LA GESTIONE DEL RISCHIO IDRAULICO DI FRONTE AI CAMBIAMENTI CLIMATICI

Torino, mercoledì 30 ottobre 2024

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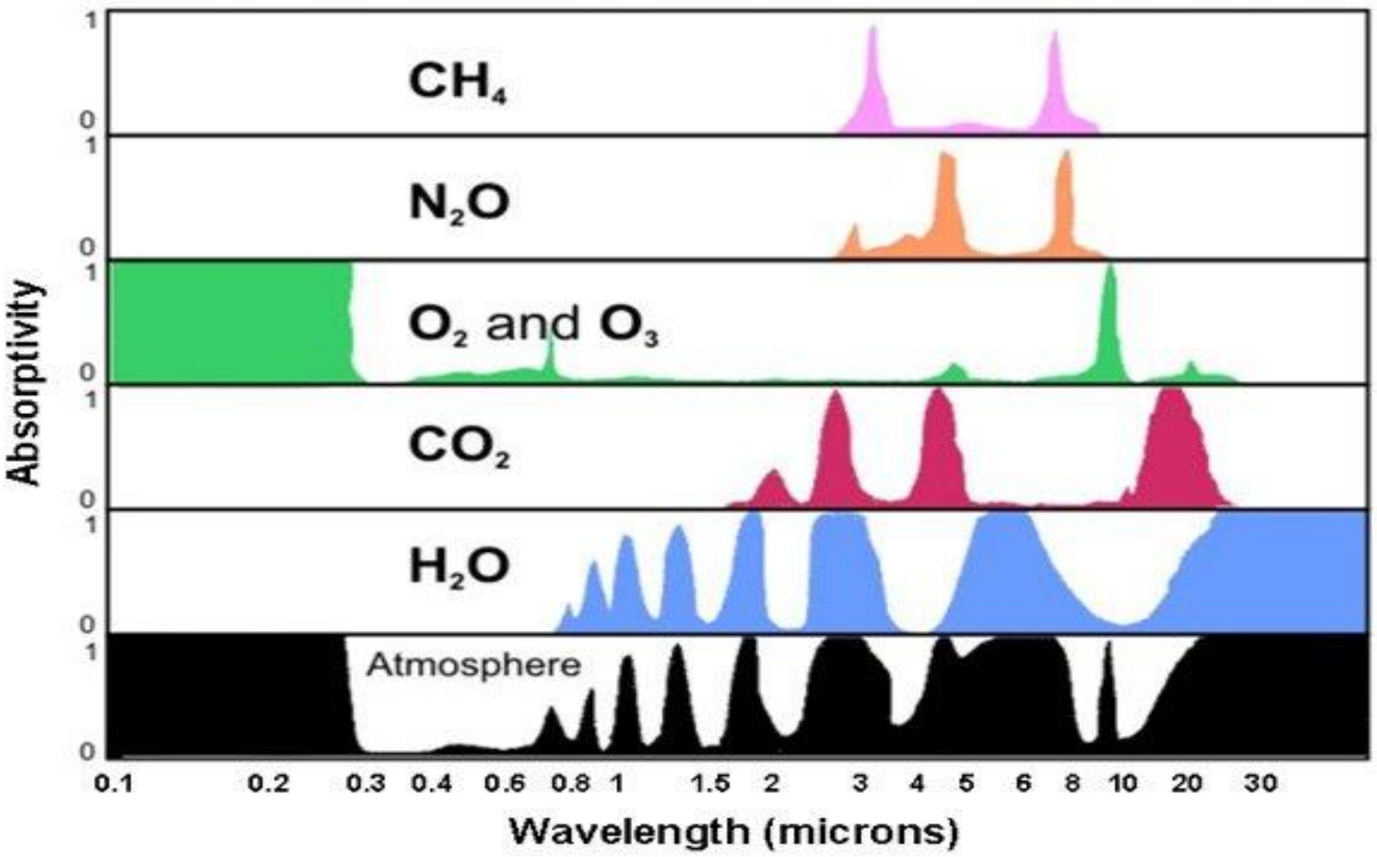
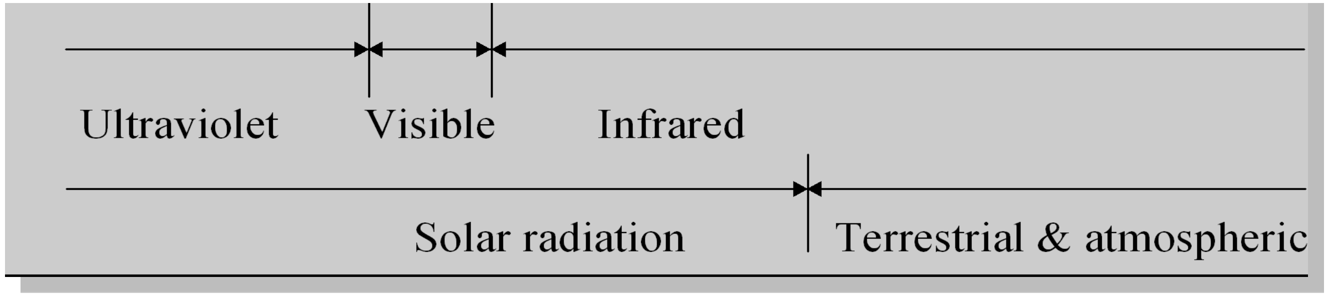
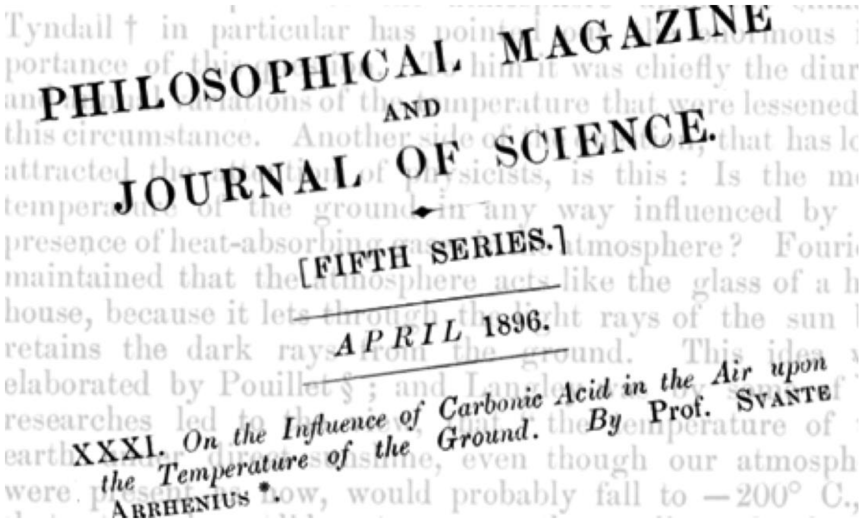
Effetto serra: basi fisiche

