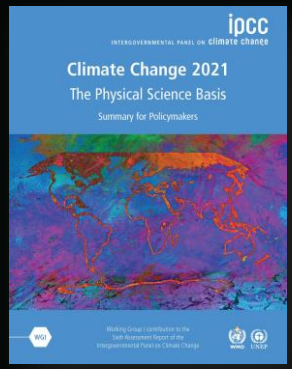
https://www.ipcc.ch/report/ar6/wg1/

Water as Climate connector



Prof. Taikan Oki
Special Advisor to the President
The University of Tokyo

"Climate-Resilient Water Management Approaches: Application Towards Climate Action and 2030 Agenda", Keynote Speech, UNESCO-IHP, 26th Oct. 2021, Online

Syukuro Manabe Facts

Congratulations!

The Nobel Prize in Physics 2021

Ill. Niklas Elmehed © Nobel Prize Outreach

Syukuro Manabe
The Nobel Prize in Physics 2021

Born: 21 September 1931, Shingu, Ehime Prefecture, Japan

Affiliation at the time of the award: Princeton University, Princeton, NJ, USA

Prize motivation: "for the physical modelling of Earth's climate, quantifying variability and reliably predicting global warming."

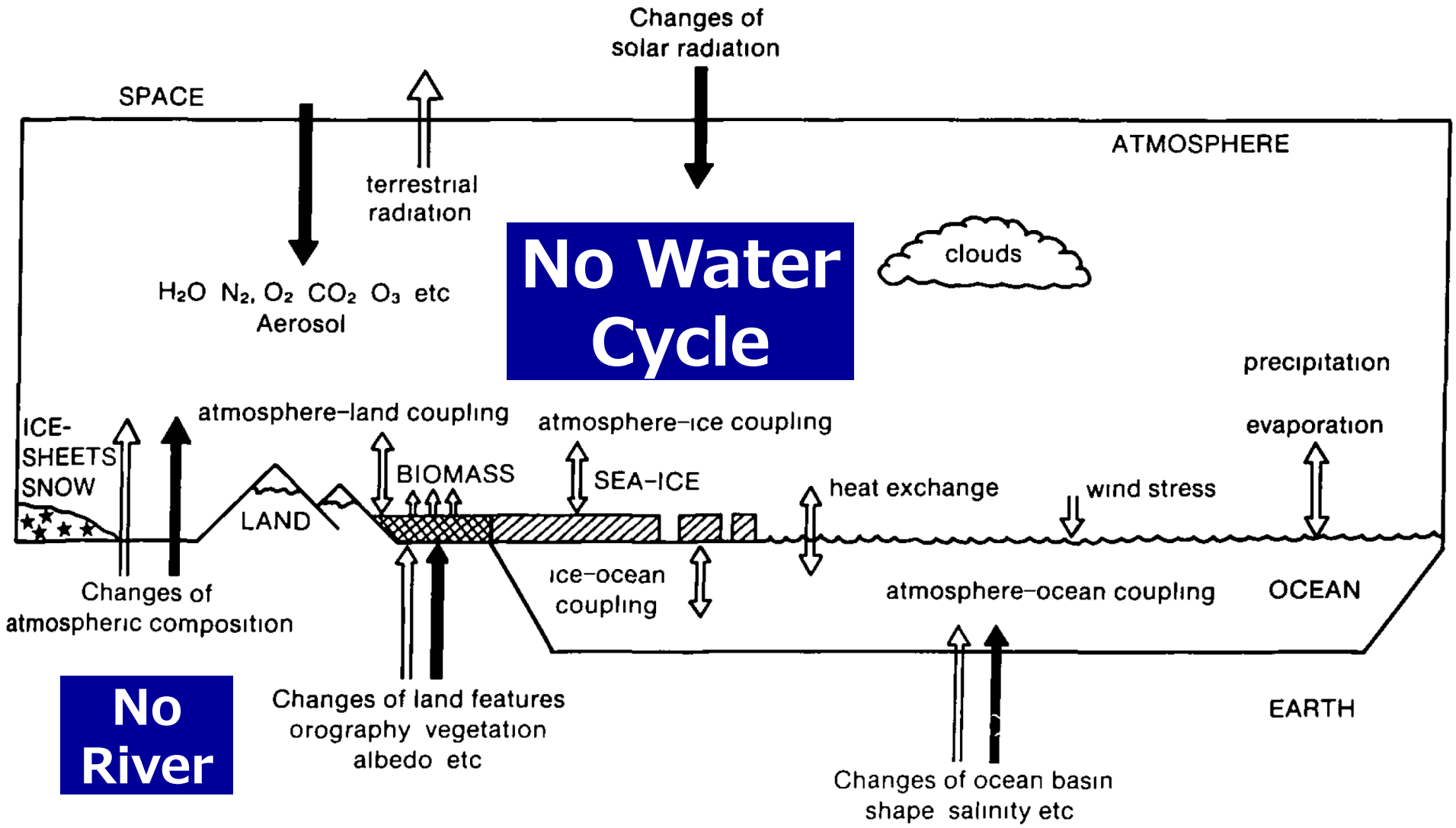
Prize share: 1/4

(March 20, 1996,
Suki's Home in Princeton)

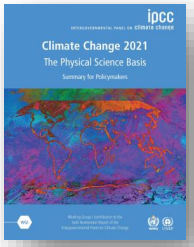
- "It's a physical science. Modeling of climate is solely based on physical theory and well-known physics."
  by Royal Swedish Academy of Sciences on Oct. 5, 2021.

MLA style: Syukuro Manabe – Facts – 2021. NobelPrize.org. Nobel Prize Outreach AB 2021. Sun. 10 Oct 2021. <https://www.nobelprize.org/prizes/physics/2021/manabe/facts/>

In IPCC FAR(1990)
from Houghton "The Global Climate"(1984)



AR6 WGI Ch8 (2021) "Water cycle changes"



(b) Water fluxes

Units in thousands of km³ per year

(km³/year)

Land precipitation 120±10%

Ocean to land water vapour transport 46±10%

Ocean precipitation 424±10%

Land evaporation 74±10%

Land ice discharge 3±40%

Inland drainage basin 1±30%

Ocean evaporation 470±10%

Human water use 24±10%

River discharge 46±10%

Groundwater recharge 13±60

Fresh groundwater discharge 0.25±90%

Saline groundwater discharge 4±70%

Observed warming

Contributions to warming based on two complementary approaches

a) Observed warming 2010-2019 relative to 1850-1900

b) Aggregated contributions to 2010-2019 warming relative to 1850-1900, assessed from attribution studies

c) Contributions to 2010-2019 warming relative to 1850-1900, assessed from radiative forcing studies

