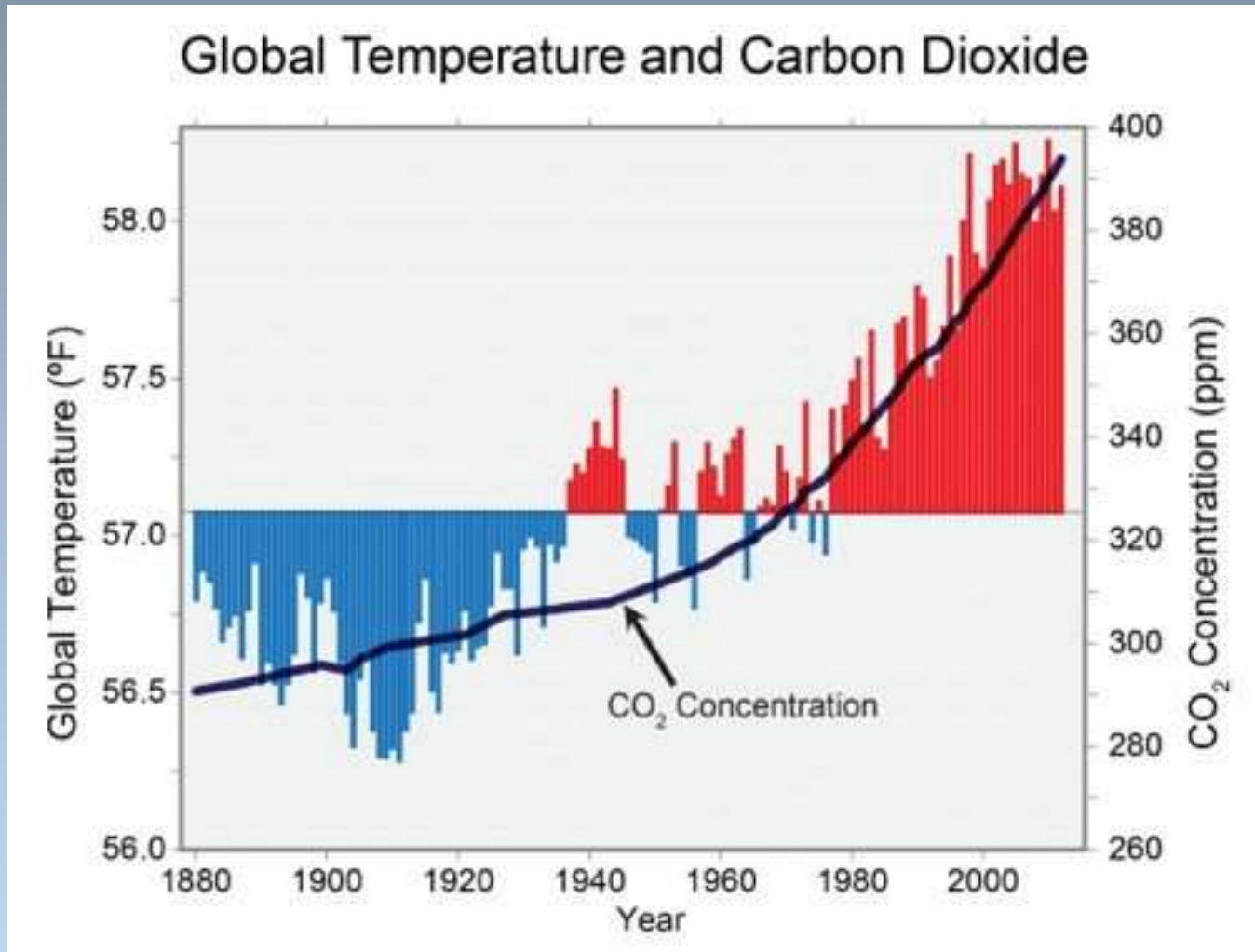
6.4%

Building Sector



2010 GHG emissions

The increase in global temperature is