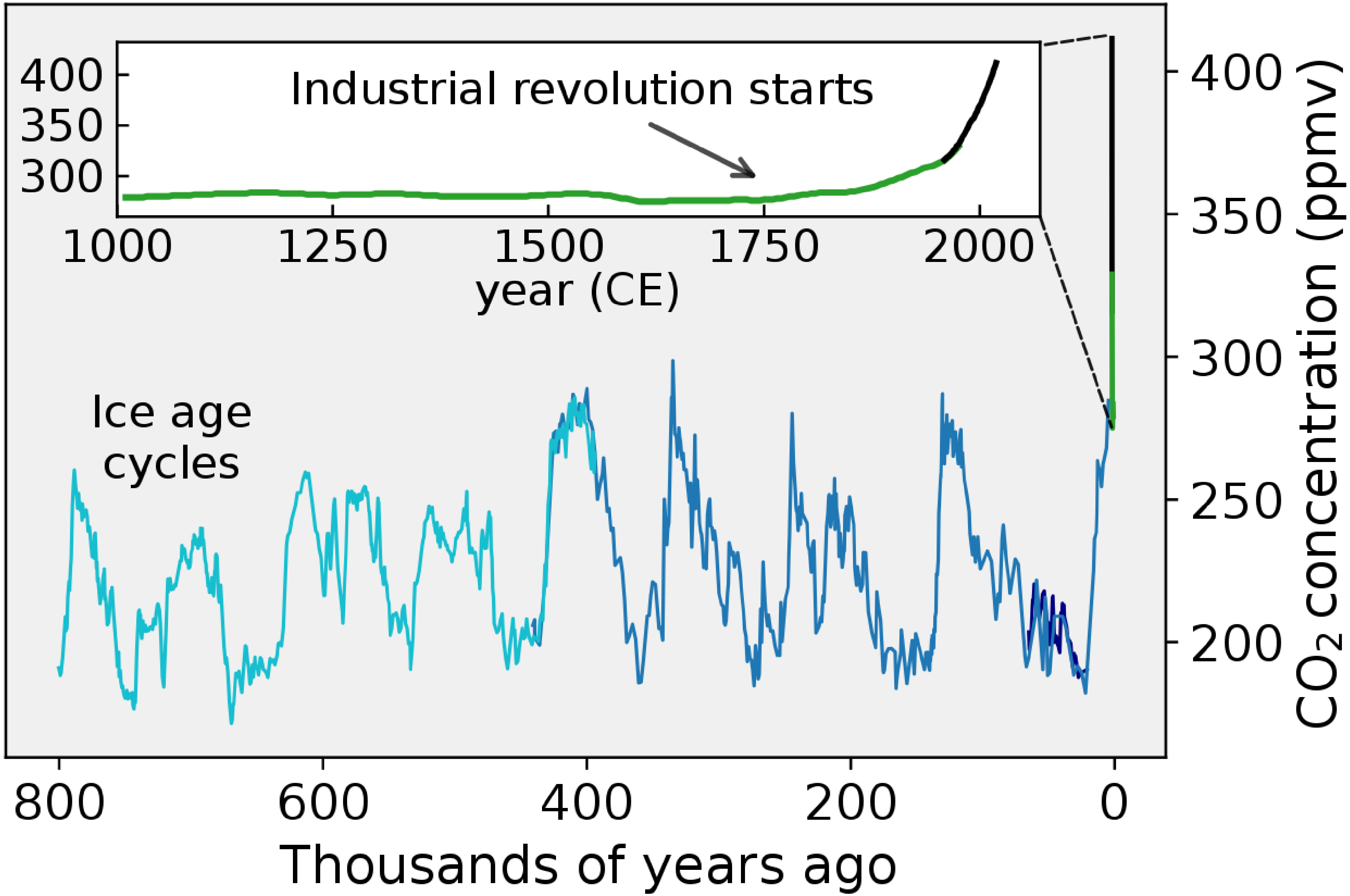



Ultraviolet
Visible
Infrared
Solar radiation
Terrestrial & atmospheric

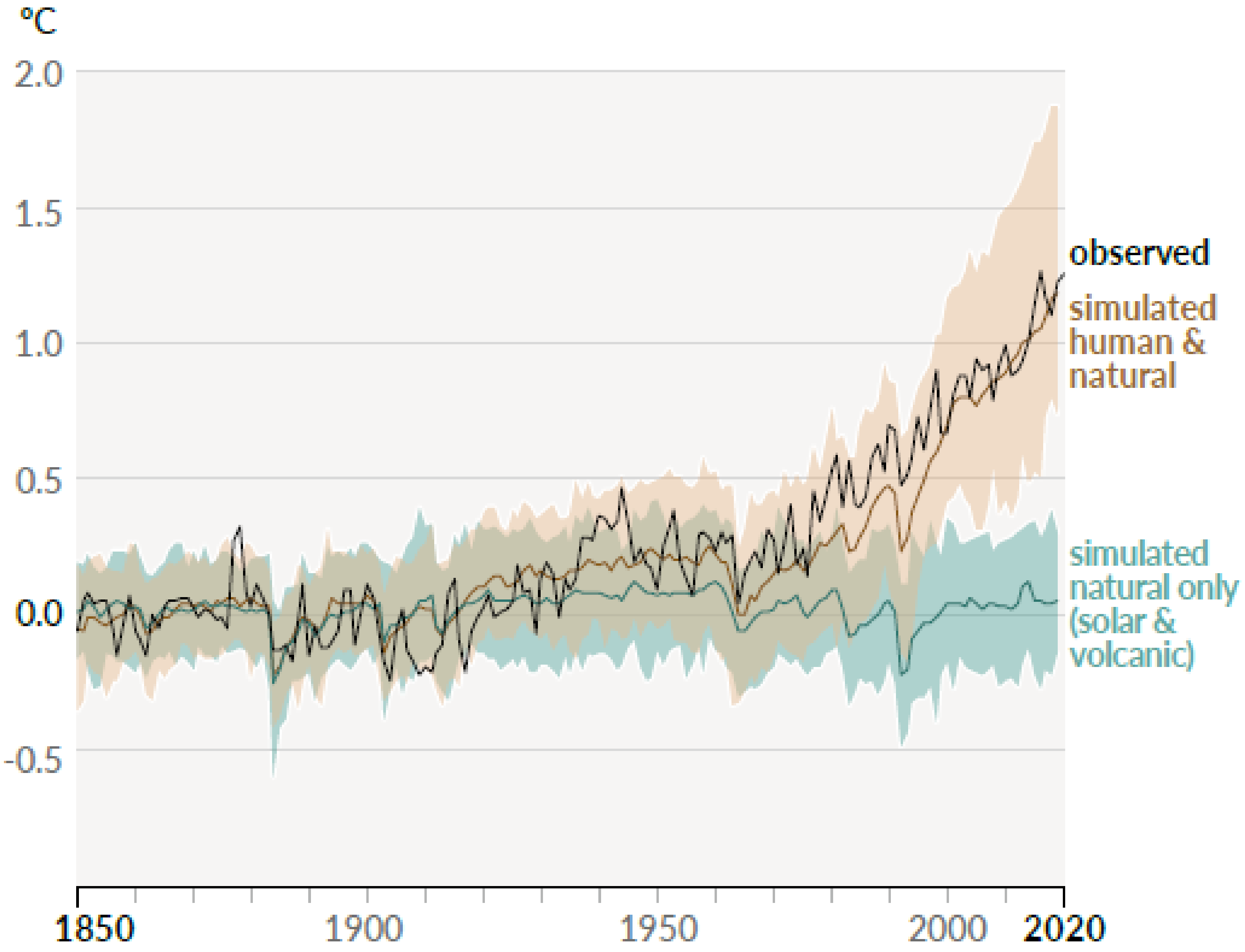

PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE.
[FIFTH SERIES.]
APRIL 1896.

