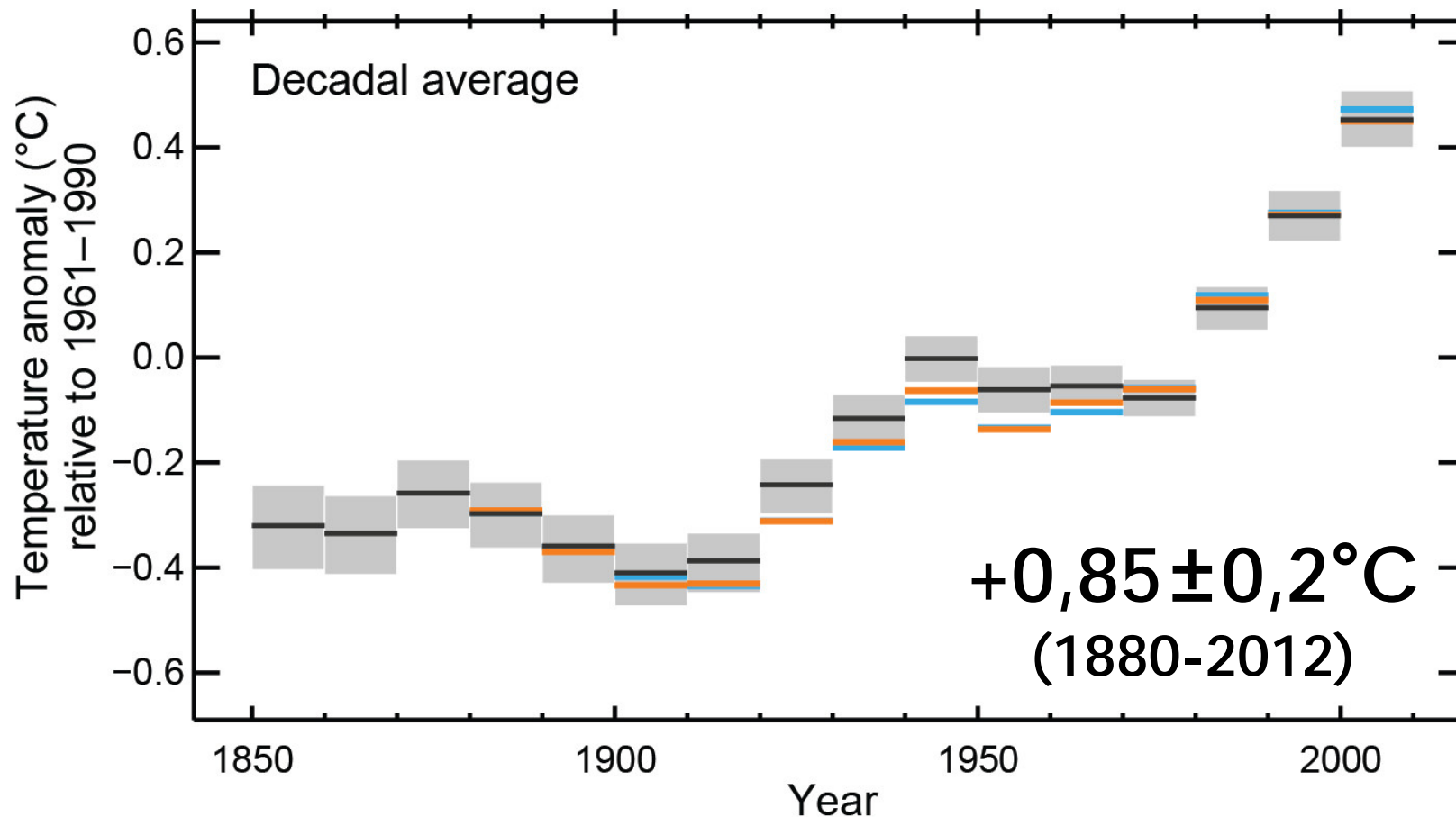


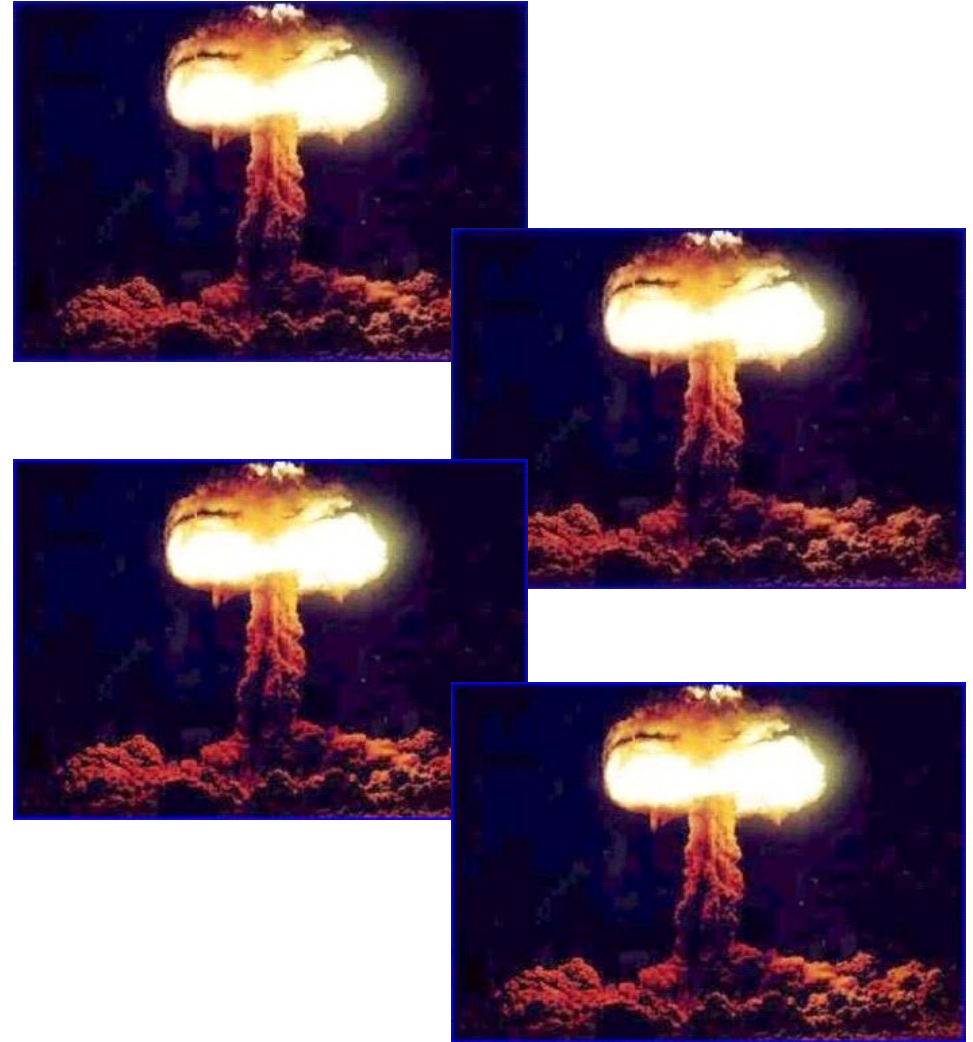
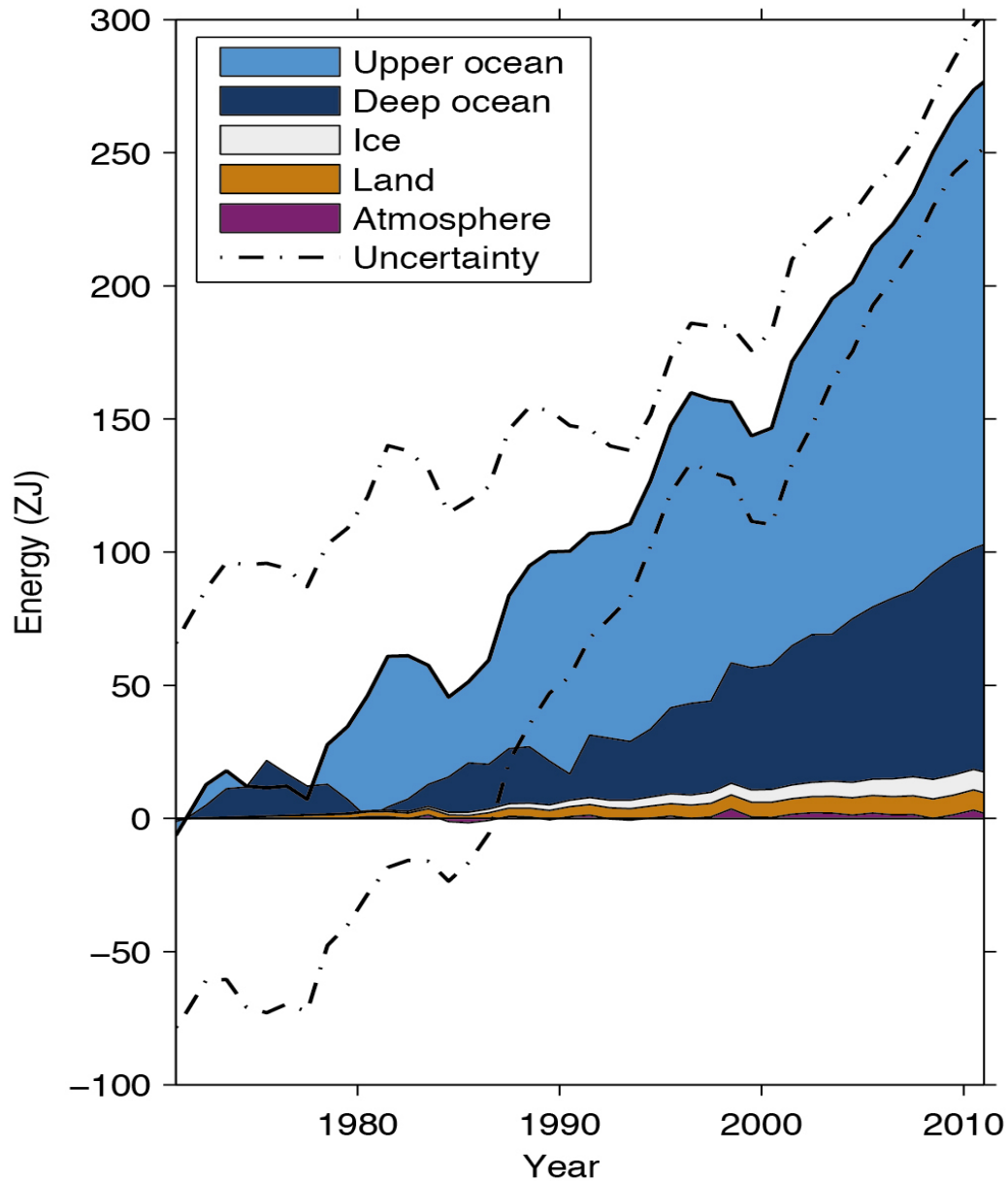
Summary of the main findings
of IPCC AR5
on climate scenarios,
their implications for mitigation
and the likely climate change
impacts for the SEE region

IPCC main observations

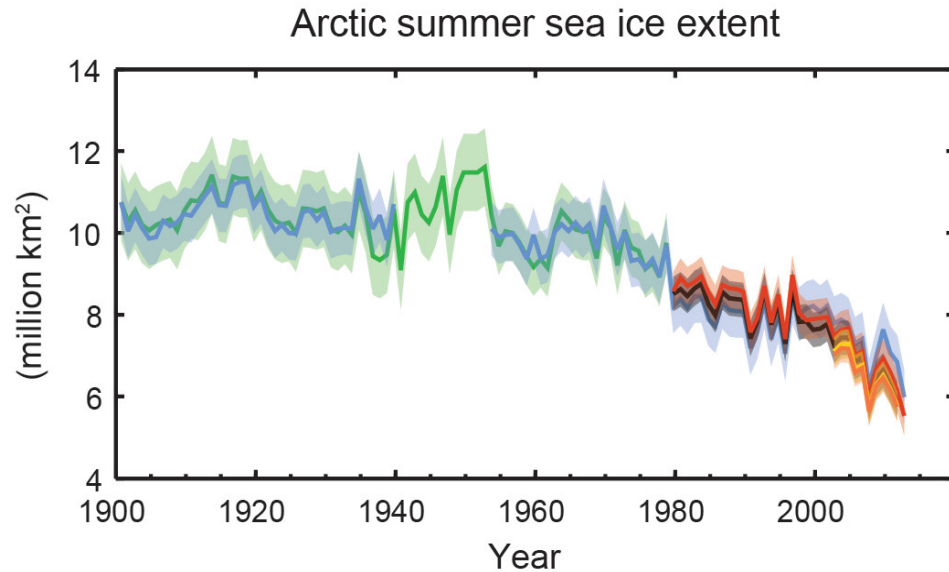
Observed globally averaged combined land and ocean
surface temperature anomaly 1850–2012