following the atmospheric carbon dioxide

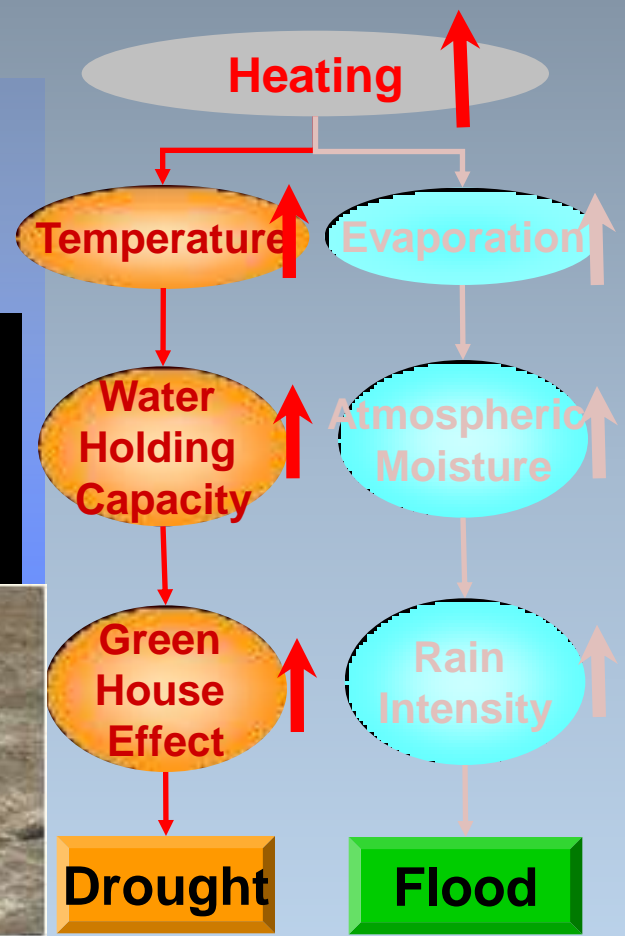
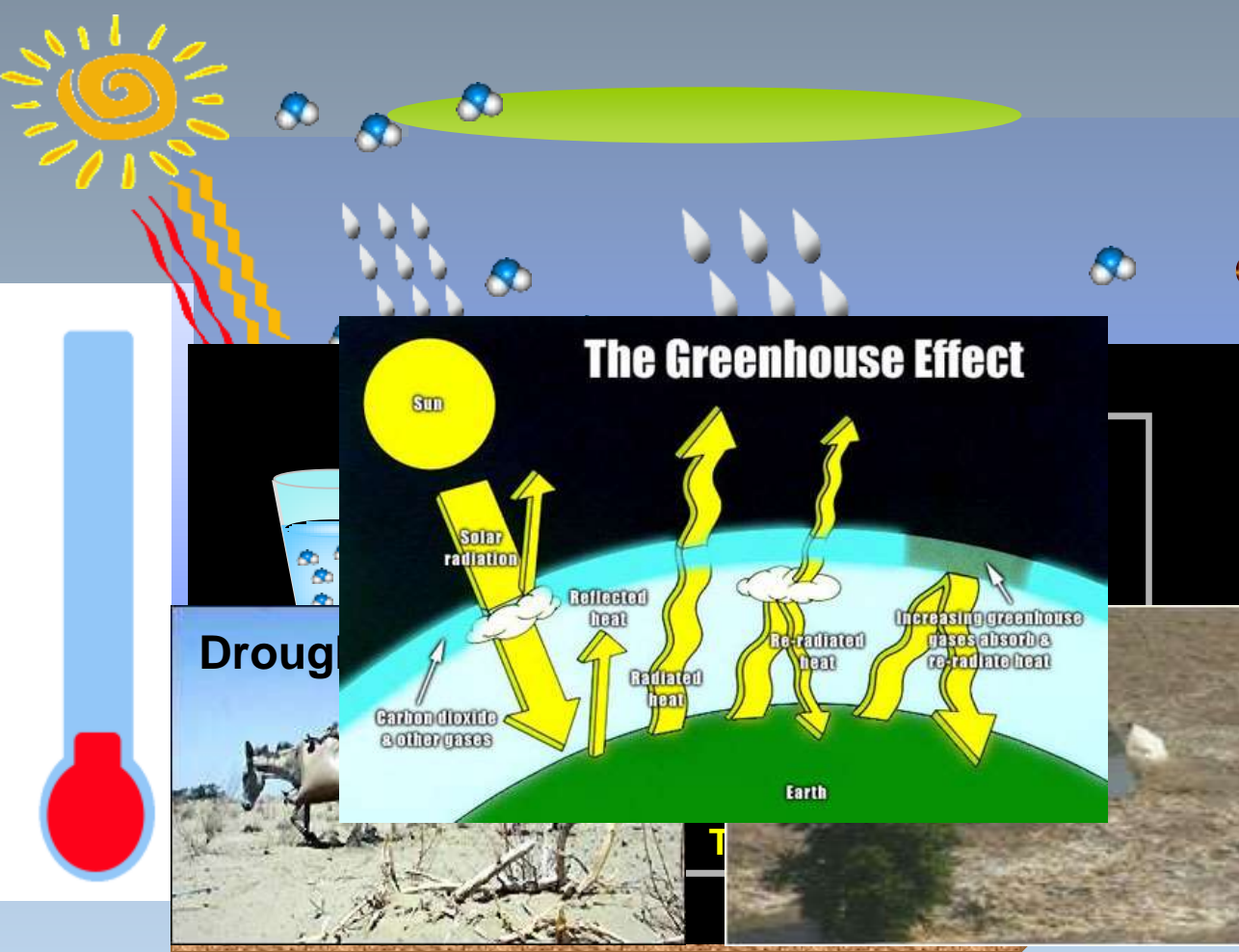