XXXI. *On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground.* By Prof. SVANTE ARRHENIUS *.

Variazioni di concentrazione CO2 atmosferica

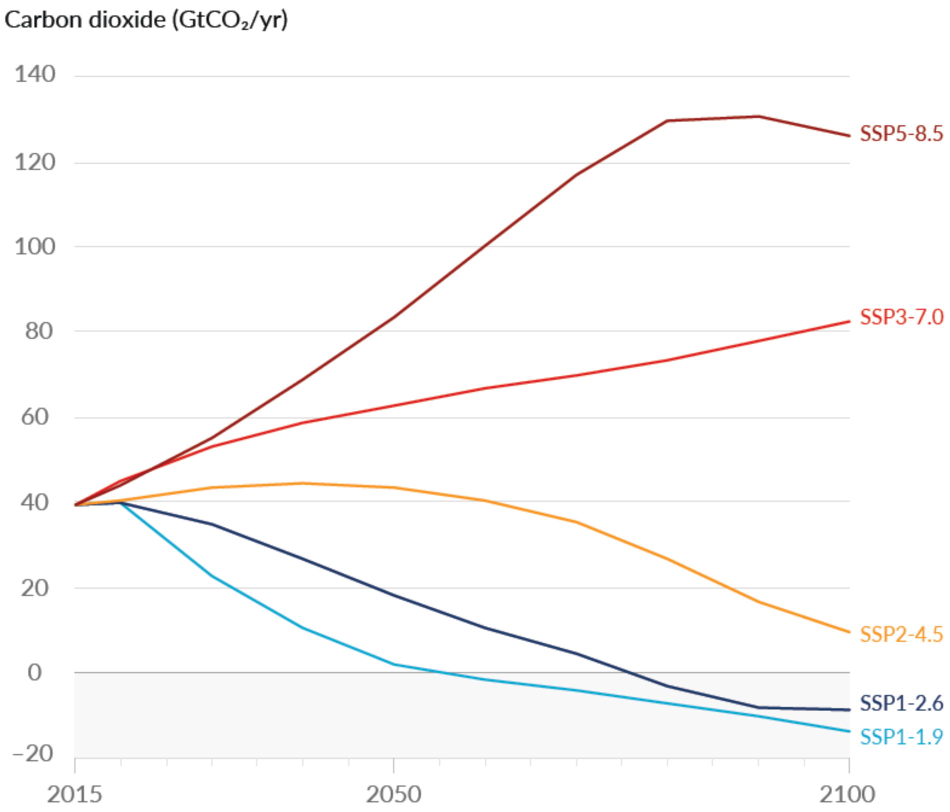


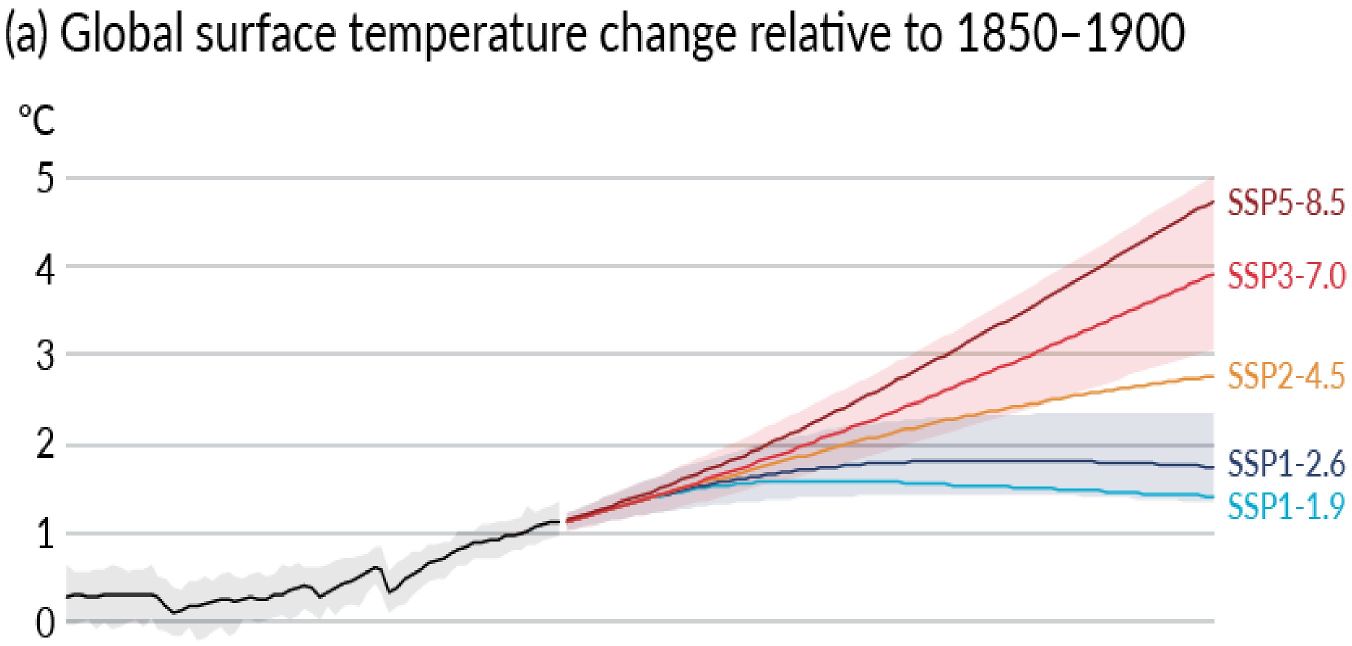
Osservazioni e simulazioni di temperatura globale



Source: IPCC, Assessment report 6

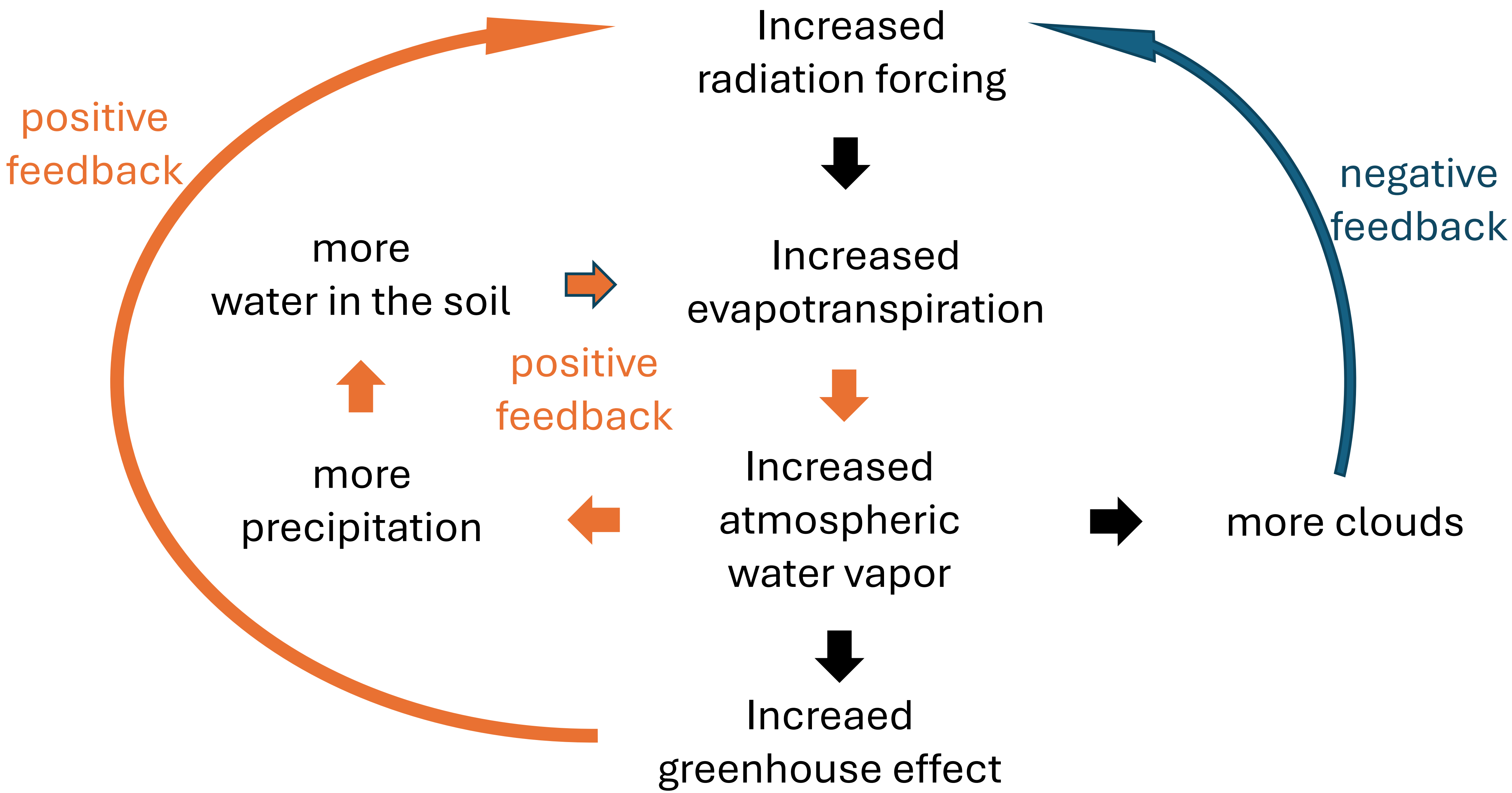
Traiettorie future di emissioni e temperature