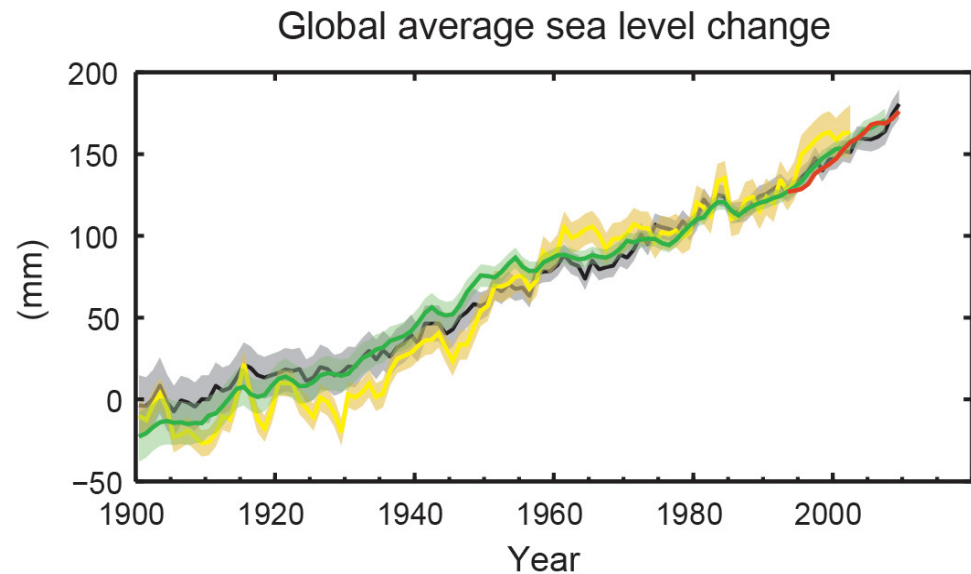
IPCC main observations



IPCC main observations

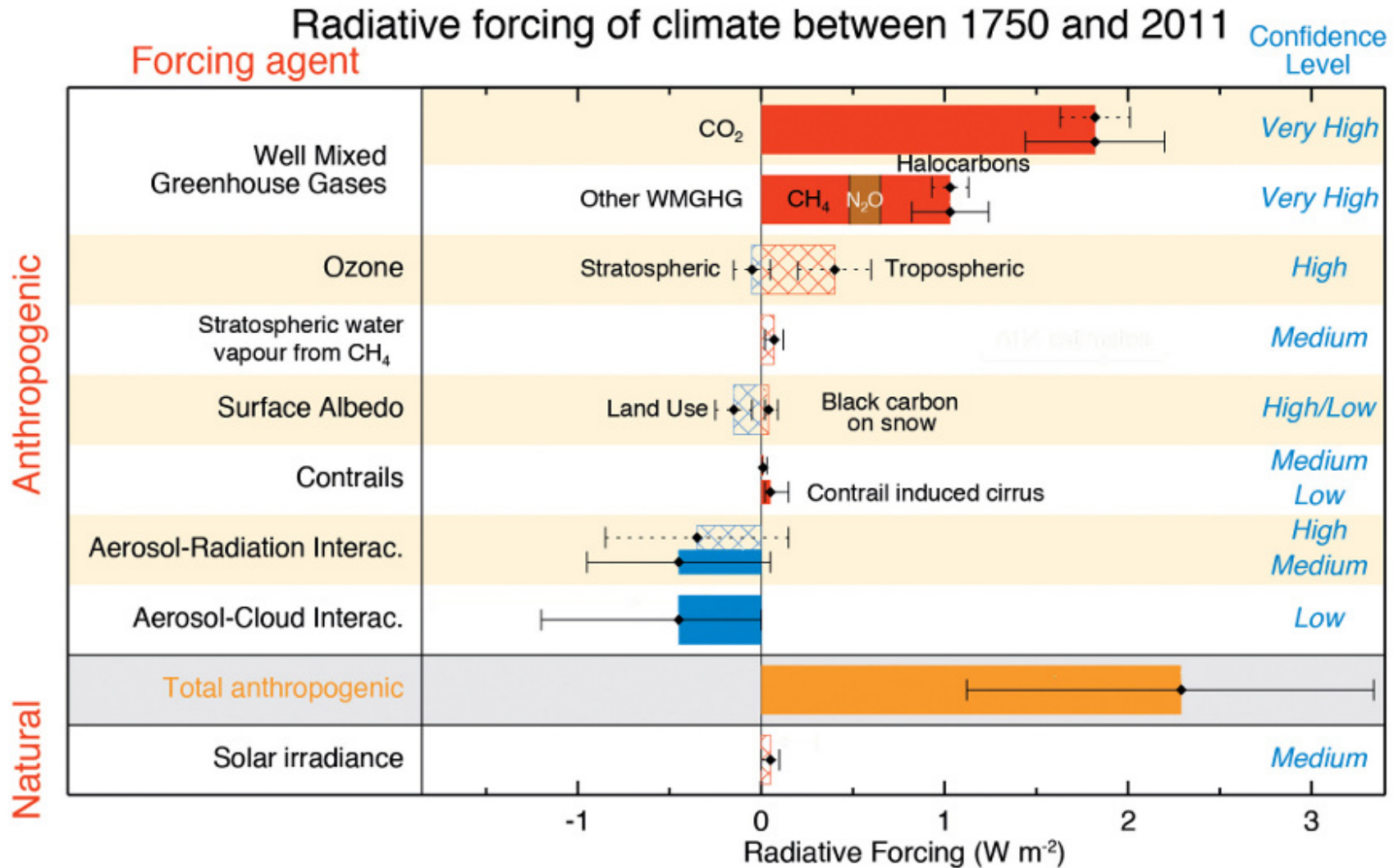


**$-(3,5:4,1)\%/10\text{ys}$
(1979-2012)**

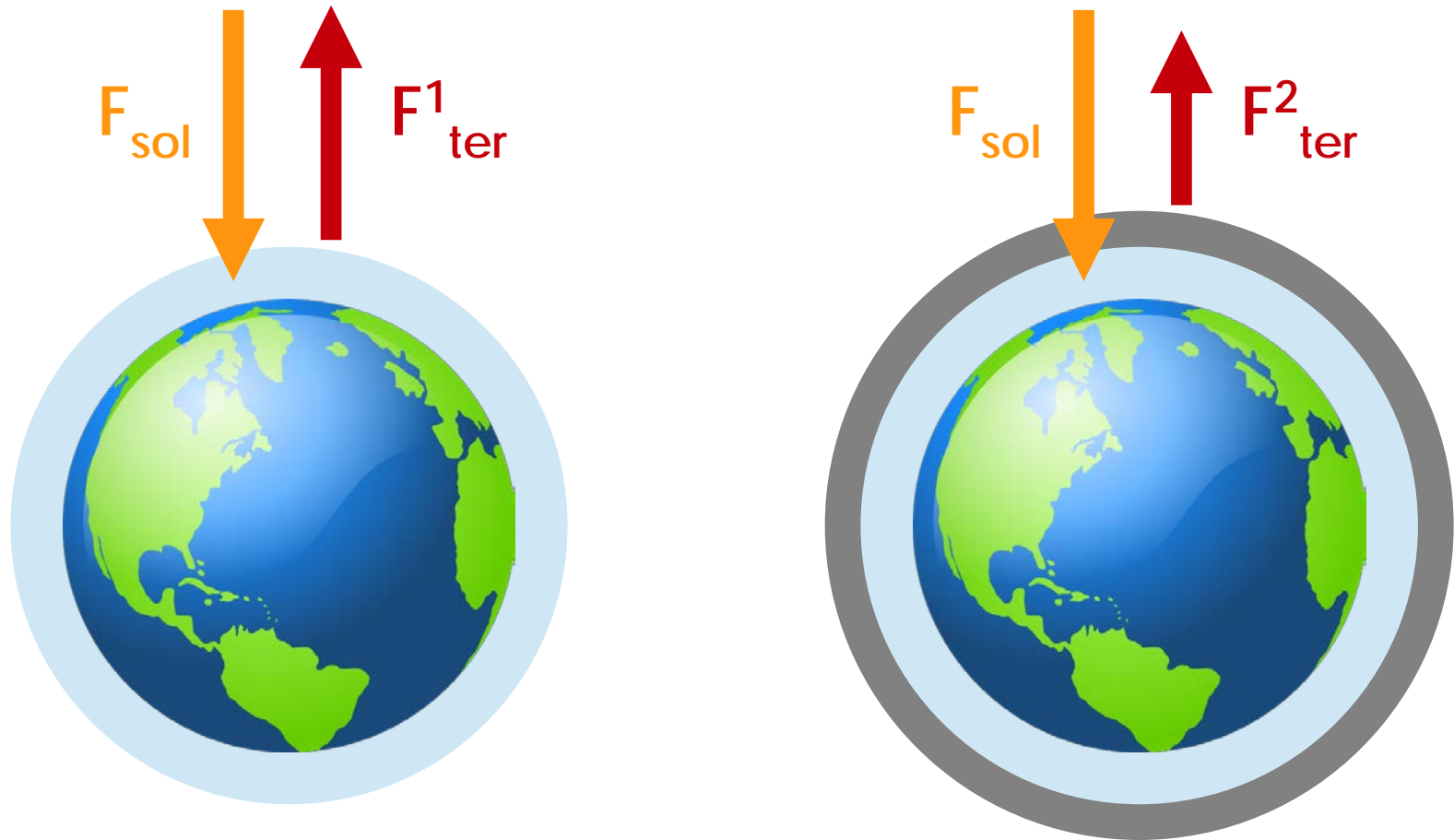


**$+ 19 \pm 2\text{cm}$
(1901-2010)**

Radiative Forcing [W/m²]

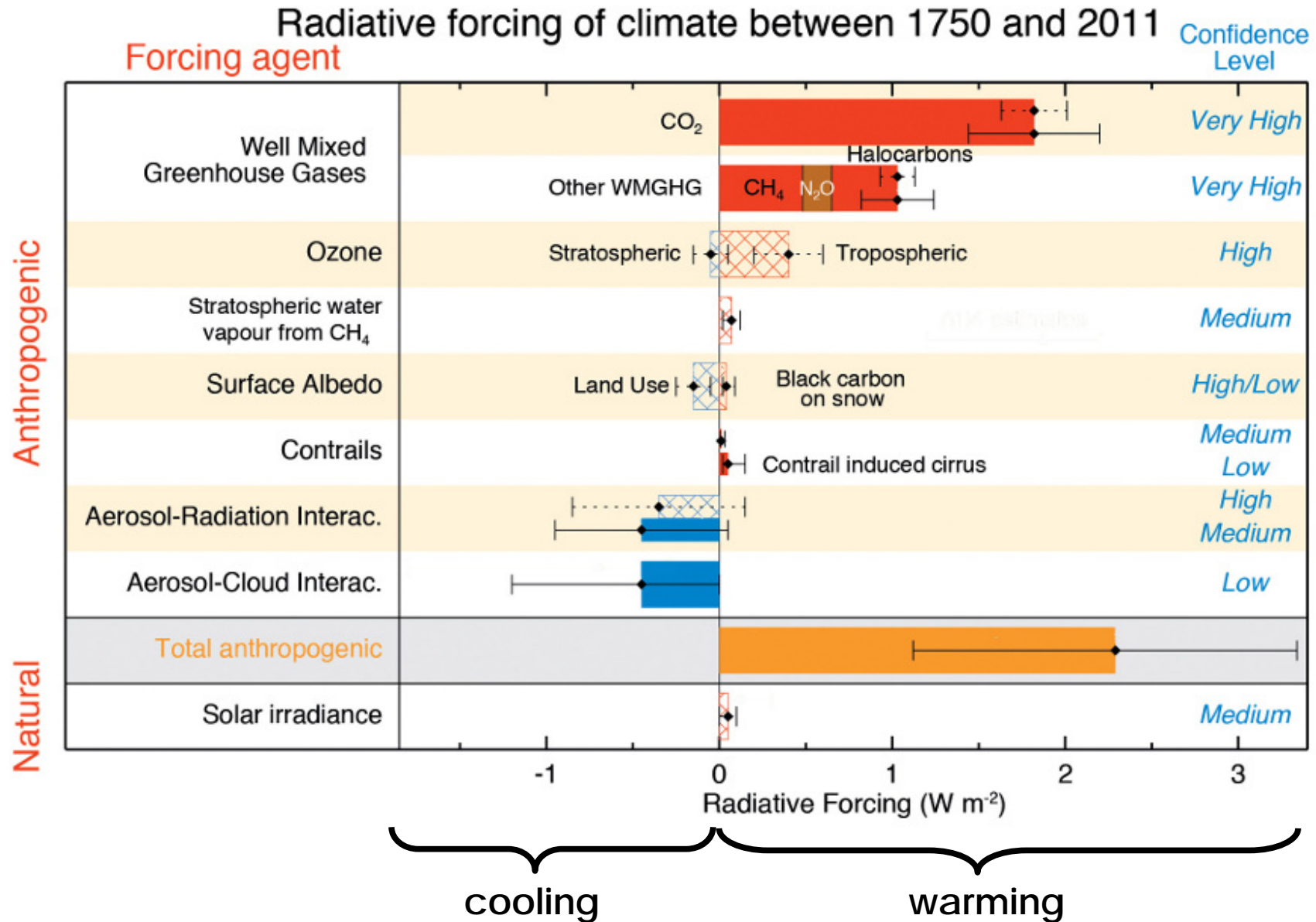


Radiative Forcing [W/m²]



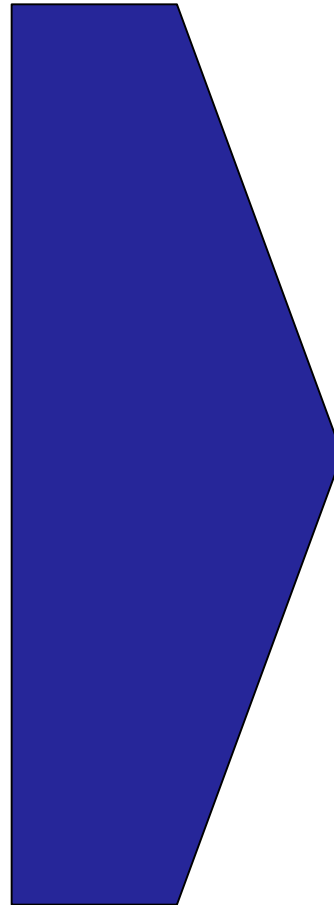
$$\text{RF} = F_{\text{ter}}^1 - F_{\text{ter}}^2$$

Radiative Forcing [W/m²]