Source: <https://www.globalchange.gov>

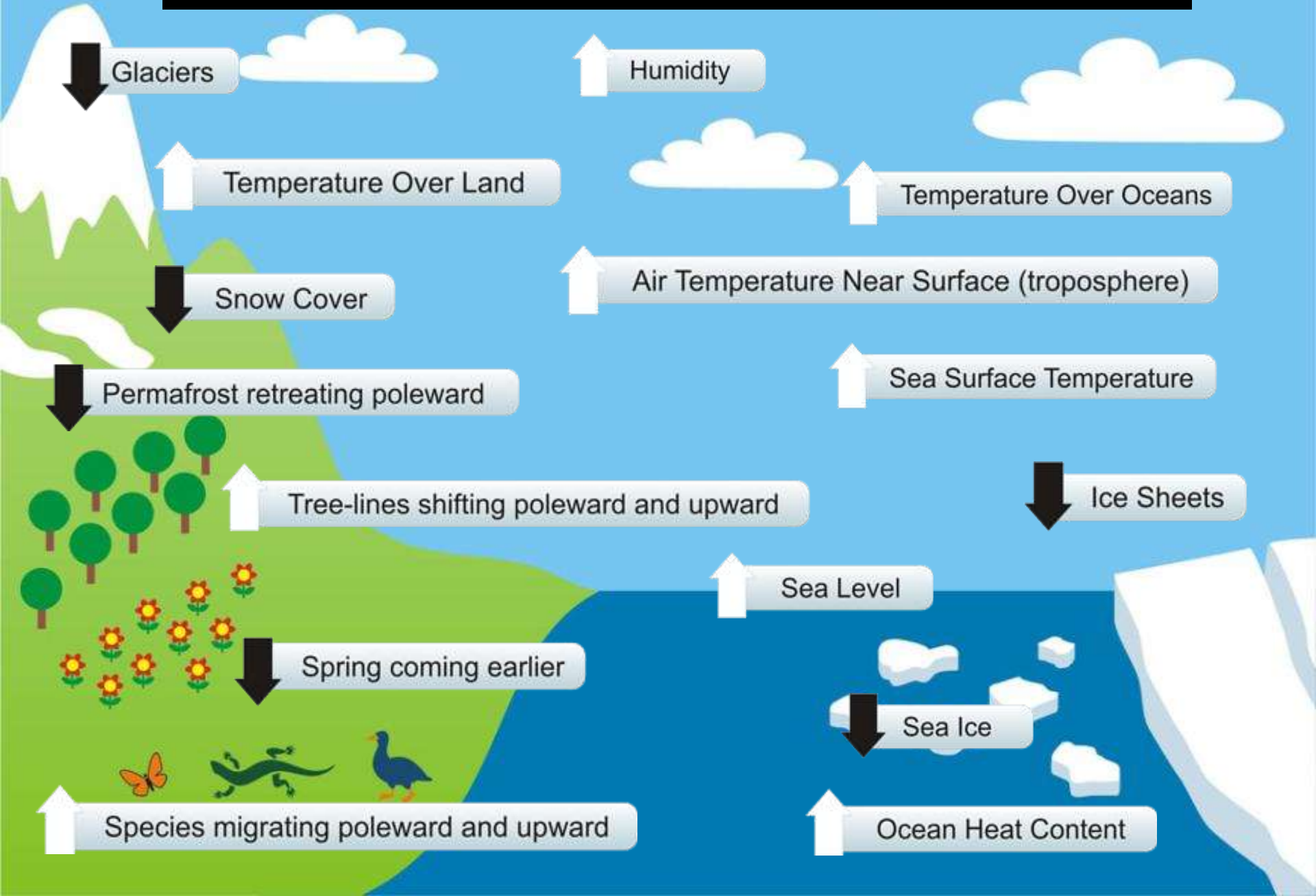
Decadal Global Monthly Temperature (w.r.t. Average 1951-1980)

Decadal Global Summer Temperature in the Northern Hemisphere(w.r.t Average 1951-1980)

Global Warming ; Floods, and droughts



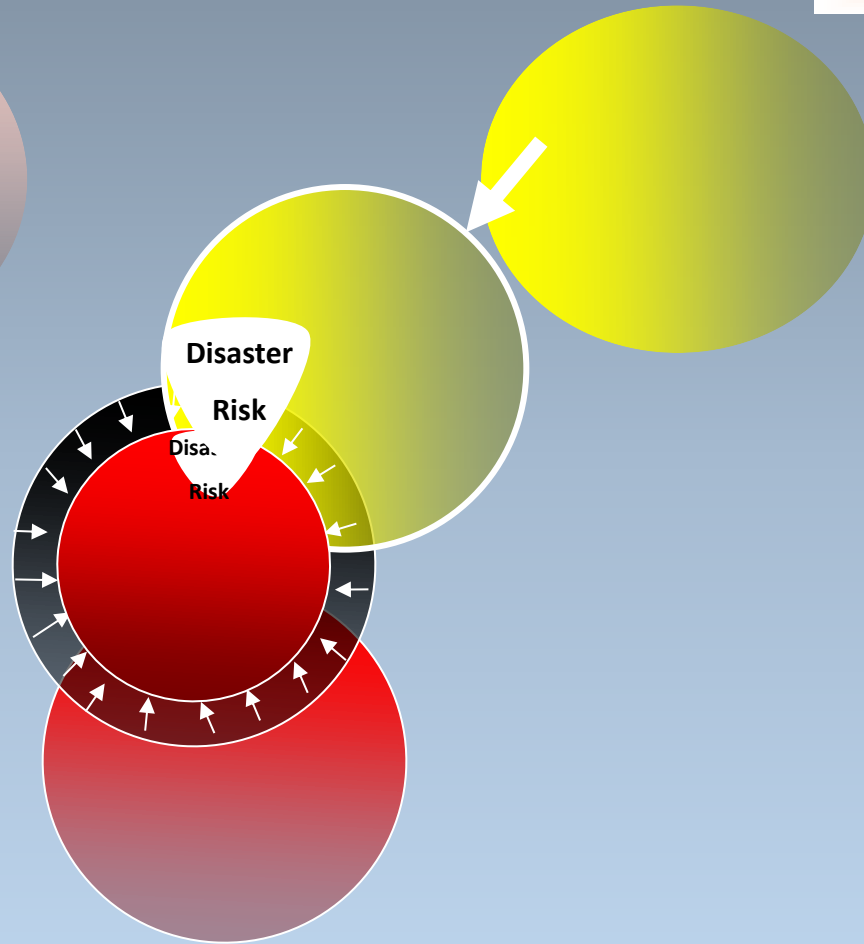
How do we know that the world is warming?



Disaster Risk = f (Hazard, Vulnerability, Exposure)

Hazard

Exposure



Disaster

Risk

Disa.