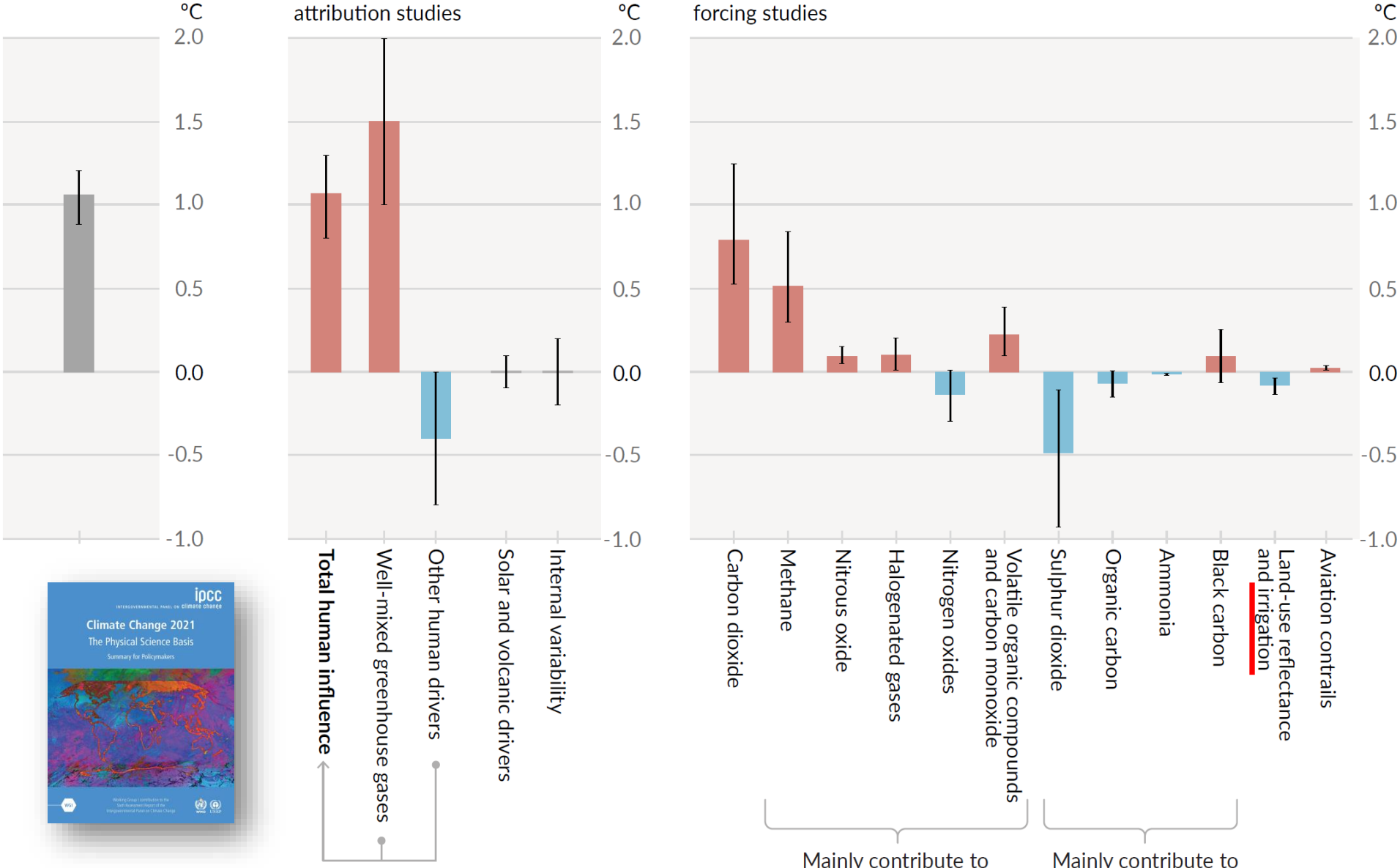
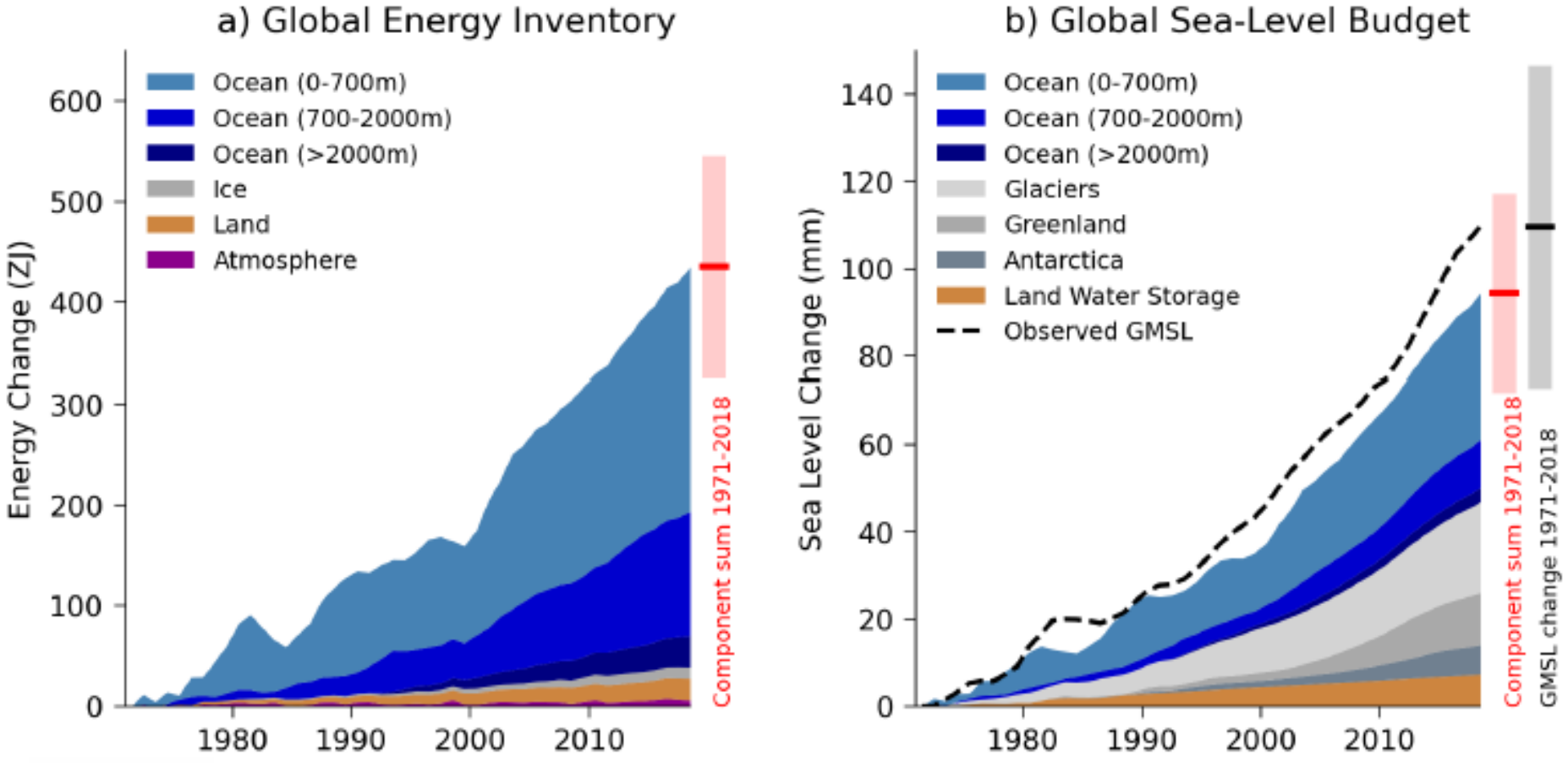
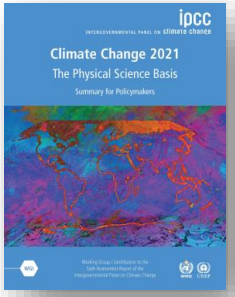