Climate modelling

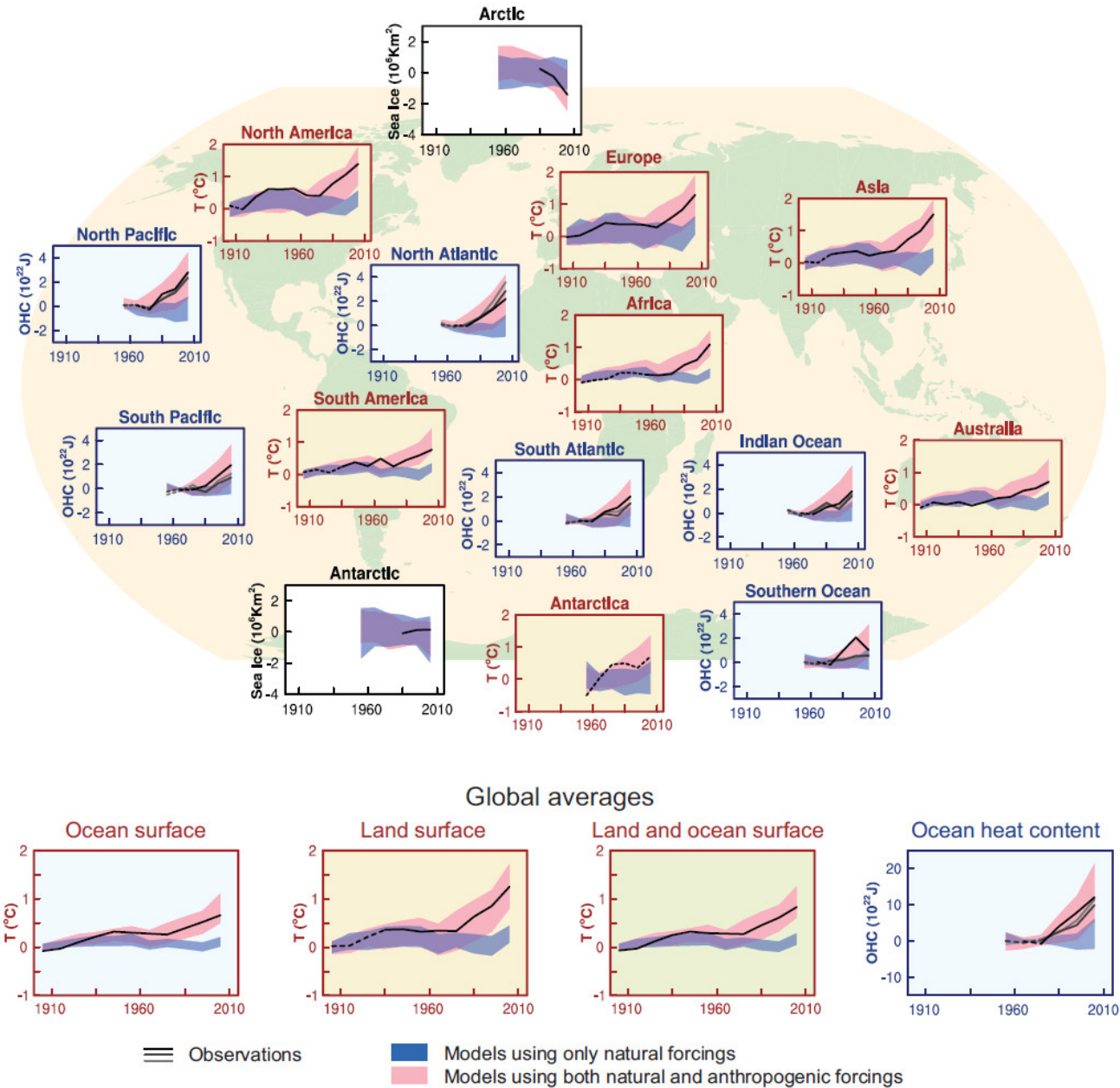
$$F = mg$$



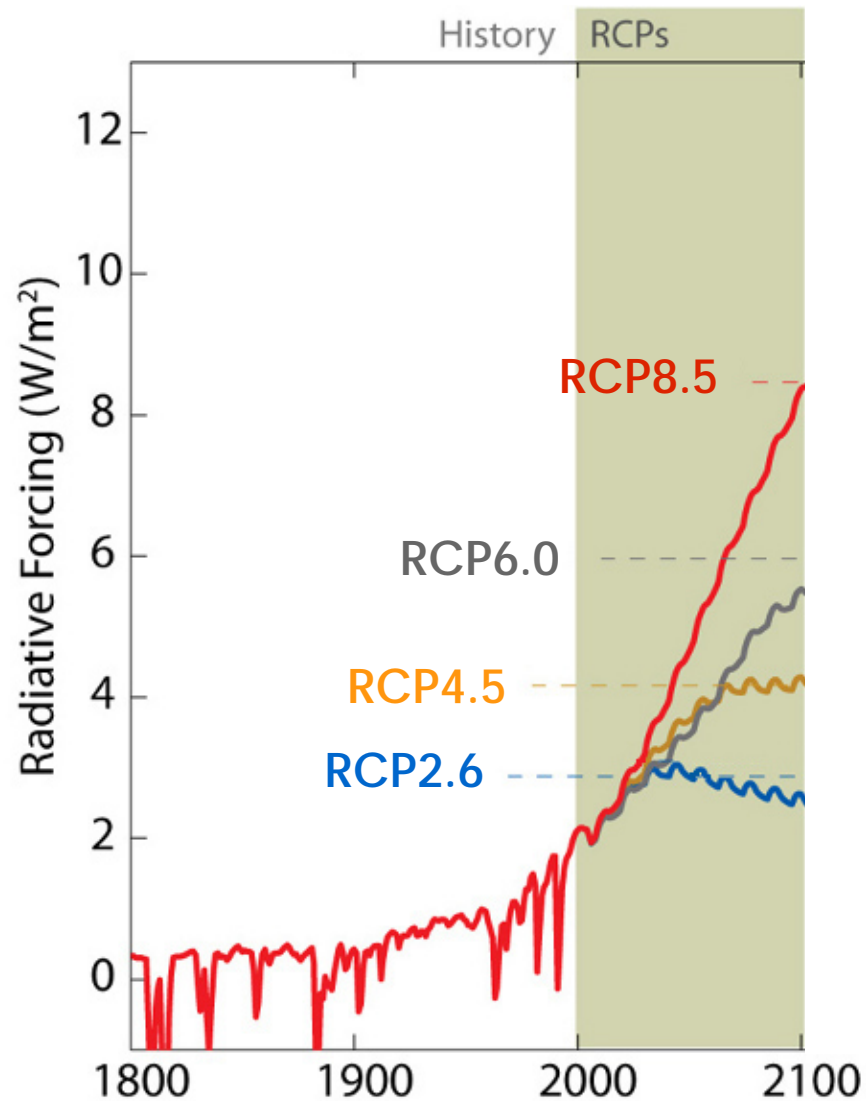
Podstawowy układ równań:
Równanie ruchu powietrza: $\frac{d\vec{v}}{dt} = -2\vec{\Omega} \times \vec{v} - \frac{1}{\rho} \nabla p + \vec{g} + \vec{F}_e$
z uwzględnieniem równowagi hydrostatycznej:
$$\left\{ \begin{array}{l} \frac{du}{dt} - f v = -\frac{1}{\rho} \frac{\partial p}{\partial x} \\ \frac{dv}{dt} + f u = -\frac{1}{\rho} \frac{\partial p}{\partial y} \end{array} \right\}$$
 równ. kwadratowe
 $\frac{\partial \rho}{\partial t} = -\nabla \cdot (\rho \vec{v})$
 $\frac{d\theta}{dt} = 0$ (wzrost energii) (z równ. energii) (z równ. energii)
 $c_p \frac{dT}{dt} + p \frac{d\alpha}{dt} = \dot{Q}$ (z równ. energii)
Dla potrzeby umieszczenia i przeniesienia adiabaty jest to układ równań, wykorzystywany do prognozowania.