Risk

Vulnerability

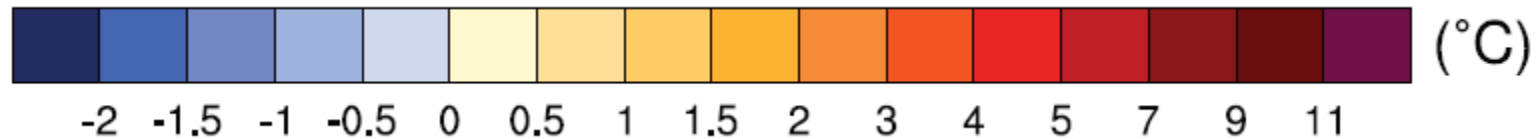
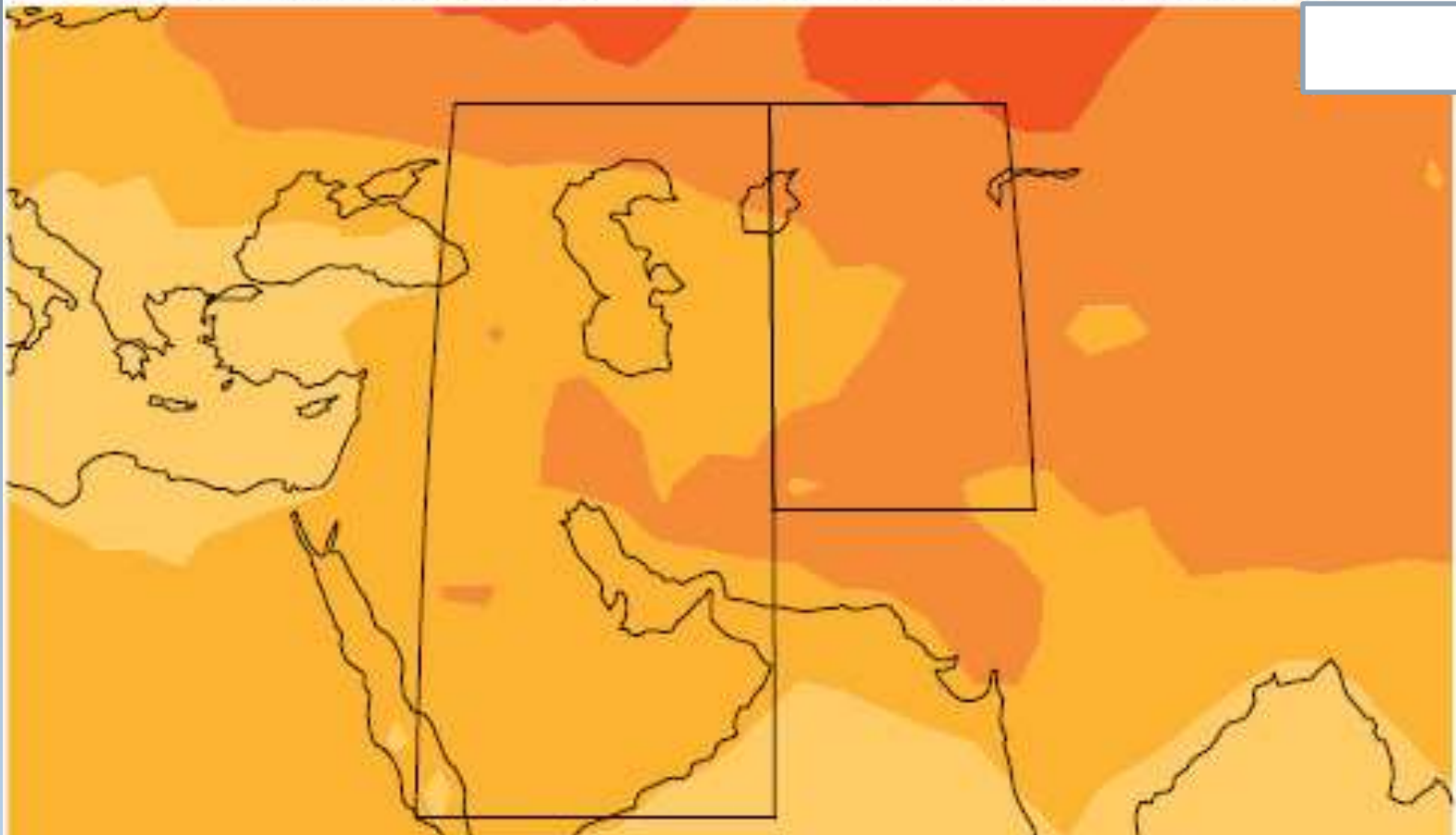
Warming in the climate system
is unequivocal

Human influence on the
climate system is clear

Limiting climate change will require
substantial and sustained reductions
of greenhouse gas emissions