(a) Global surface temperature change relative to 1850–1900

Source: IPCC, Assessment report 6

Intensificazione del ciclo idrologico



Increased
radiation forcing

Increased
evapotranspiration

Increased
atmospheric
water vapor

Increaed
greenhouse effect

more clouds

negative
feedback

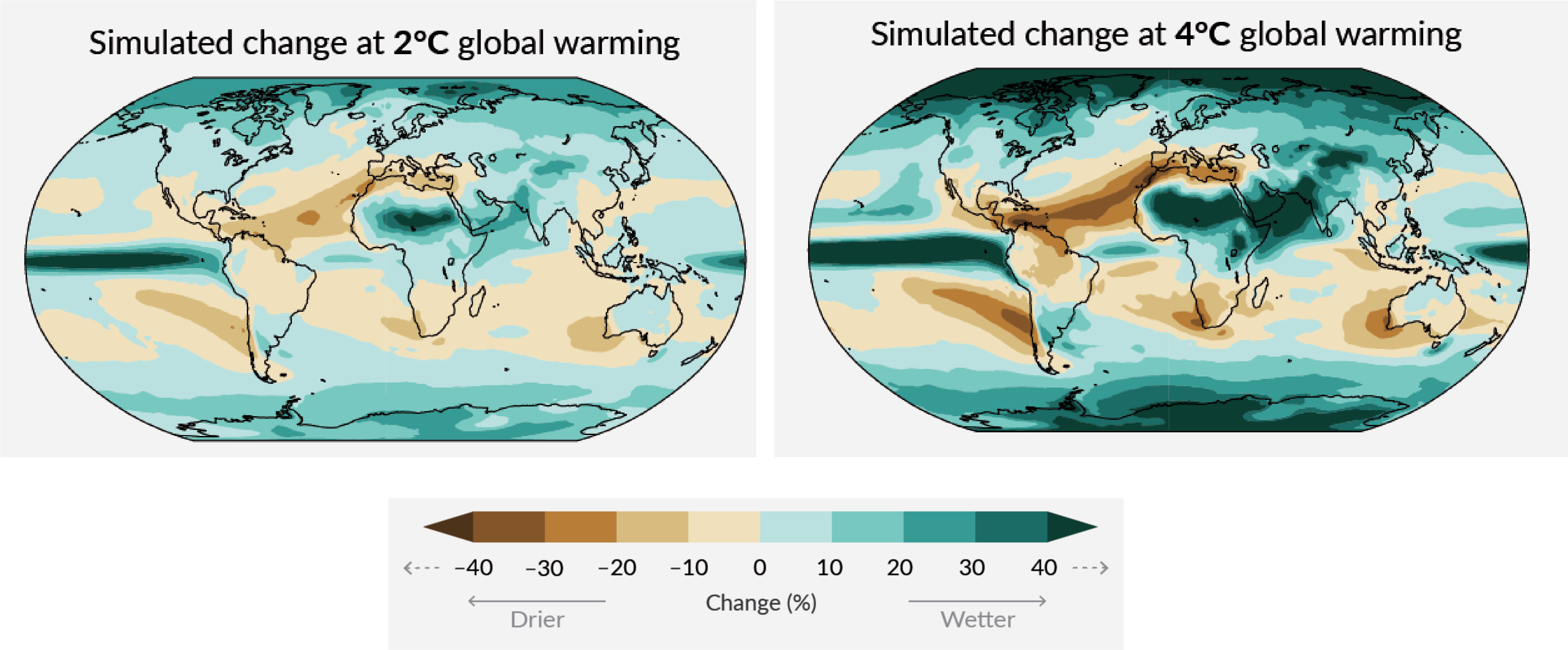
more
precipitation