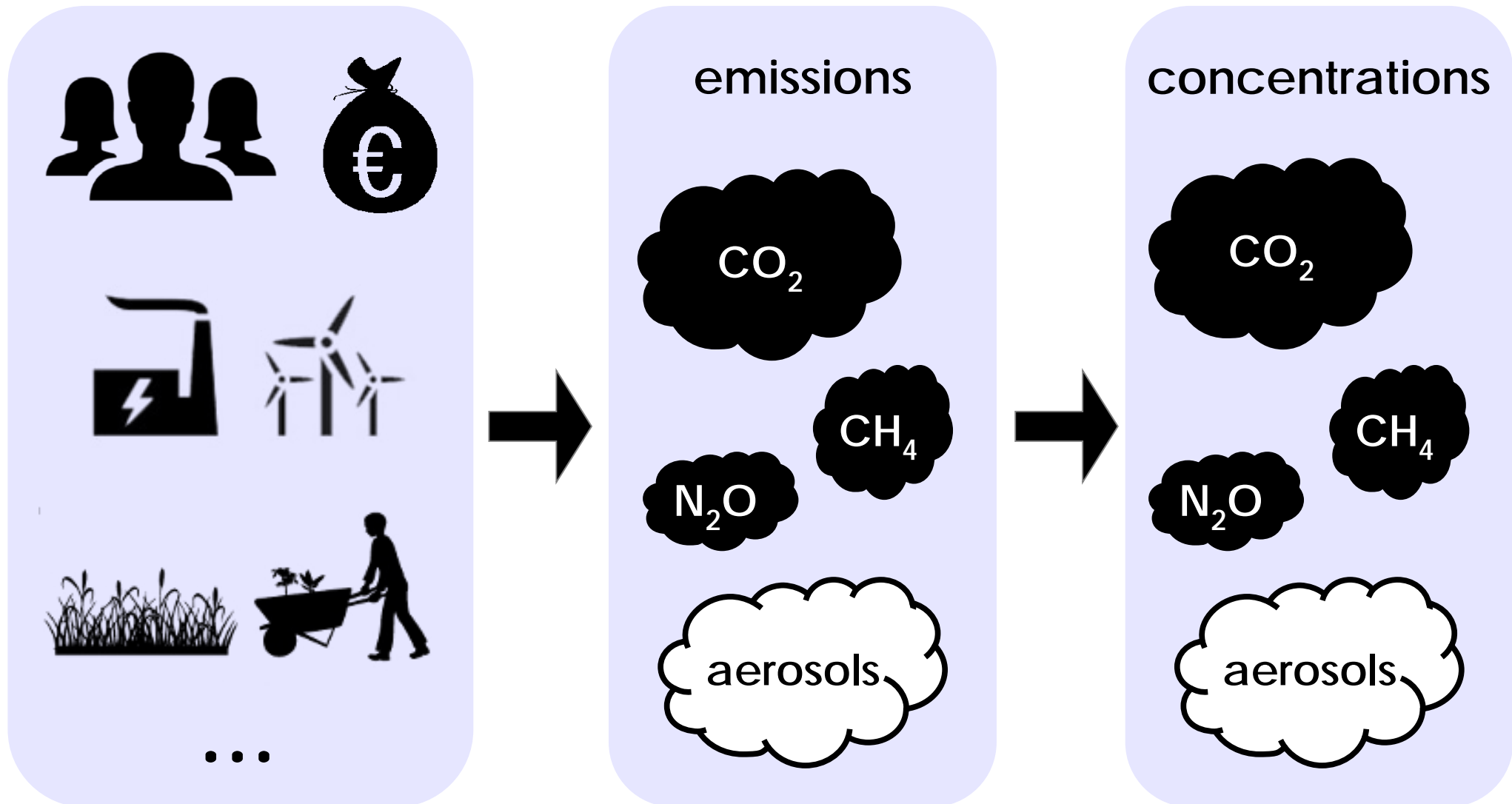
Climate modelling



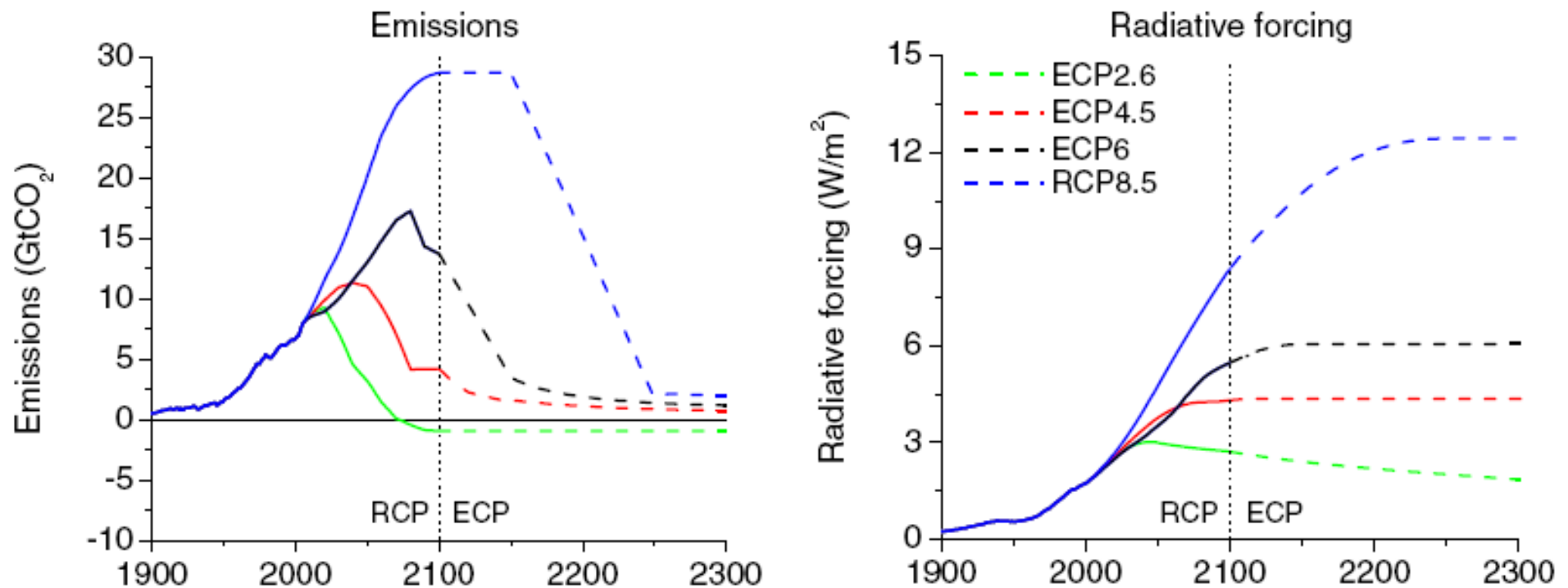
Representative Concentration Pathways



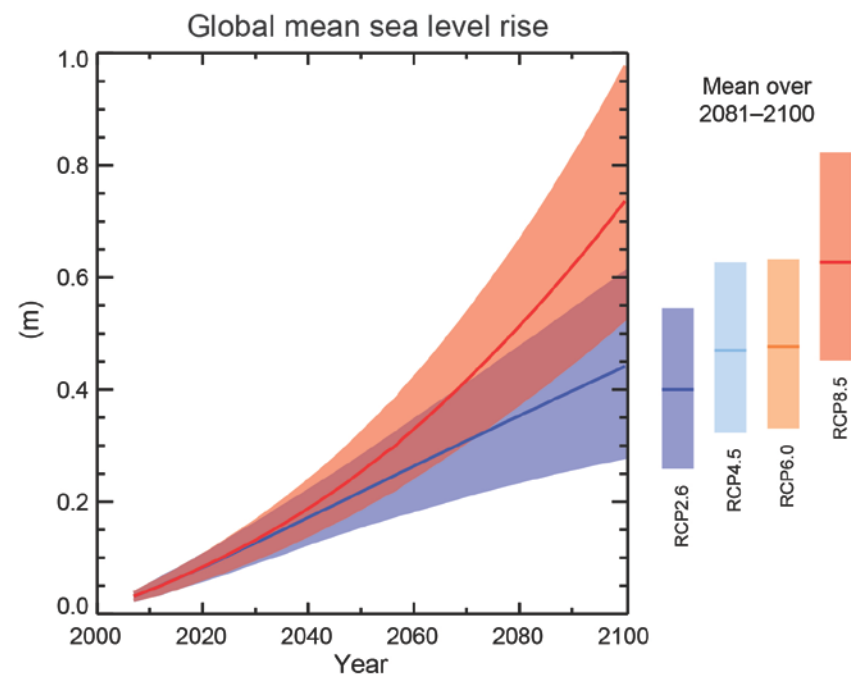
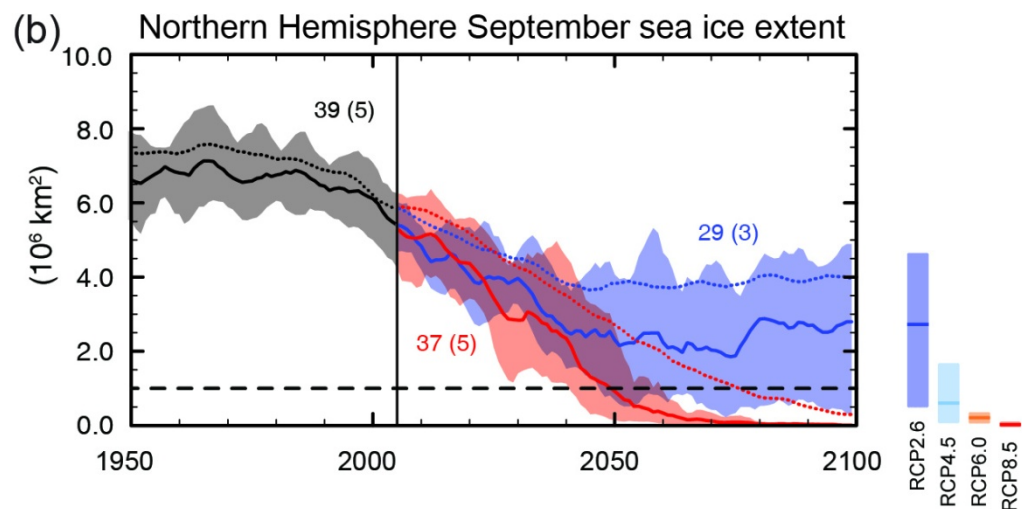
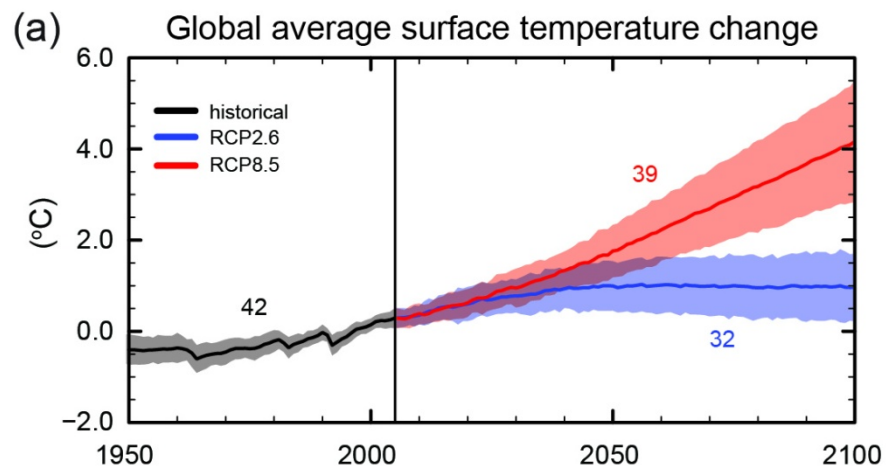
Representative Concentration Pathways