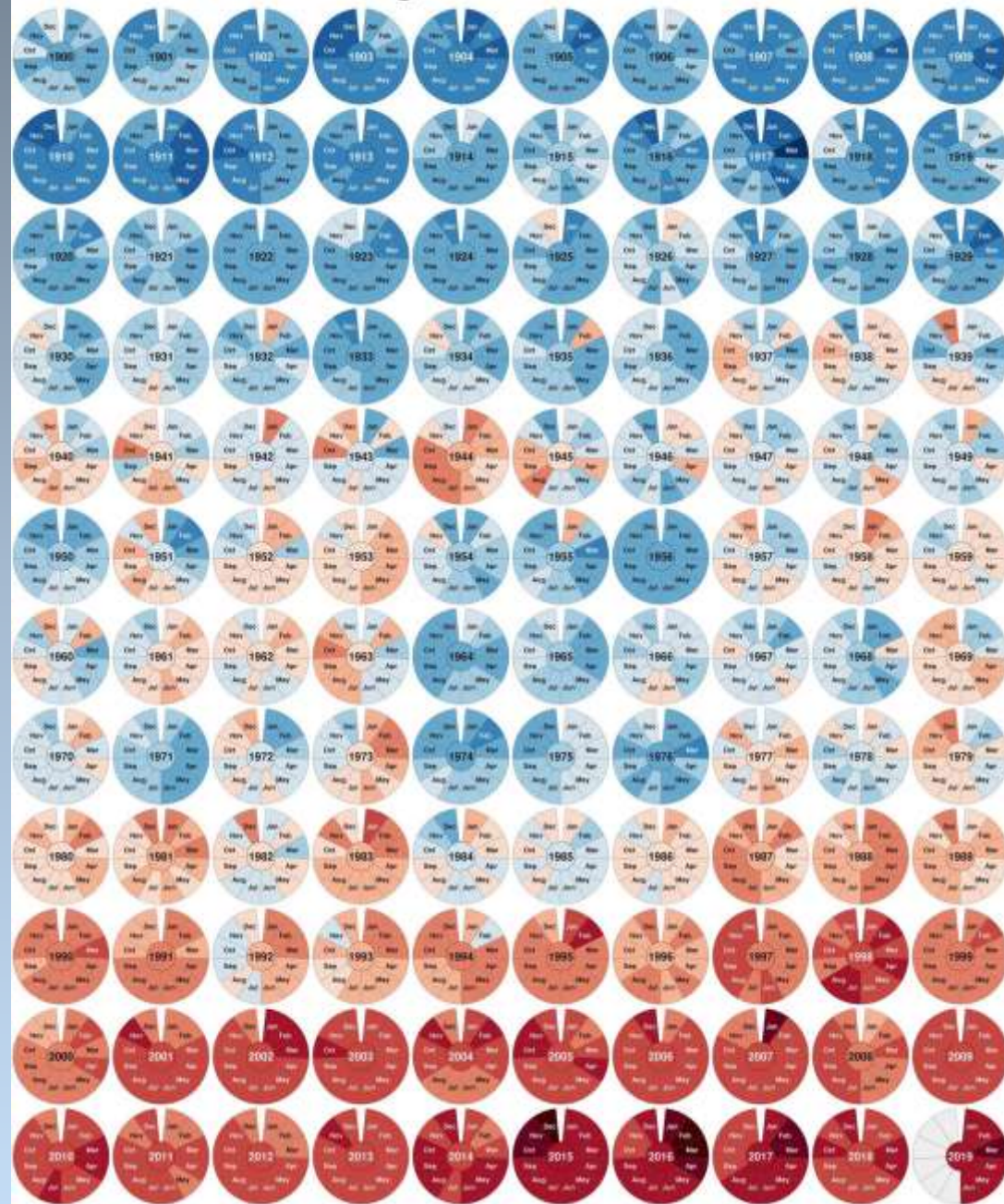
Temperature Change Map Asia – RCP4.5

Temperature change RCP4.5 In 2046-2065: December-February

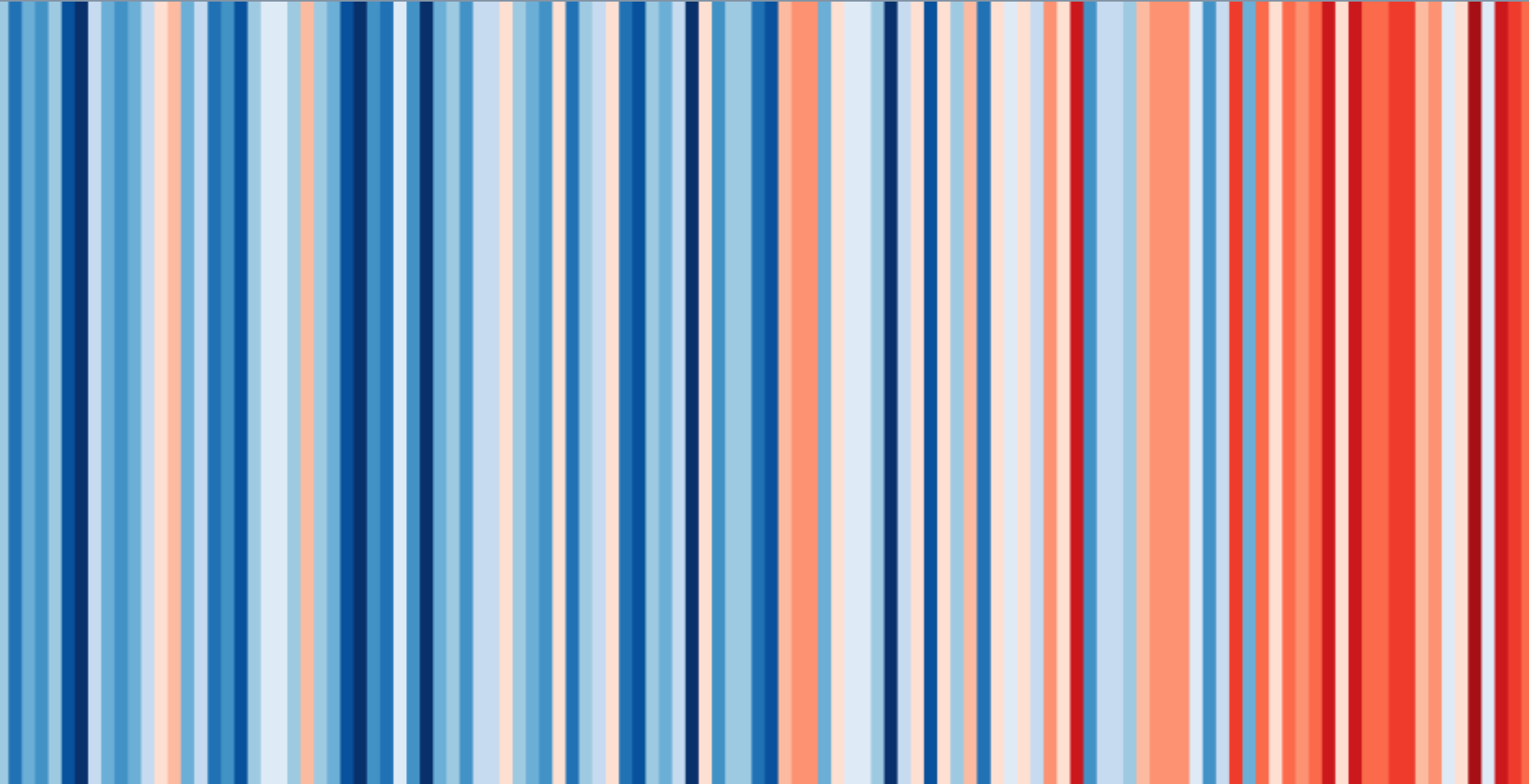


Global monthly temperature 1900 to 2019. Colors indicate temperature compared to 1961-1990 average. The last time we had a cooler than average month was more than 25 years ago in February 1994!