more
water in the soil

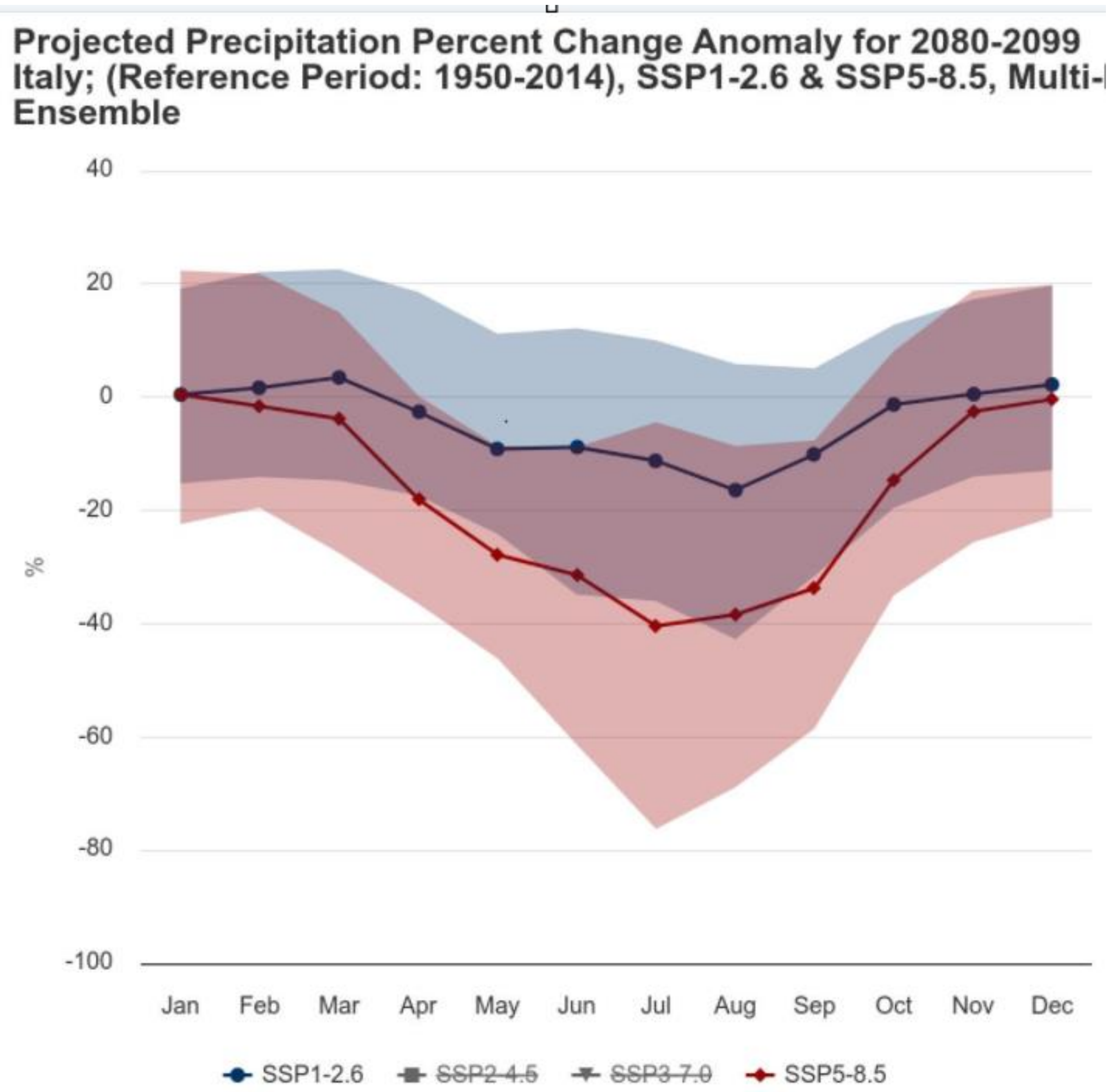
positive
feedback

positive
feedback

Variazioni percentuali attese nella precipitazione totale annua

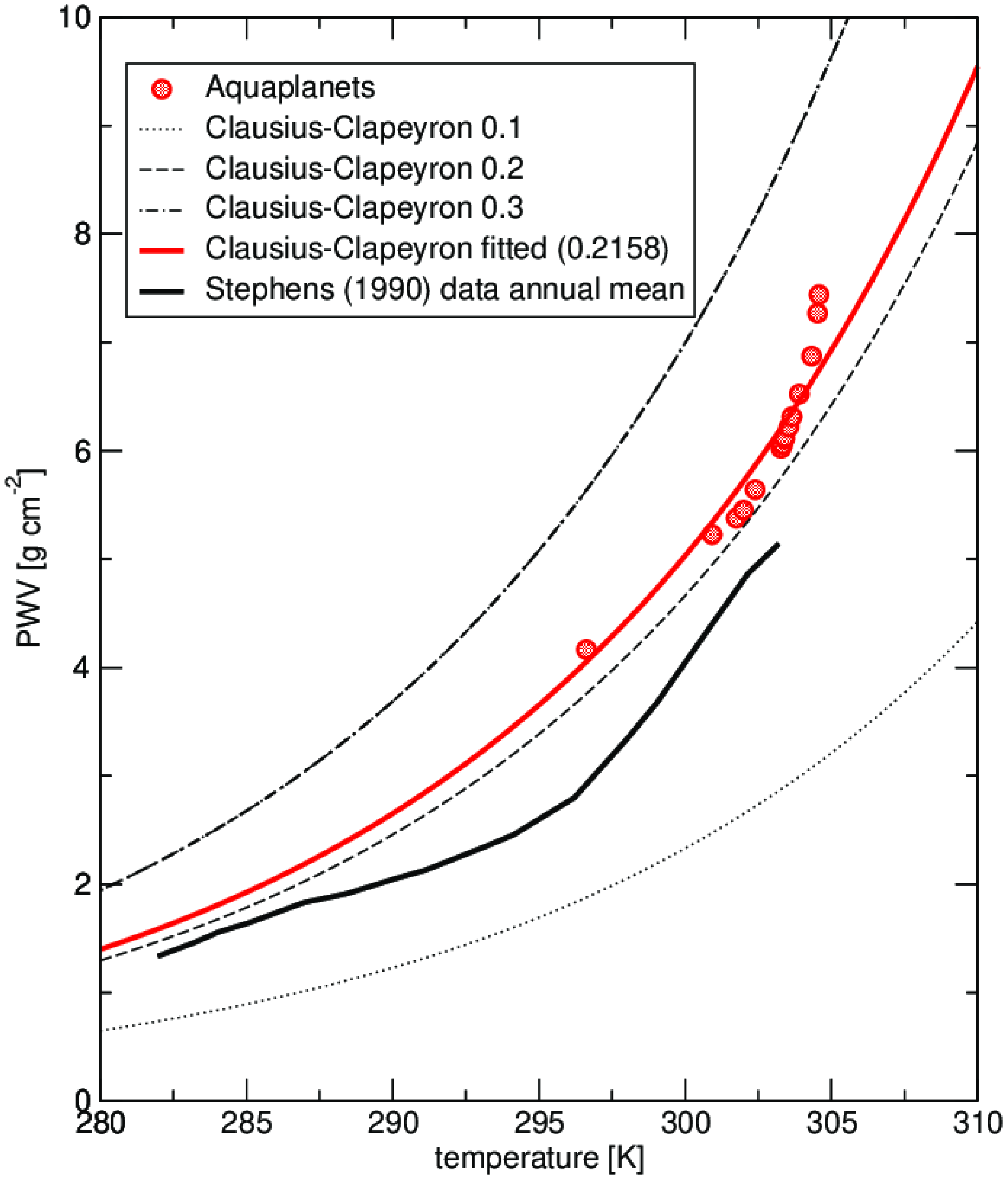

Simulated change at **2°C** global warming
Simulated change at **4°C** global warming
-40
-30
-20
-10
0
10
20
30
40
Change (%)
Drier
Wetter