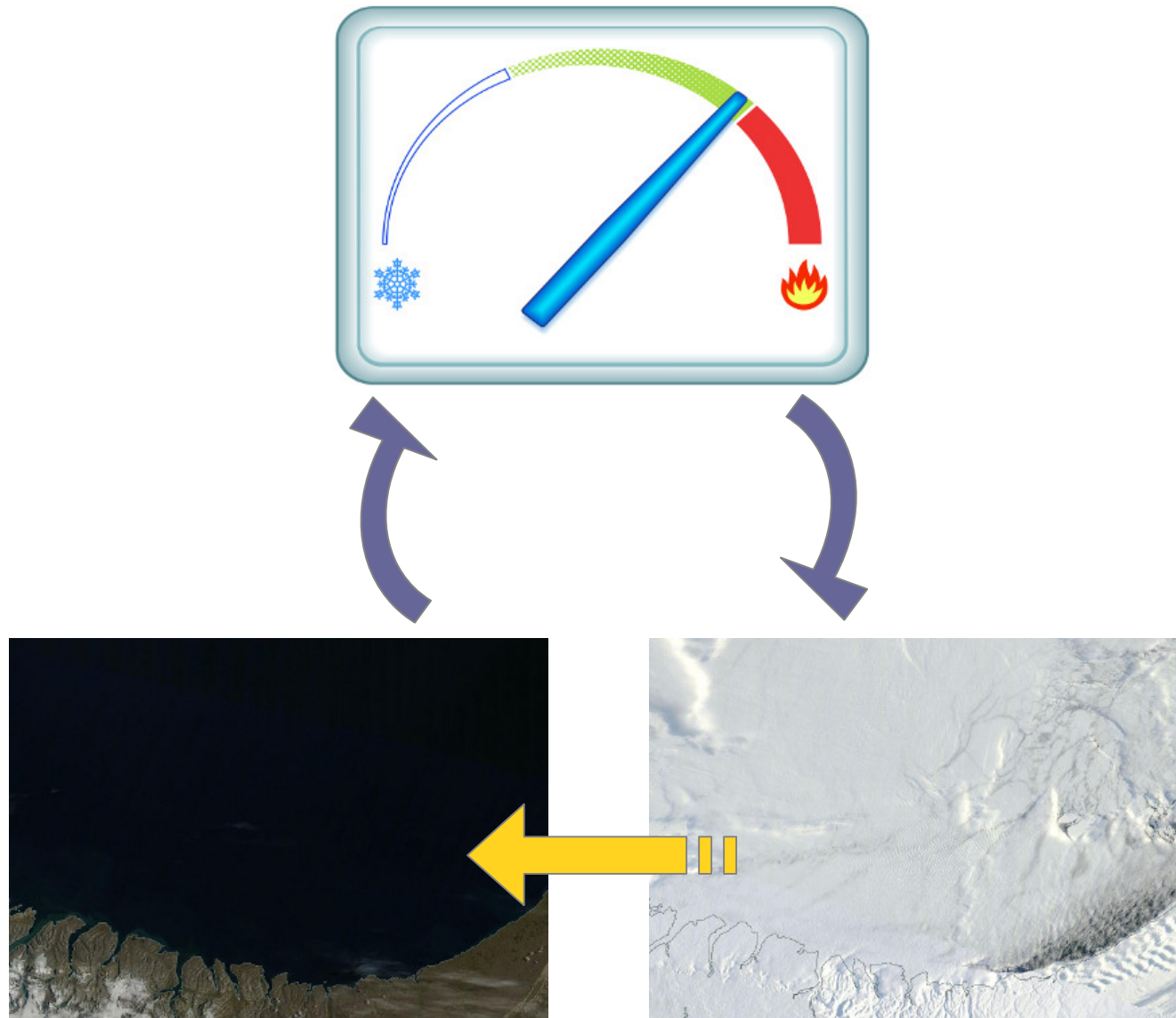
Representative Concentration Pathways



Climate projections

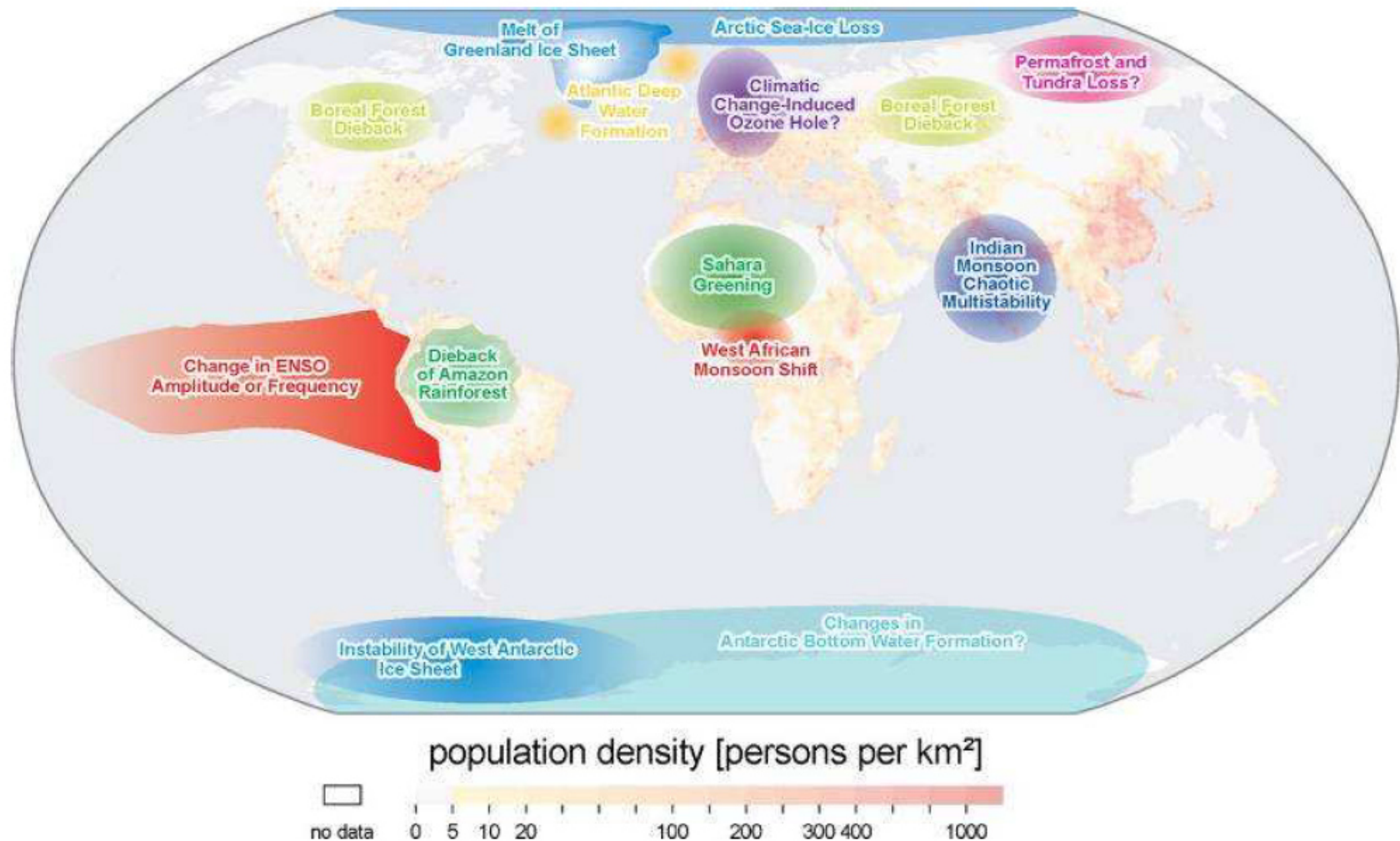


Climate feedbacks

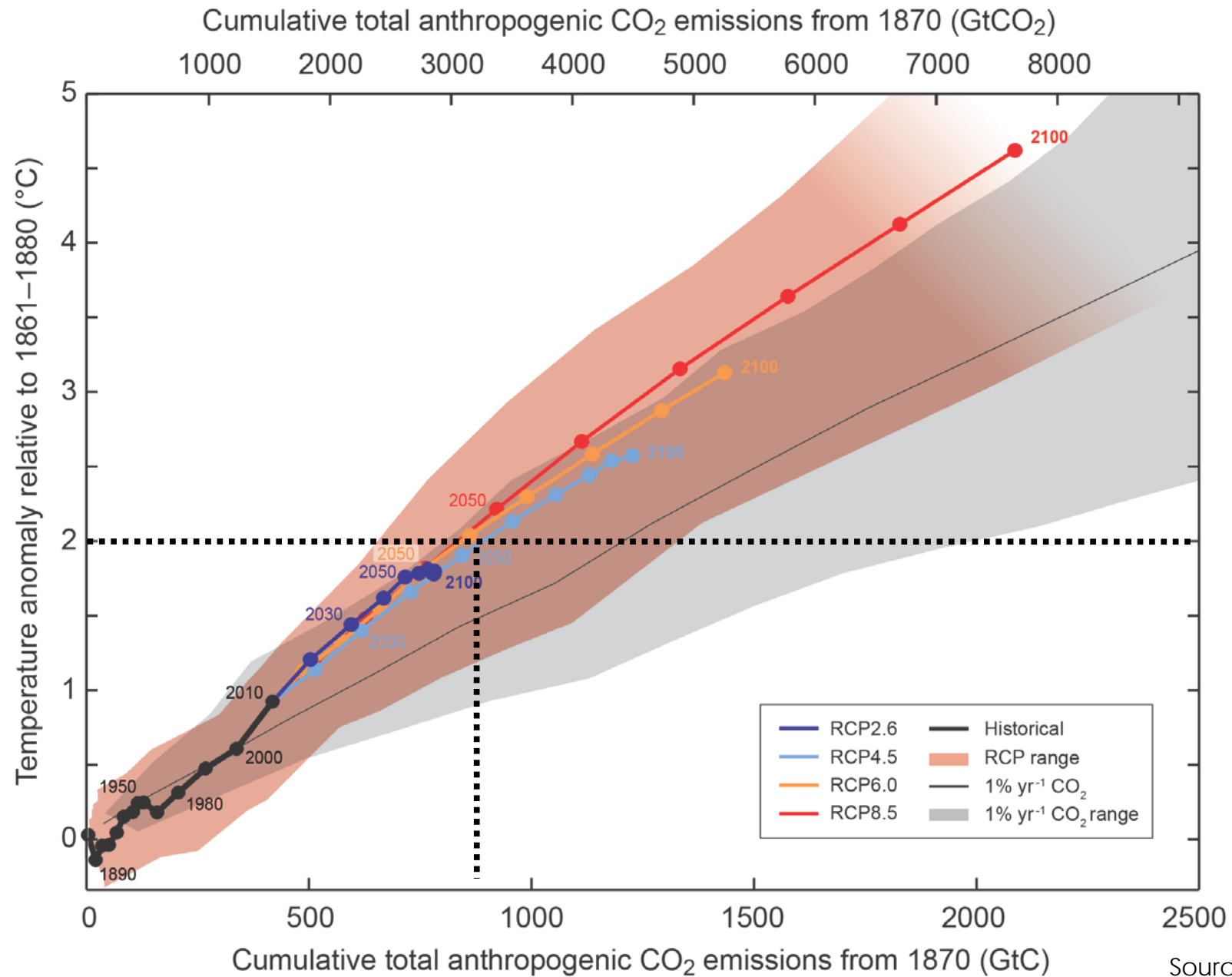


Tipping points

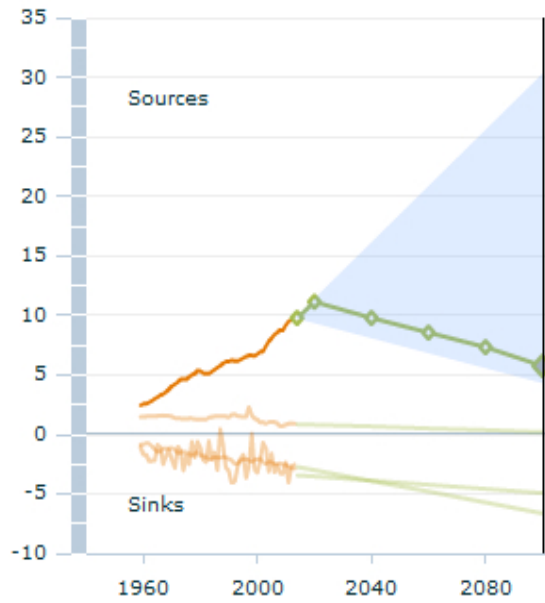
Potential future tipping elements in the climate system, overlain on global human populations density, as identified by Lenton et al. (2008)



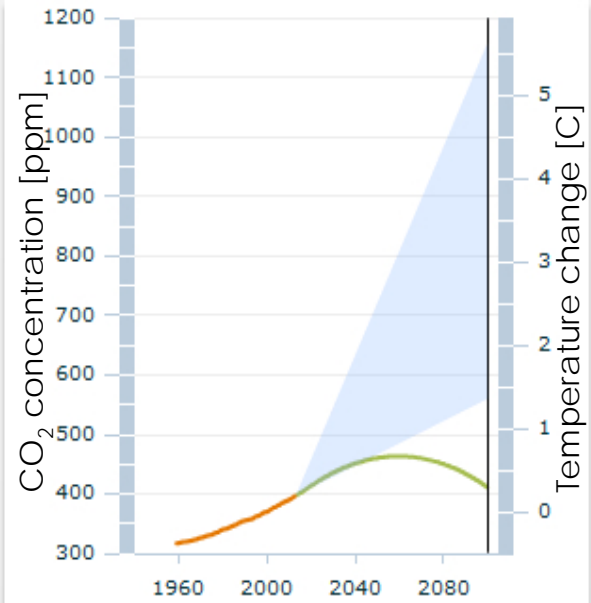
Mitigation



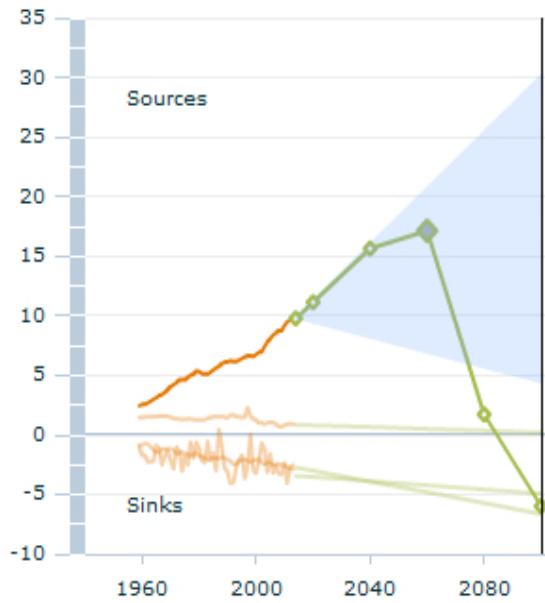
Sources and Sinks in PgC/yr, actual and projected



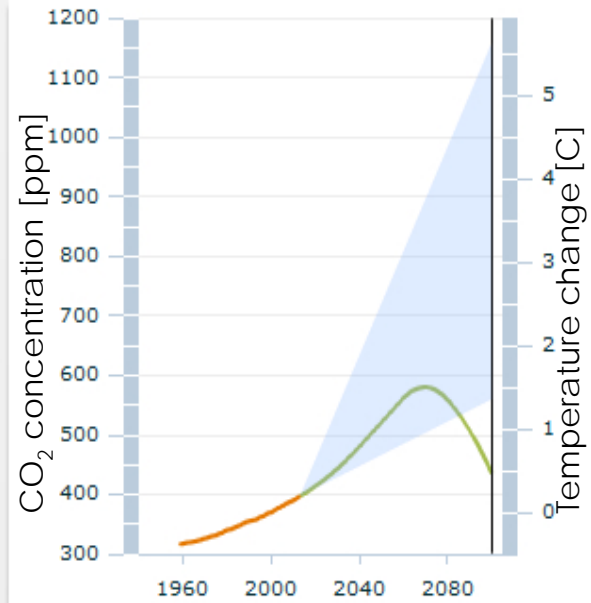
Atmospheric CO₂, actual and projected



Sources and Sinks in PgC/yr, actual and projected

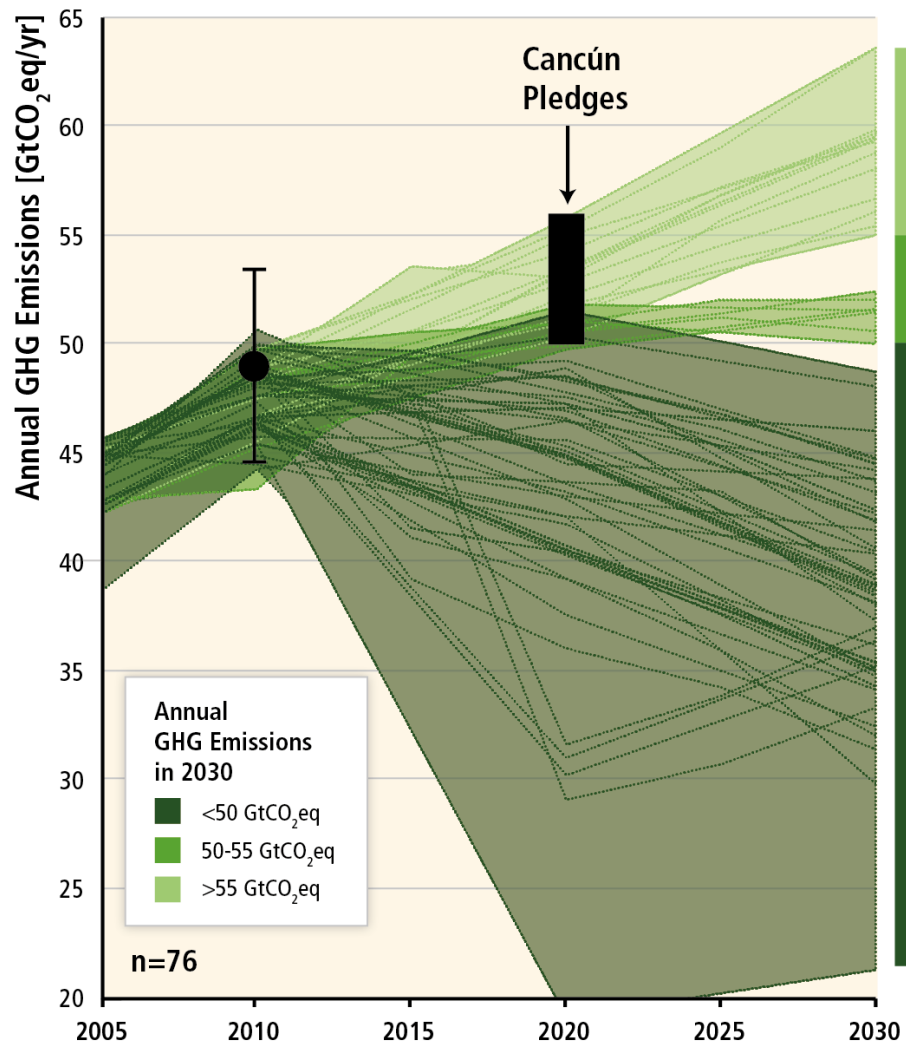


Atmospheric CO₂, actual and projected

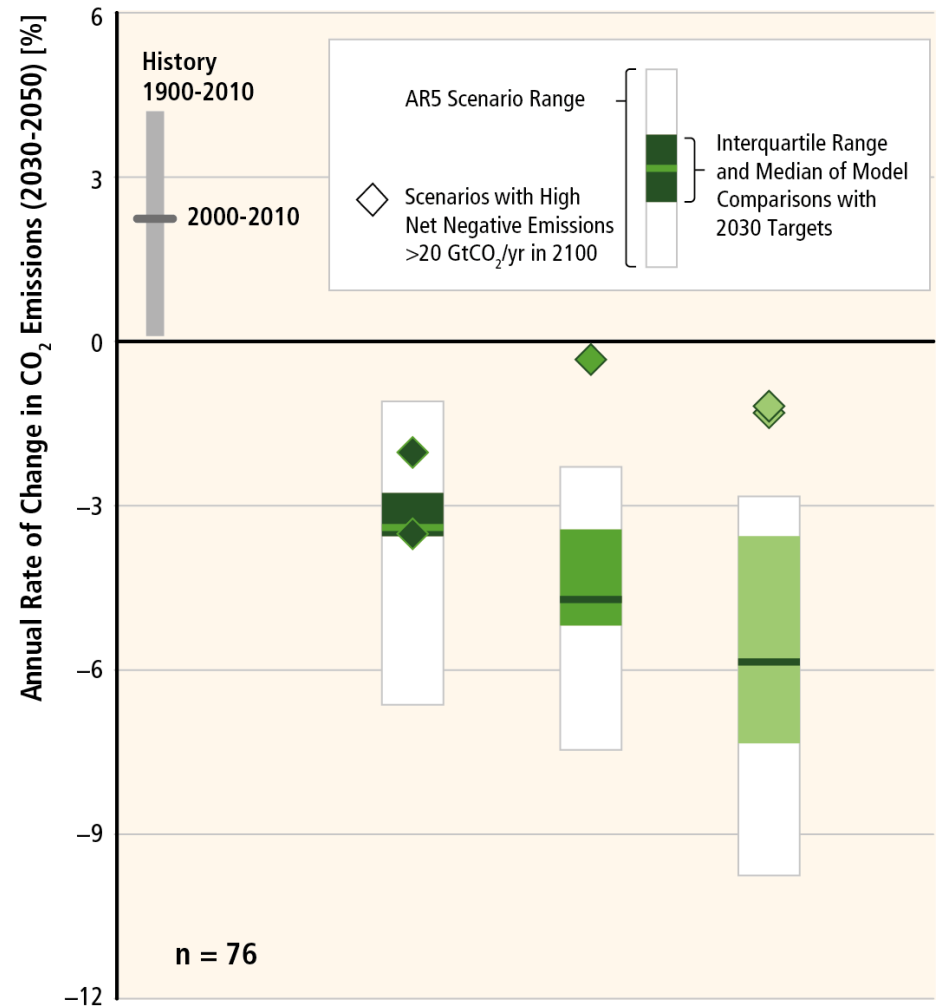


Mitigation scenarios

GHG Emissions Pathways to 2030 of Mitigation Scenarios Reaching 430-530 ppm CO₂eq in 2100