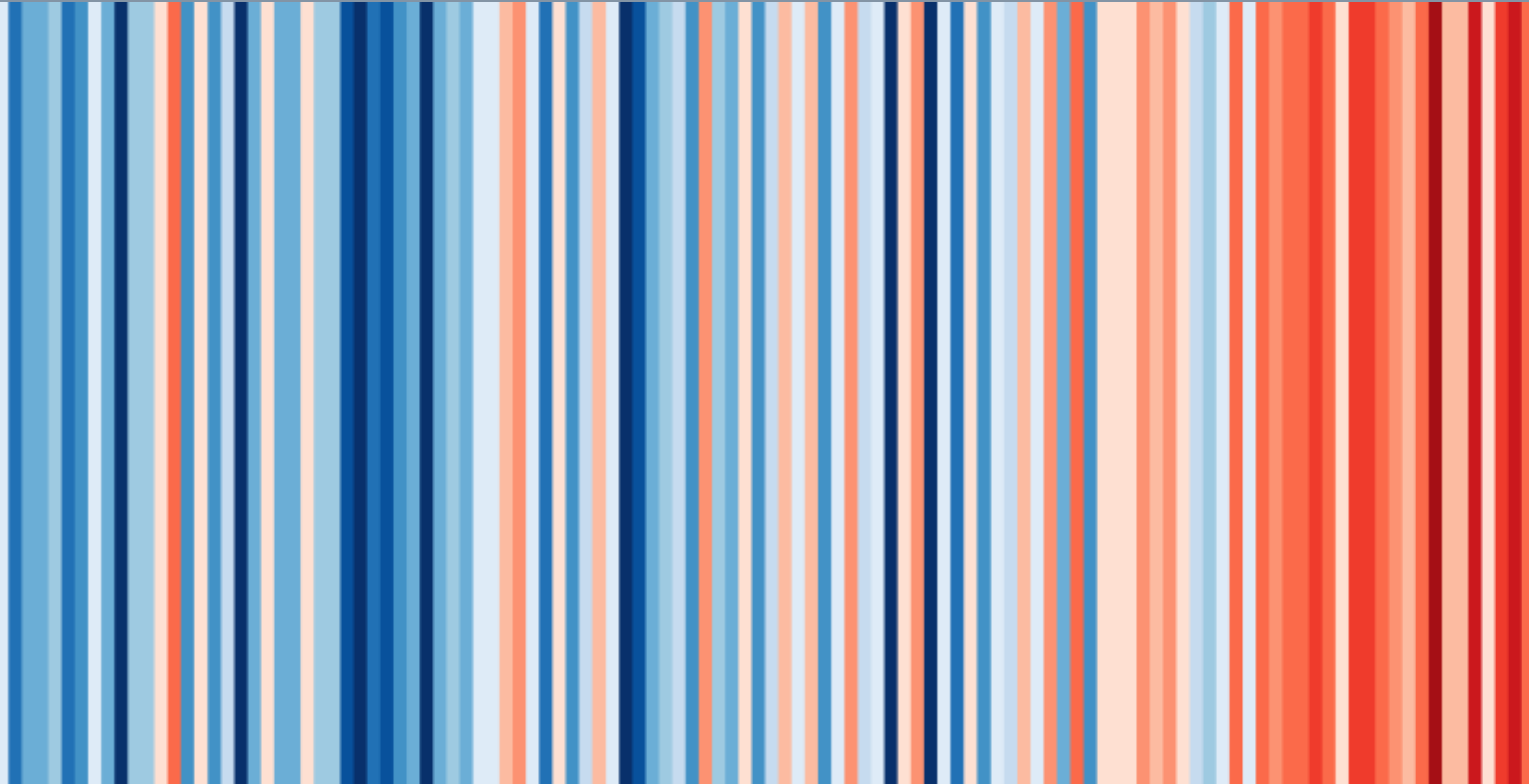
Monthly global mean temperature compared to average for 1961-1990