Source: IPCC, Assessment report 6



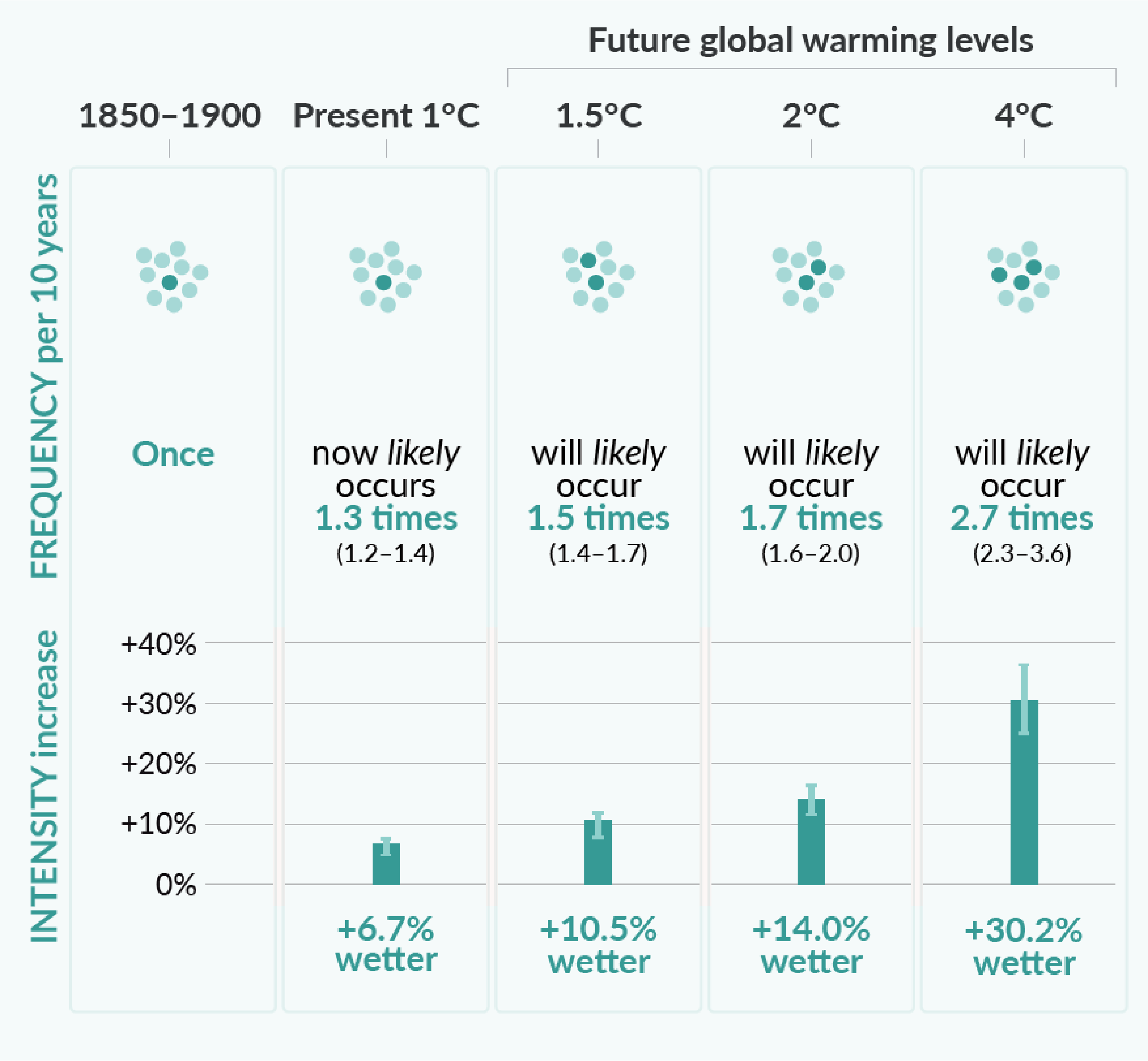
Variazioni percentuali attese nella precipitazione totale in Italia

Source: World Bank Climate Atlas



Precipitazioni estreme più intense

Il vapore acque contenibile in una massa d’ariaaumenta con l’aumentare della temperatura (Clausius Clapeyron effect)