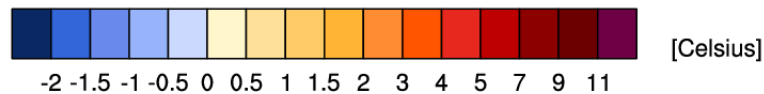
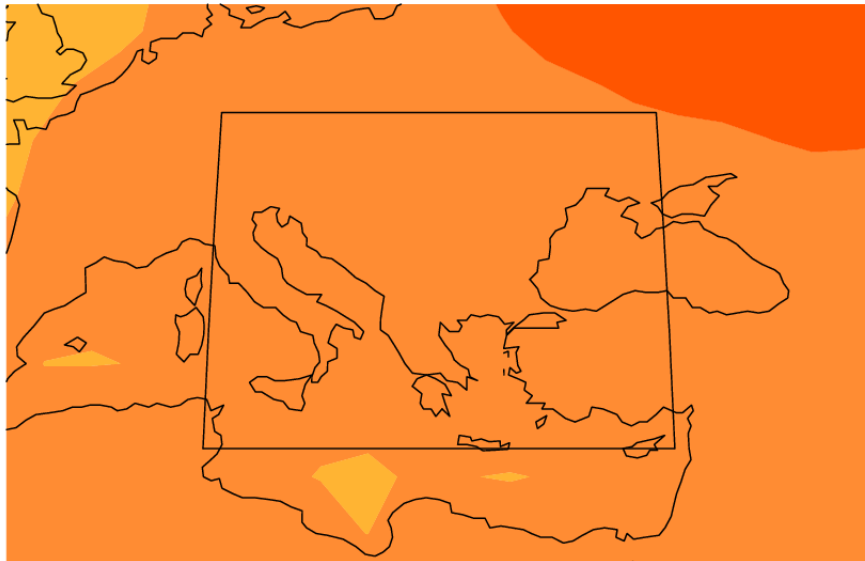
Implications for the Pace of Annual Average CO₂ Emissions Reductions from 2030 to 2050 Depending on Different 2030 GHG Emissions Levels