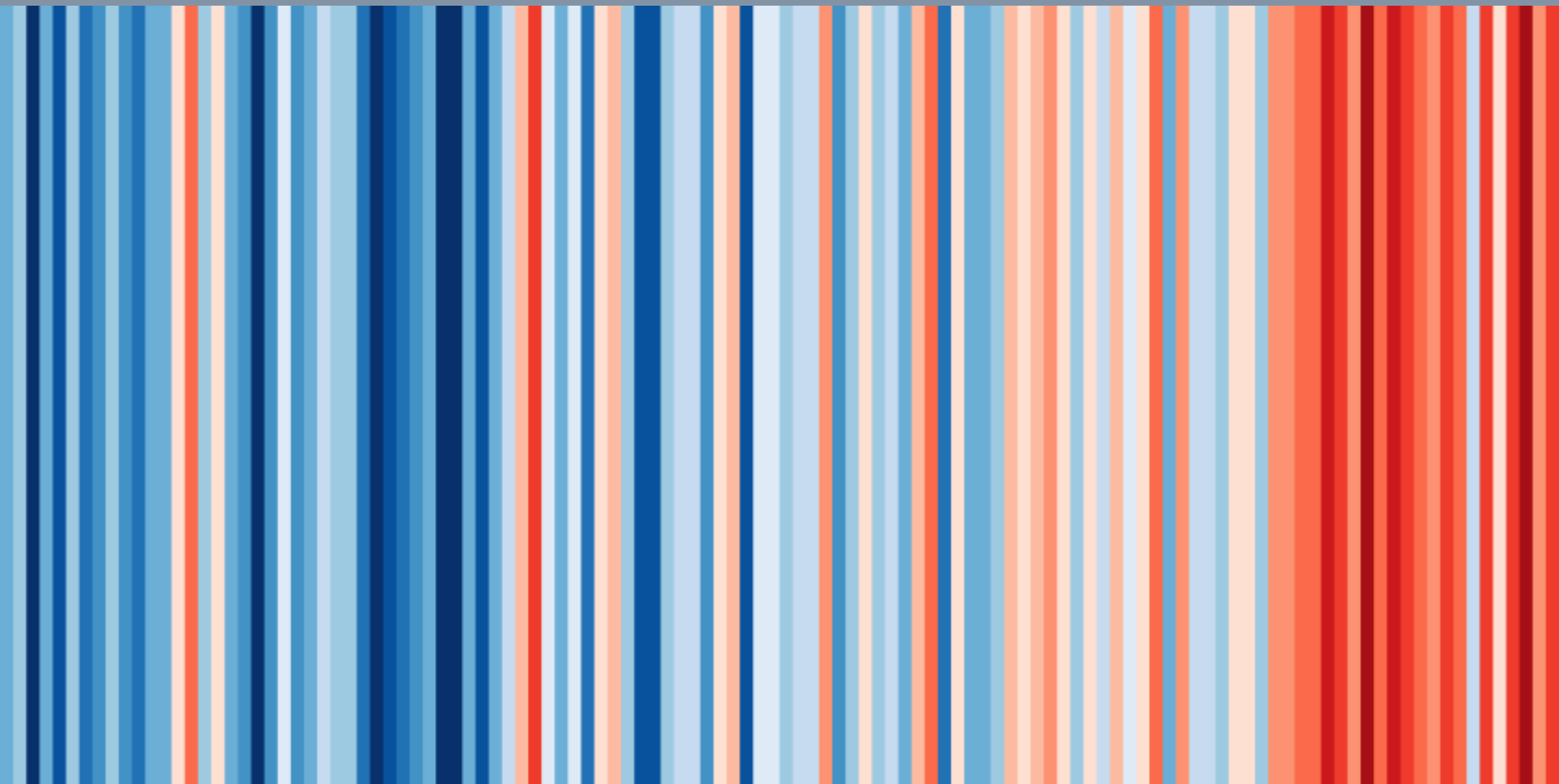
Warming Stripes for Kazakhstan from 1901-2018



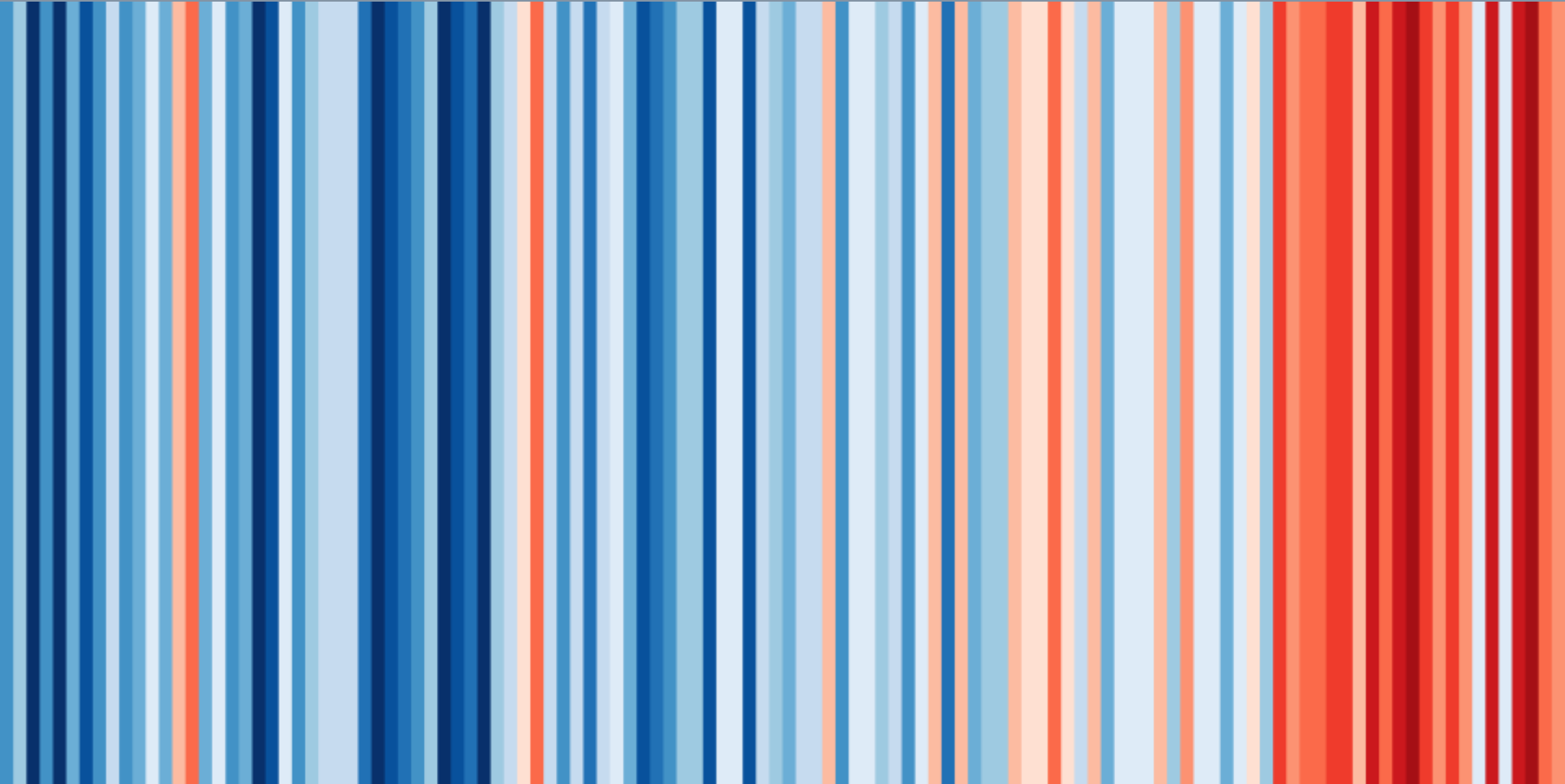
Warming Stripes for Turkmenistan from 1901-2018