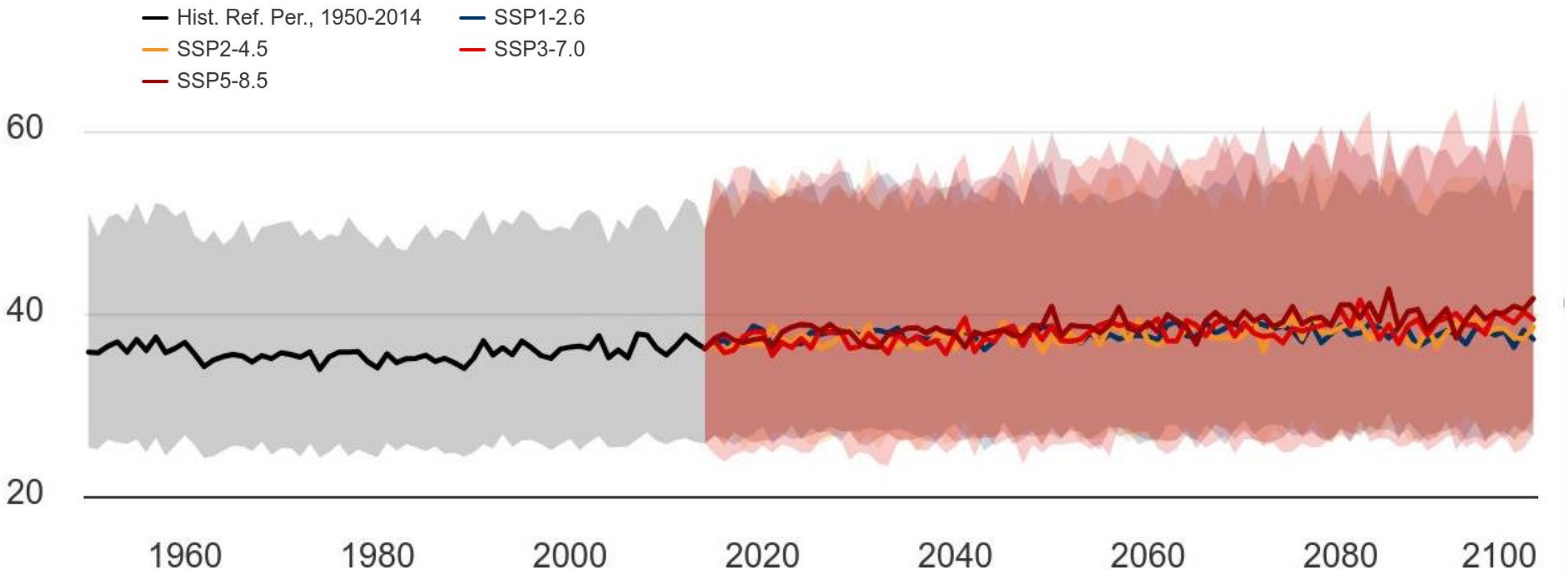


Aumento atteso delle precipitazioni estreme

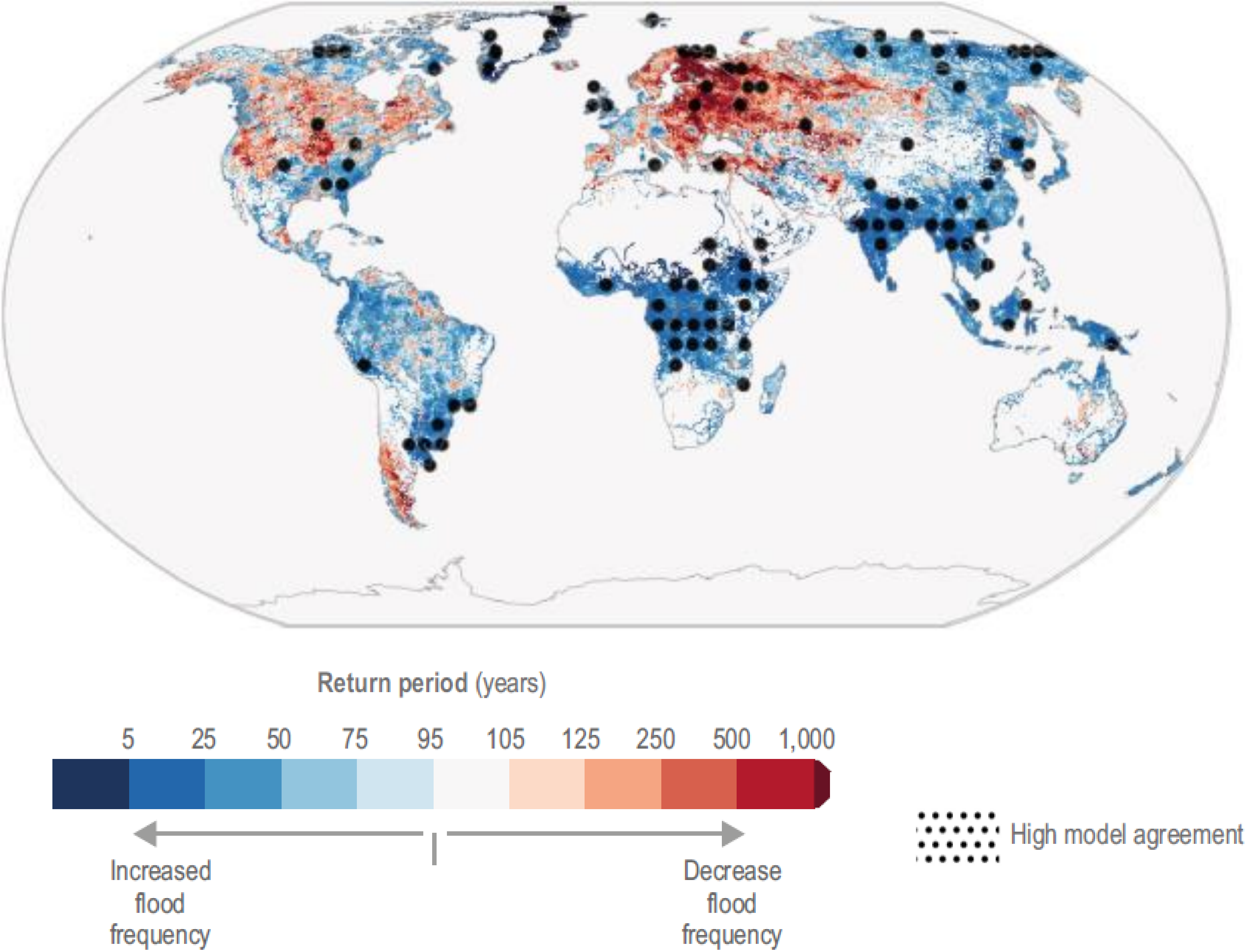
Tempo di ritorno 10 anni

Source: IPCC Assessment report 6

Variazioni attese nelle precipitazioni estreme (giornaliere) in Italia



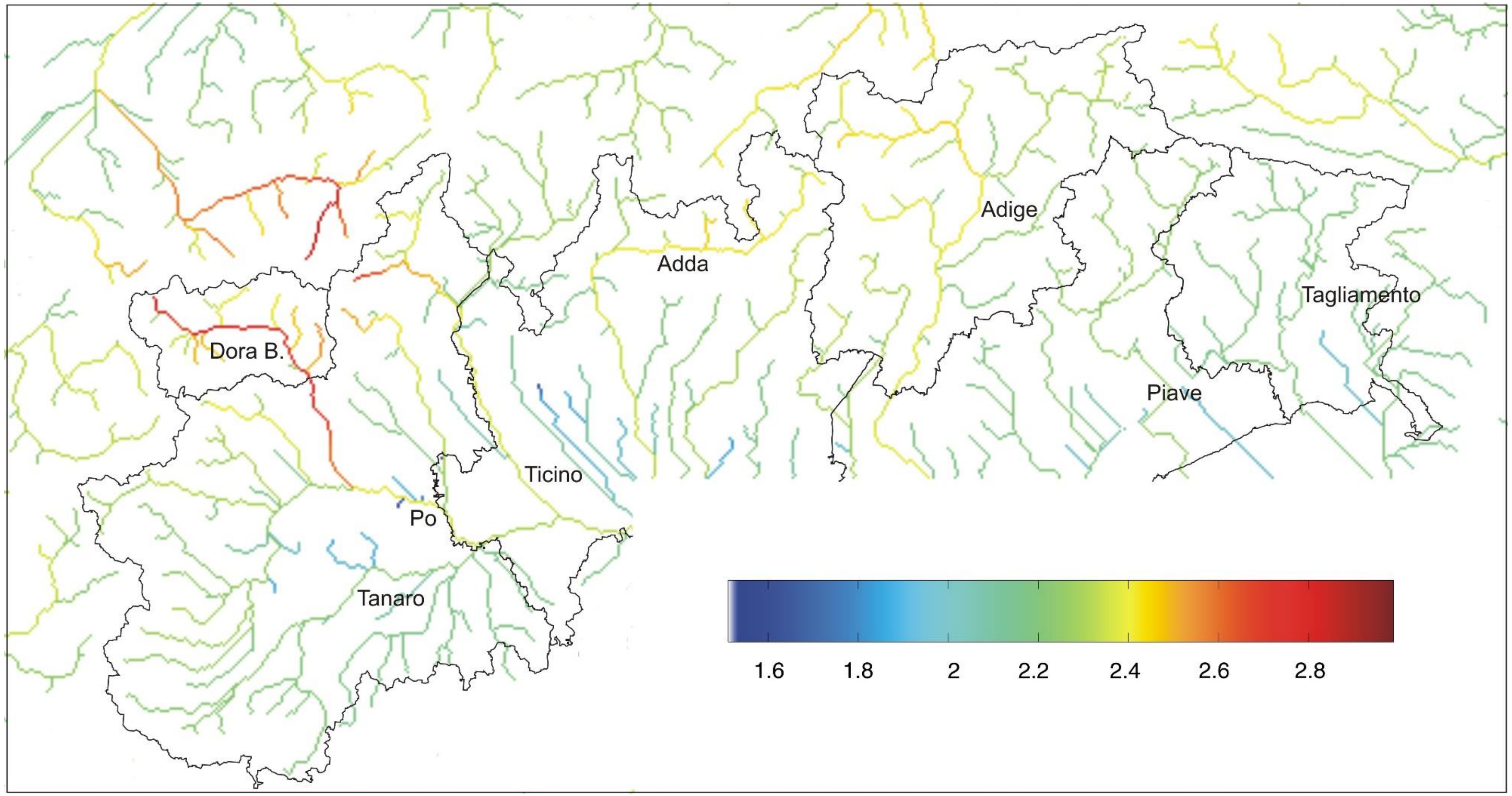
Source: World Bank Climate Atlas


Return period (years)
5
25
50
75
95
105
125
250
500
1,000
Increased flood frequency
Decrease flood frequency
High model agreement