Projections for SEE: temperature

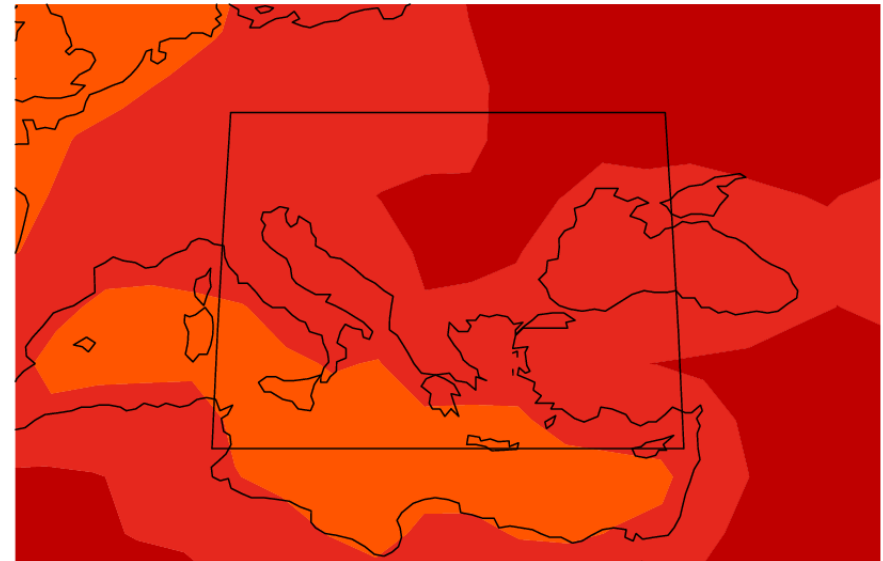
RCP4.5

mean rcp45 temperature 2071-2100 minus 1971-2000 Jan-Dec AR5 CMIP5 subset



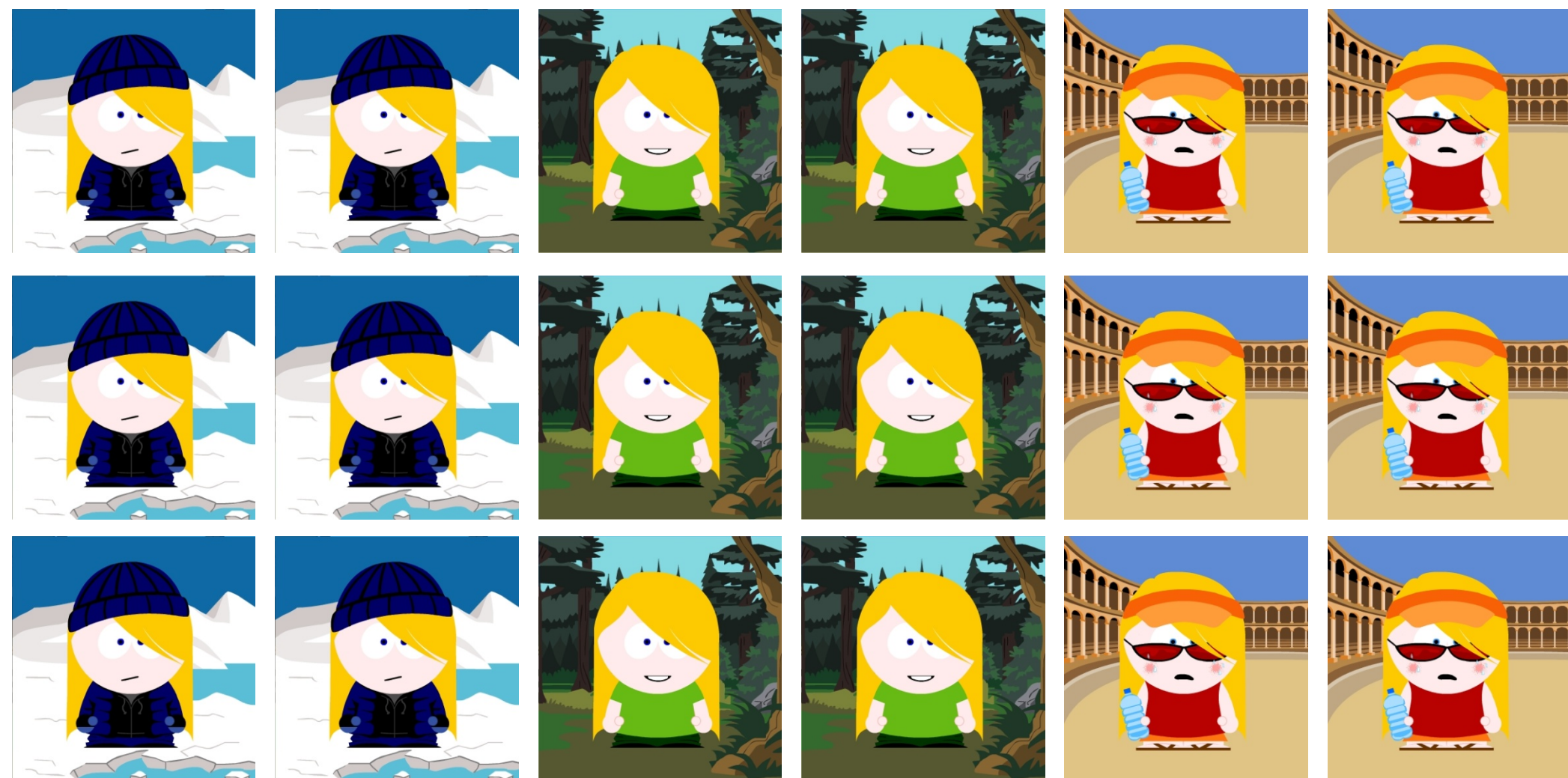
temperature change

RCP8.5

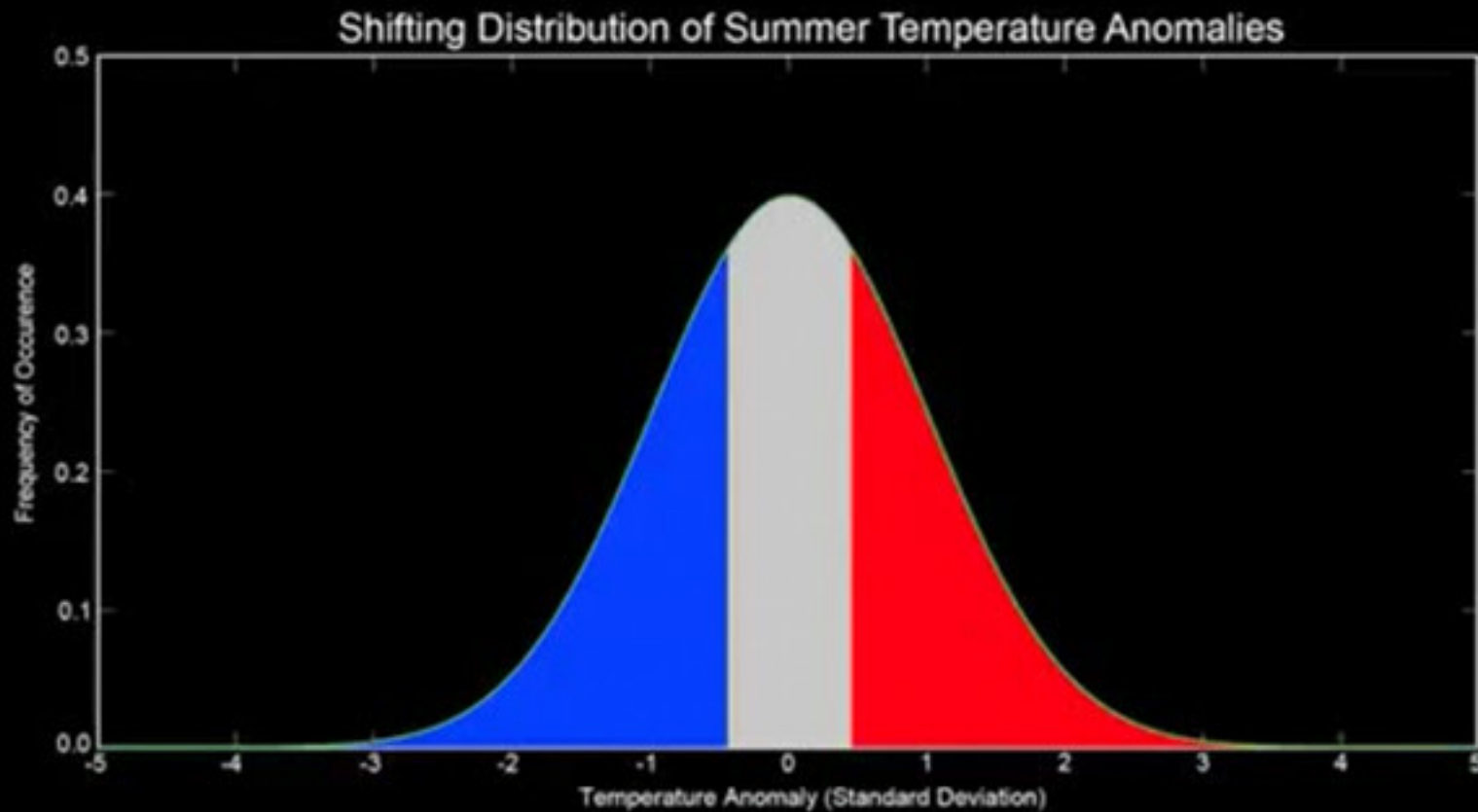


temperature change

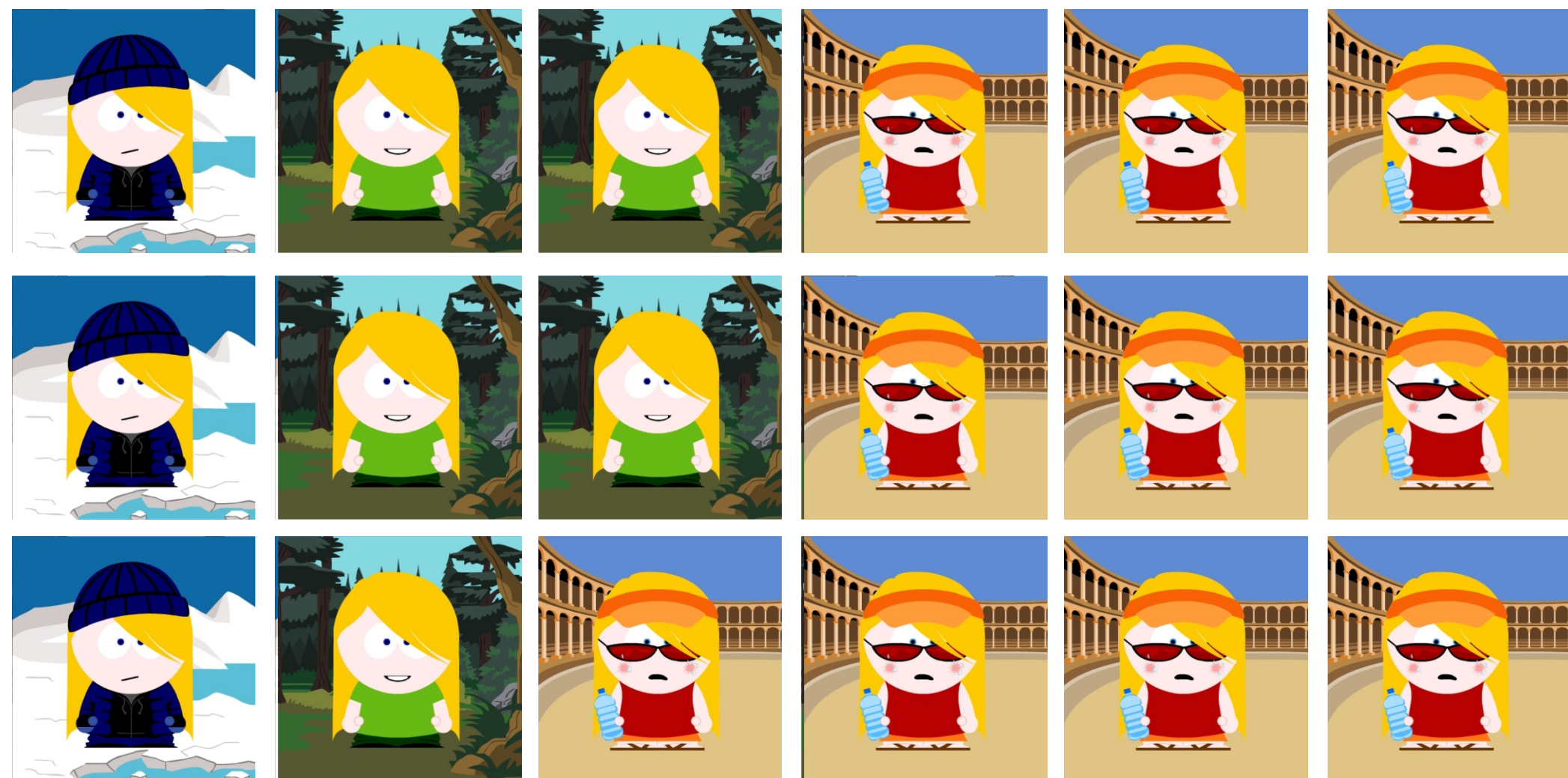
What does it mean statistically?



What does it mean statistically?

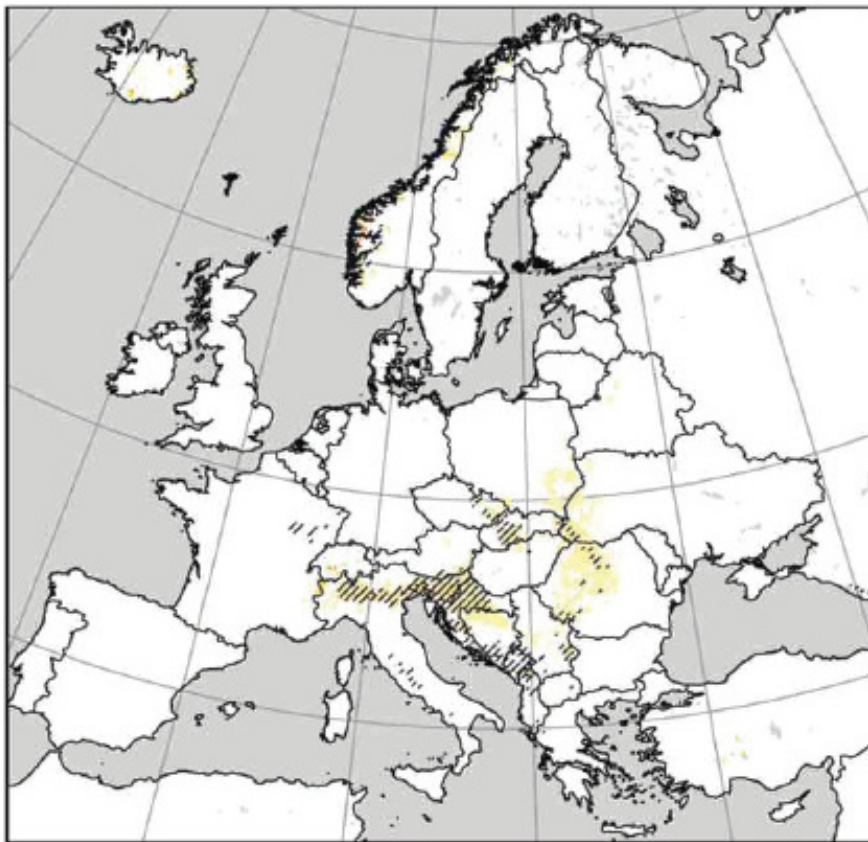


What does it mean statistically?

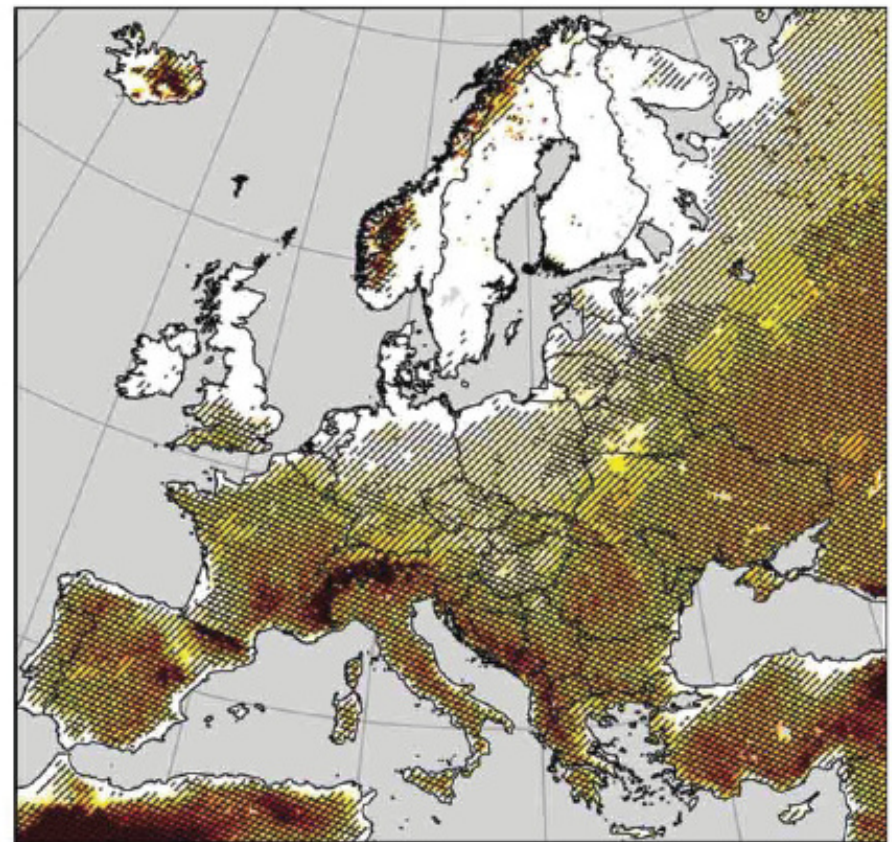


Projections for SEE: heat waves

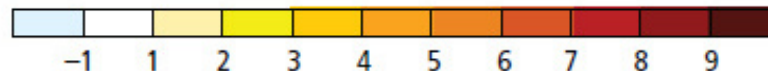
RCP4.5



RCP8.5



Changes in mean number
of heat waves
2071-2100 minus 1971-2000



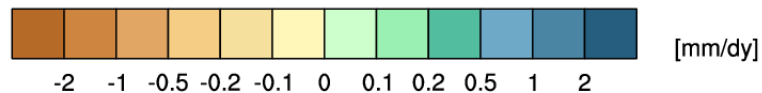
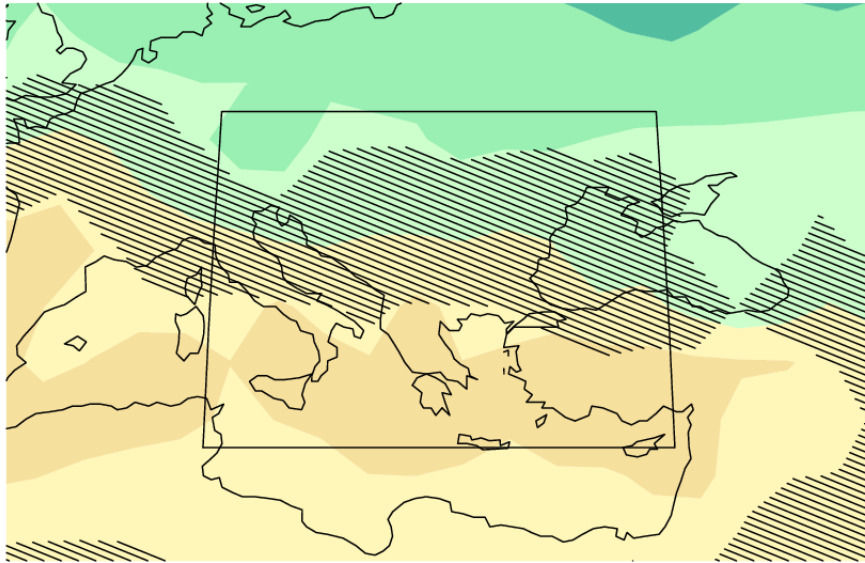
//// Significant change
\\\\ Robust change

Projections for SEE: precipitation

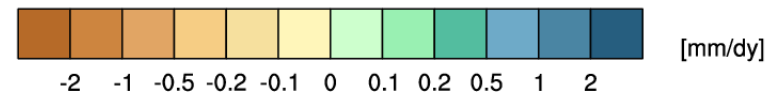
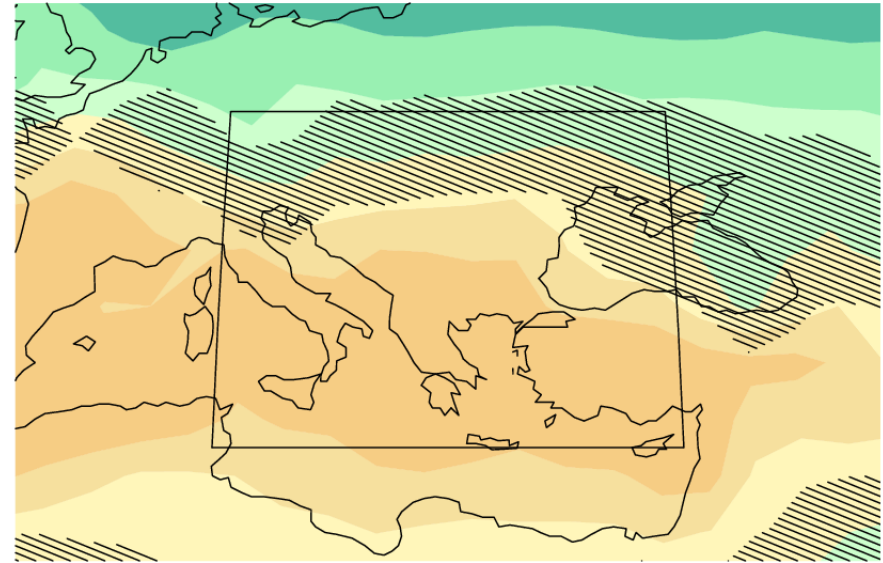
RCP4.5

RCP8.5

mean rcp45 precipitation 2071-2100 minus 1971-2000 Jan-Dec AR5 CMIP5 subset mean rcp85 precipitation 2071-2100 minus 1971-2000 Jan-Dec AR5 CMIP5 subset



mean precipitation change

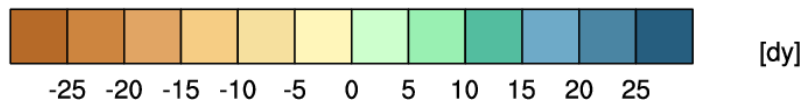
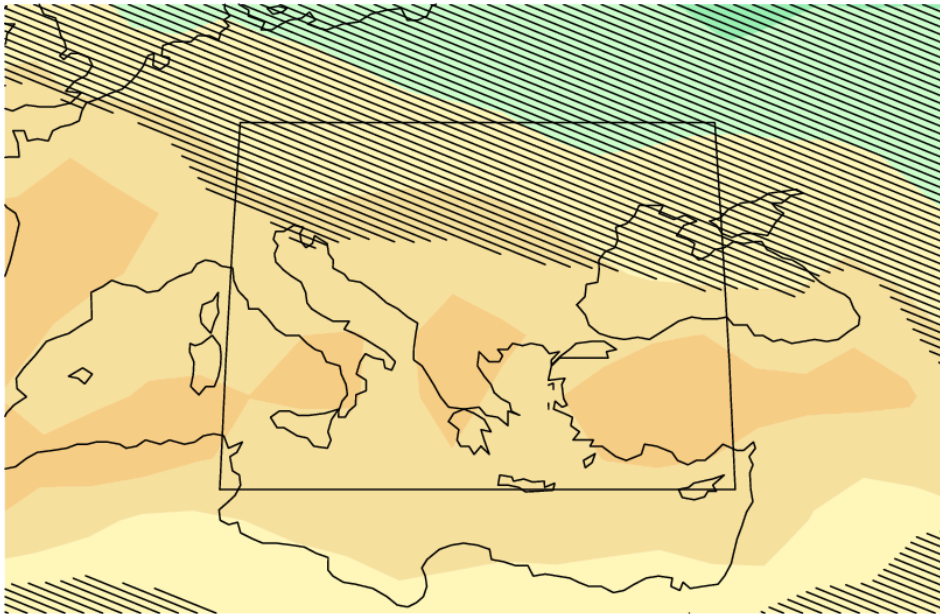