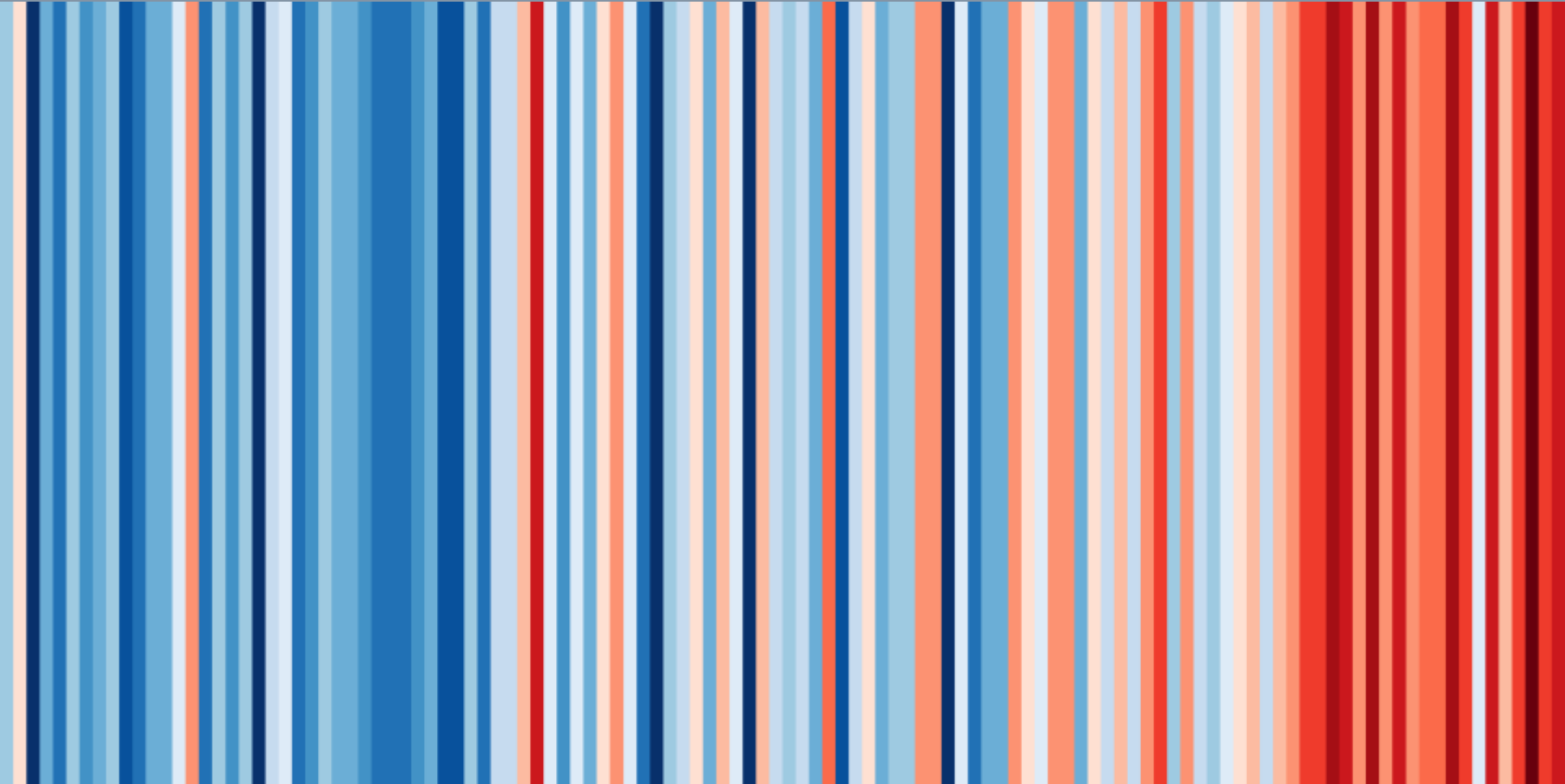
Warming Stripes for Tajikistan from 1901-2018



Warming Stripes for Kyrkizstan from 1901-2018



Warming Stripes for Afghanistan from 1901-2018



Climate Change is a Global Challenge

Weather systems do not respect geographical borders





THE FUTURE

Forty years from now
children will live in a world
shaped by our choices.

THANK YOU FOR YOUR ATTENTION!

For more information:

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IPCC Secretariat: ipcc-sec@wmo.int

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