Variazioni attese nella frequenza delle piene centenarie

Scenario di riferimento: SSP2-4.5

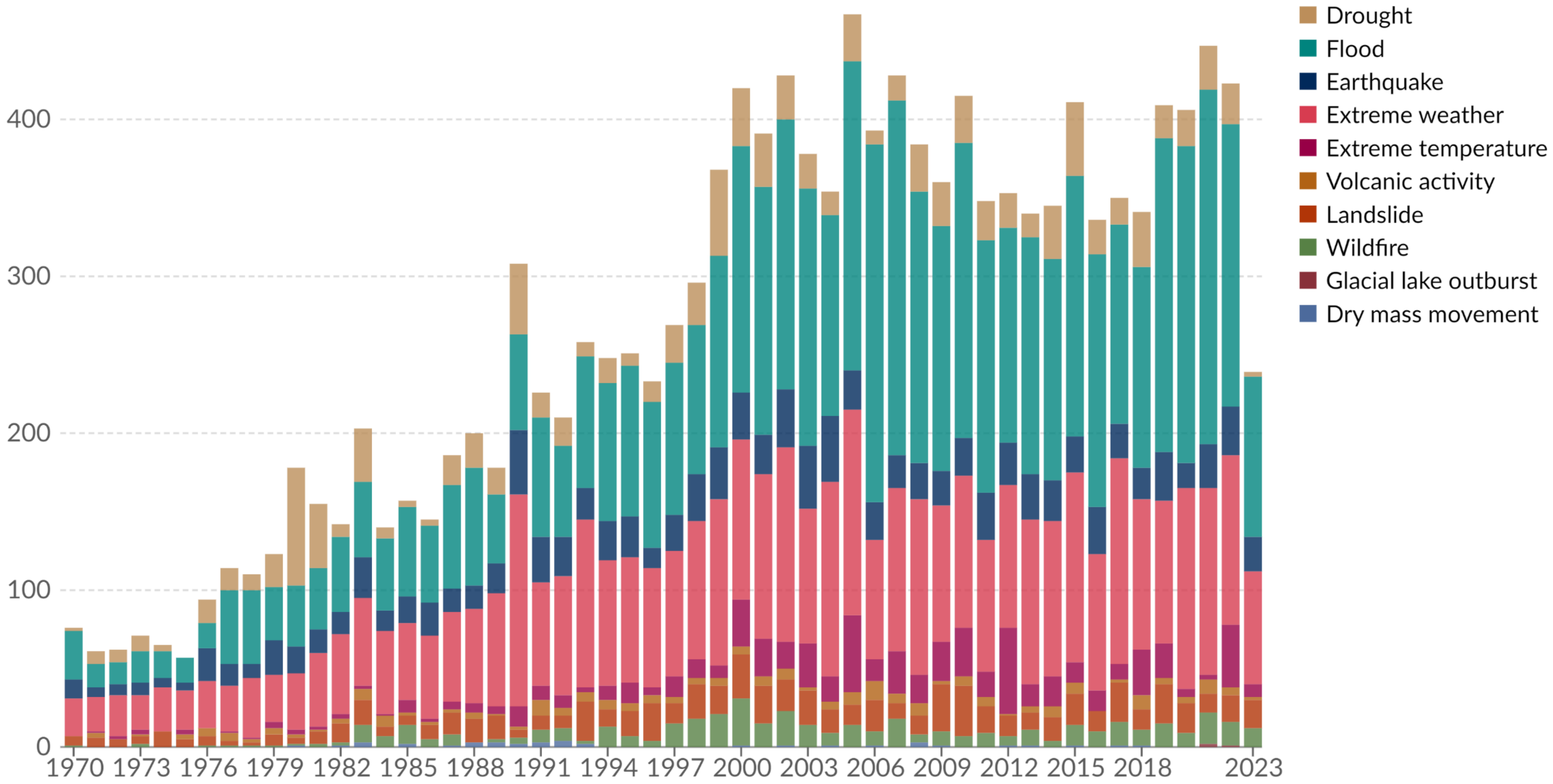
Source: IPCC Assessment report 6


Dora B.
Po
Tanaro
Ticino
Adda
Adige
Piave
Tagliamento
1.6
1.8
2
2.2
2.4
2.6
2.8

Incremento atteso di frequenza delle piene centenarie con incremento di +2 ^{o}C rispetto alle condizioni attuali

Eventi di piena in bacini alpini: atteso incremento per la crescita dell’area contribuente media dovuto all’innanlzamento dello zero termico

Incremento del numero di eventi estremi

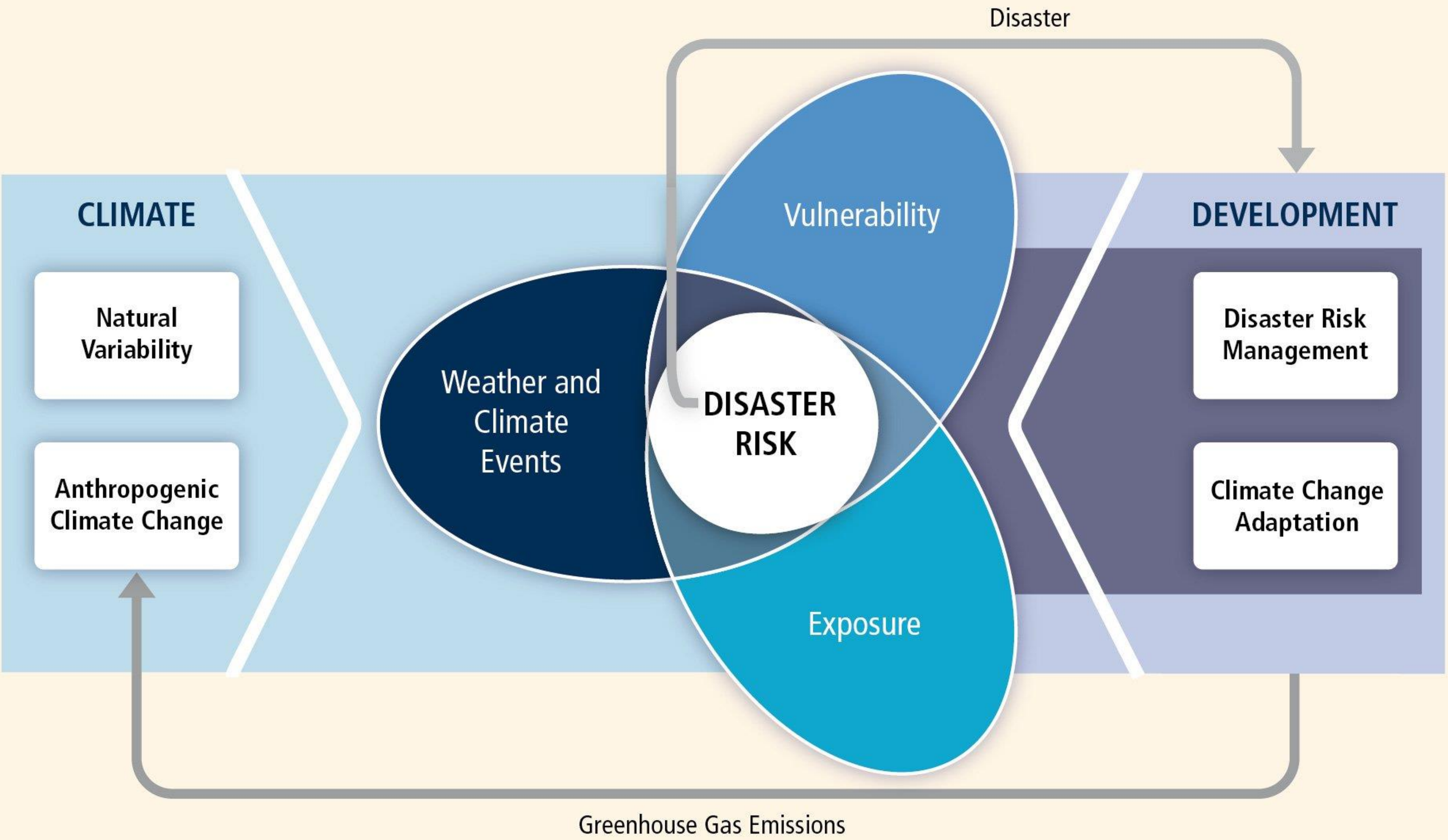


Data source: EM-DAT, CRED / UCLouvain (2023)

Note: Data includes disasters recorded up to September 2023.

OurWorldInData.org/natural-disasters | CC BY

Source: MUNICH RE database


Disaster
CLIMATE
Natural Variability
Anthropogenic Climate Change
Weather and Climate Events
Vulnerability
DISASTER RISK
Exposure
DEVELOPMENT
Disaster Risk Management
Climate Change Adaptation
Greenhouse Gas Emissions