mean precipitation change

Projections for SEE: precipitation

RCP4.5

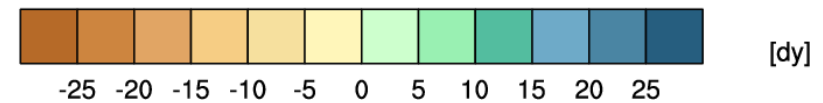
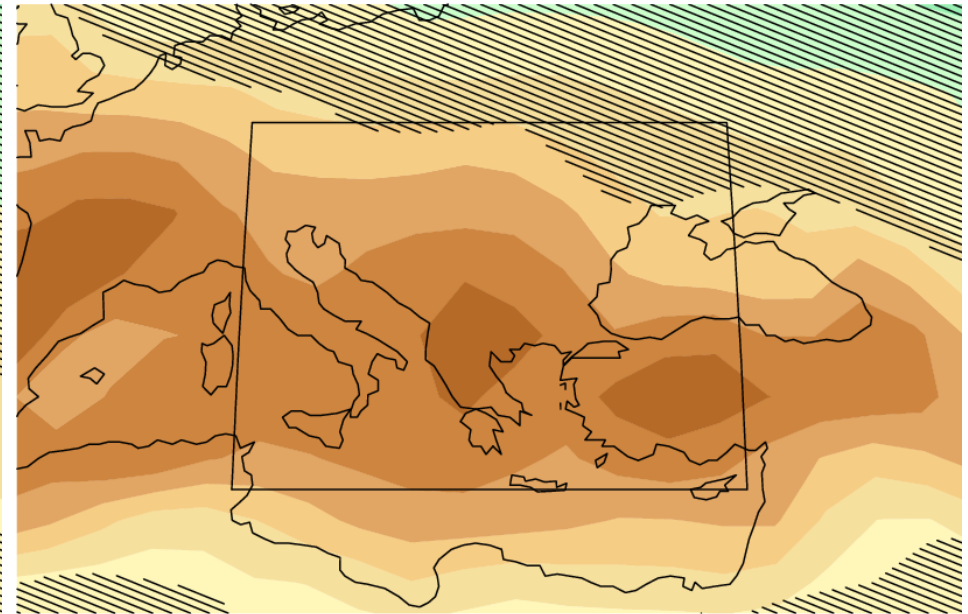
mean rcp45 R1MM 2071-2100 minus 1971-2000 full CMIP5 ensemble



number of days with precipitation >1mm

RCP8.5

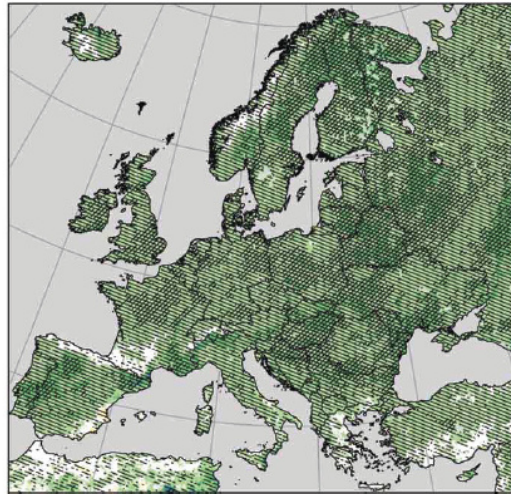
mean rcp85 R1MM 2071-2100 minus 1971-2000 full CMIP5 ensemble



number of days with precipitation >1mm

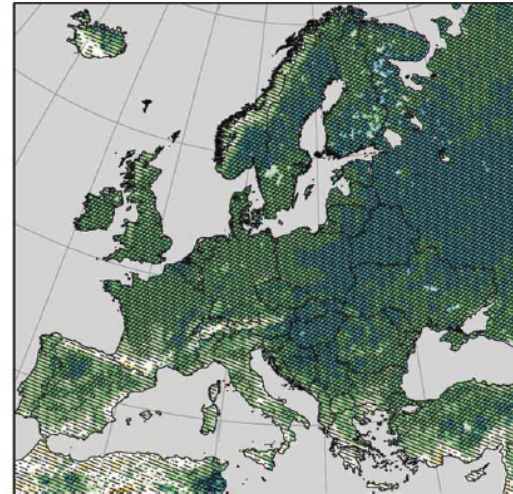
Projections for SEE: precipitation

RCP4.5



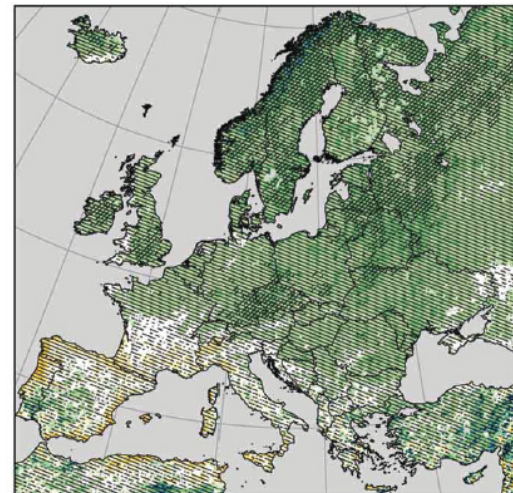
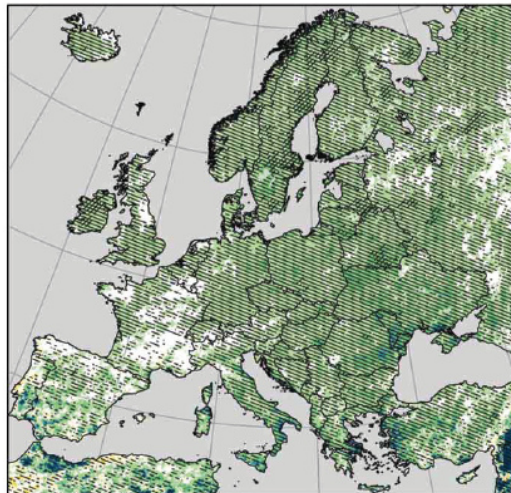
DJF

RCP8.5



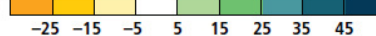
DJF

JJA



JJA

Seasonal changes in heavy
precipitation in percent
2071-2100 minus 1971-2000

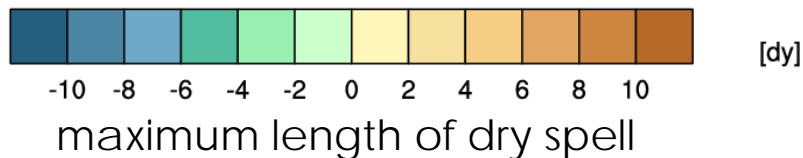
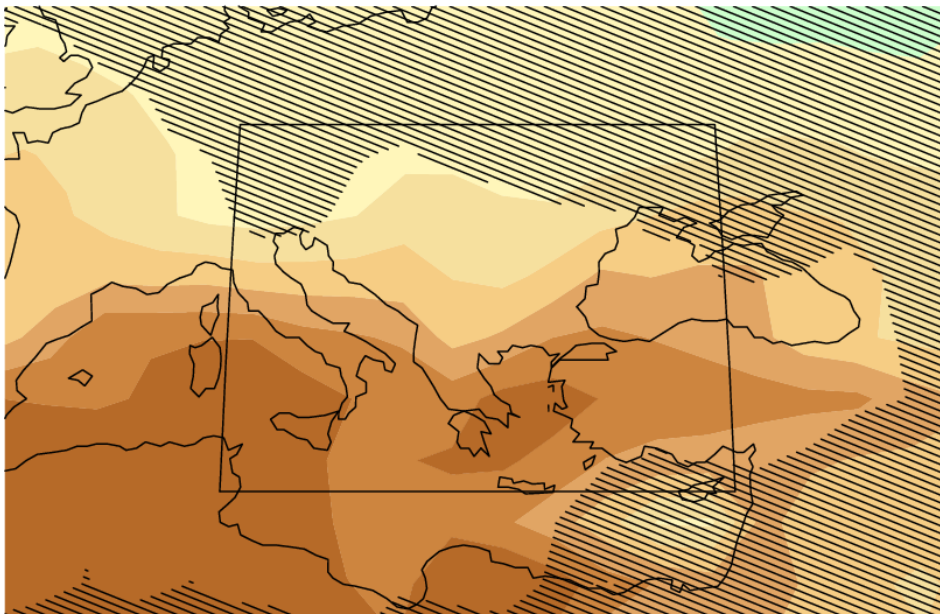


/// Significant change
/// Robust change

Projections for SEE: droughts

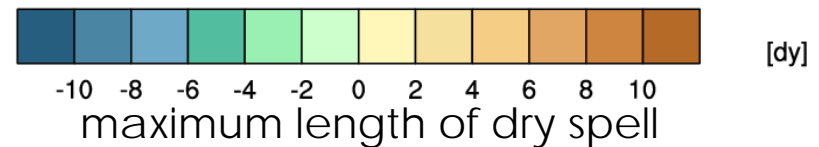
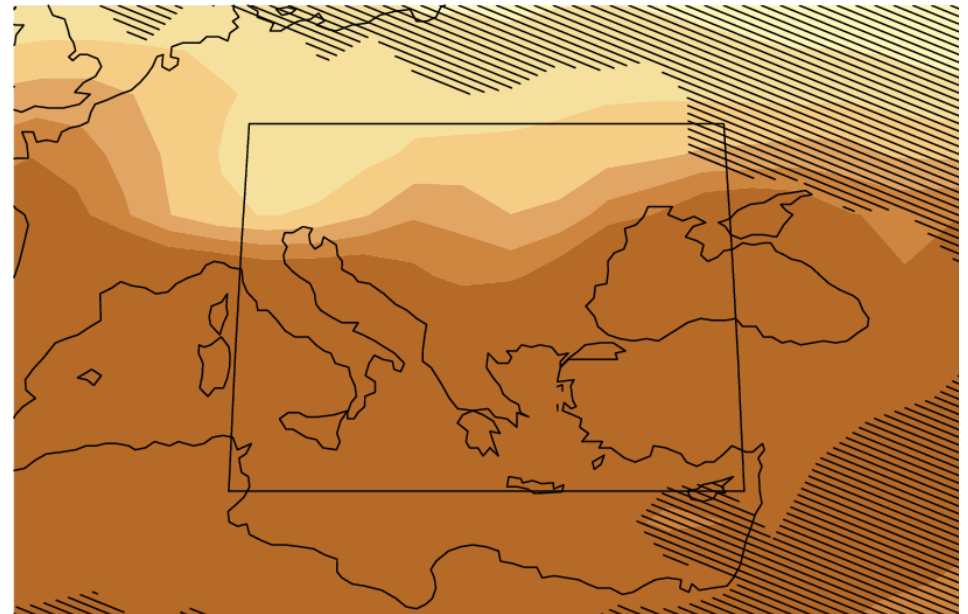
RCP4.5

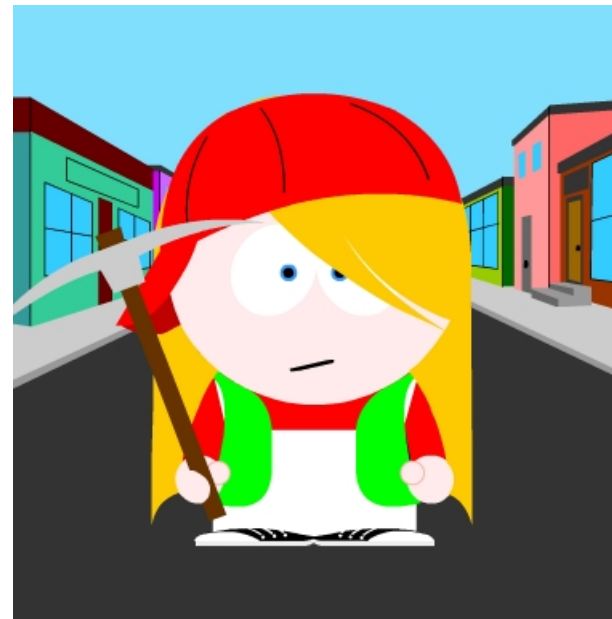
mean rcp45 ALTCD 2071-2100 minus 1971-2000 full CMIP5 ensemble



RCP8.5

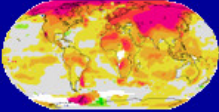
mean rcp85 ALTCD 2071-2100 minus 1971-2000 full CMIP5 ensemble





Climate Explorer

<http://climexp.knmi.nl>



KNMI Climate Explorer

Climate Explorer European Climate Assessment & Data KNMI

[Help](#) [News](#) [About](#) [Contact](#) [Seasonal forecast verification](#) [Climate Change Atlas](#)

KNMI Climate Change Atlas

Select a region

Type: ☐ IPCC WG1 ☐ countries ☐ place ☒ box

Box: °N - °N, °E - °E

Land/sea mask: ☒ everything ☐ only land points ☐ only sea points

Select a season

Season: First month , length months

Select a dataset and variable

Dataset:

Variable:

☒ absolute ☐ relative changes are shown

Output: ☒ map ☐ time series

Map options

Scenario:

Measure:

Reference period: -

Future period: -

Mean/percentiles:

Make map May take up to 15 minutes the first time a season / measure is selected

Users are strongly advised to study the [short introduction](#). Specific help is available under the [i](#) icons.

Further information

- > [Short introduction](#)
- > [IPCC WG1 AR5 report](#), notably Annex I "Atlas"
- > [CMIP5 co-ordinated climate model experiments](#)
- > [RCP scenario's](#)

Funding

- > [KNMI](#)
- > [Red Cross / Red Crescent Climate Centre](#)
- > [Dutch Ministry of Infrastructure and Environment, DGMI](#)

mean rcp85 soil moisture 2071-2100 minus 1971-2000 Jan-Dec AR5 CMIP5 subset