Figure SPM.2: Assessed contributions to observed warming in 2010–2019 relative to 1850–1900.



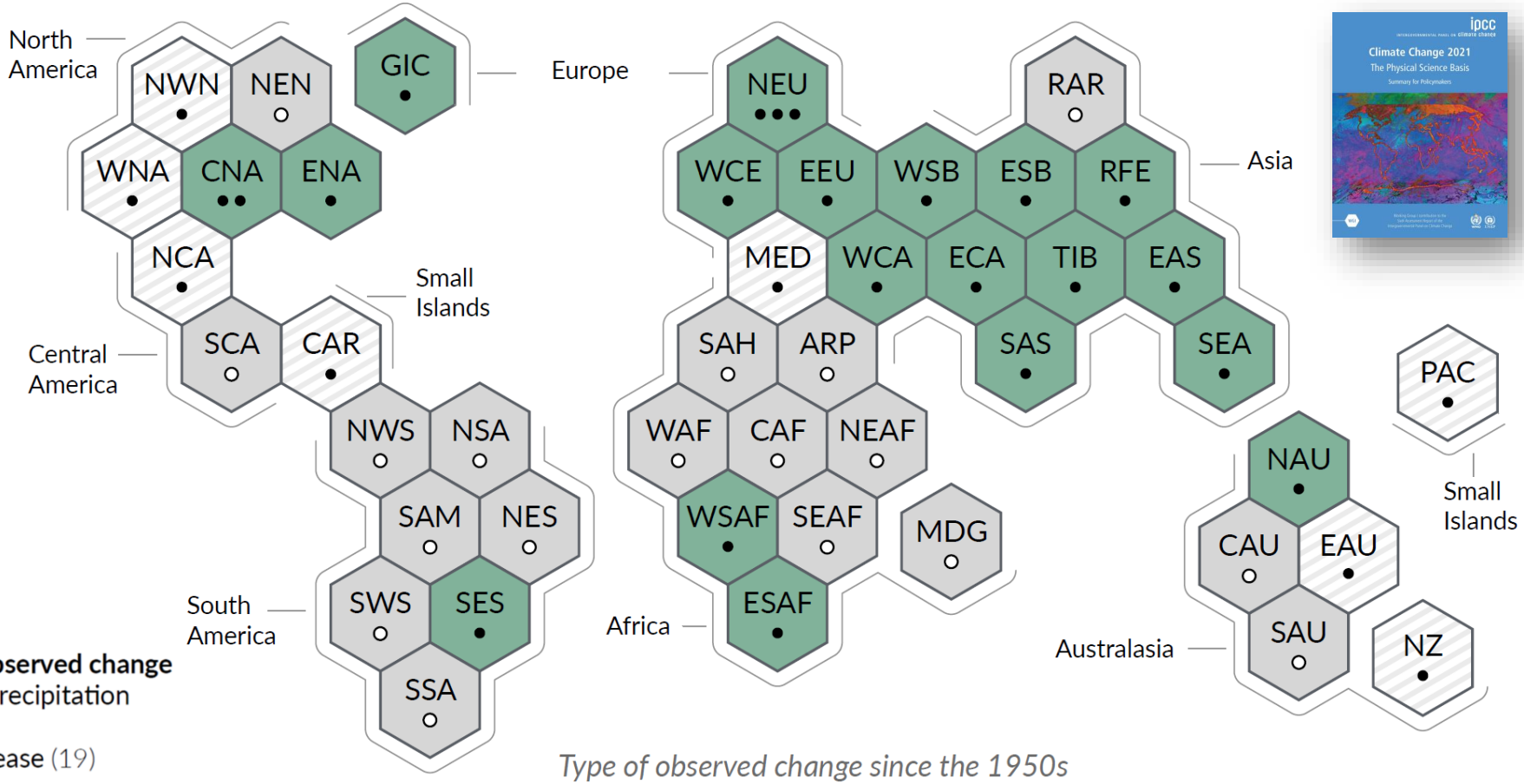


Cross-Chapter 9.1, Figure 1:
Global Energy Inventory and Sea Level Budget.

FAQ 9.2: “Reservoirs and aquifers on land have reduced, which contributed about an 8% increase in sea level.”

(7.3 mm sea level rise for 1971-2018)

b) Synthesis of assessment of observed change in **heavy precipitation** and confidence in human contribution to the observed changes in the world's regions



Type of observed change in heavy precipitation

- Increase (19)
- Decrease (0)
- Low agreement in the type of change (8)
- Limited data and/or literature (18)

Figure SPM.3: Synthesis of assessed observed and attributable regional changes.

Confidence in human contribution to the observed change

- ●●● High
- ●● Medium
- ● Low due to limited agreement
- ○ Low due to limited evidence

c) Synthesis of assessment of observed change in **agricultural and ecological drought** and confidence in human contribution to the observed changes in the world's regions

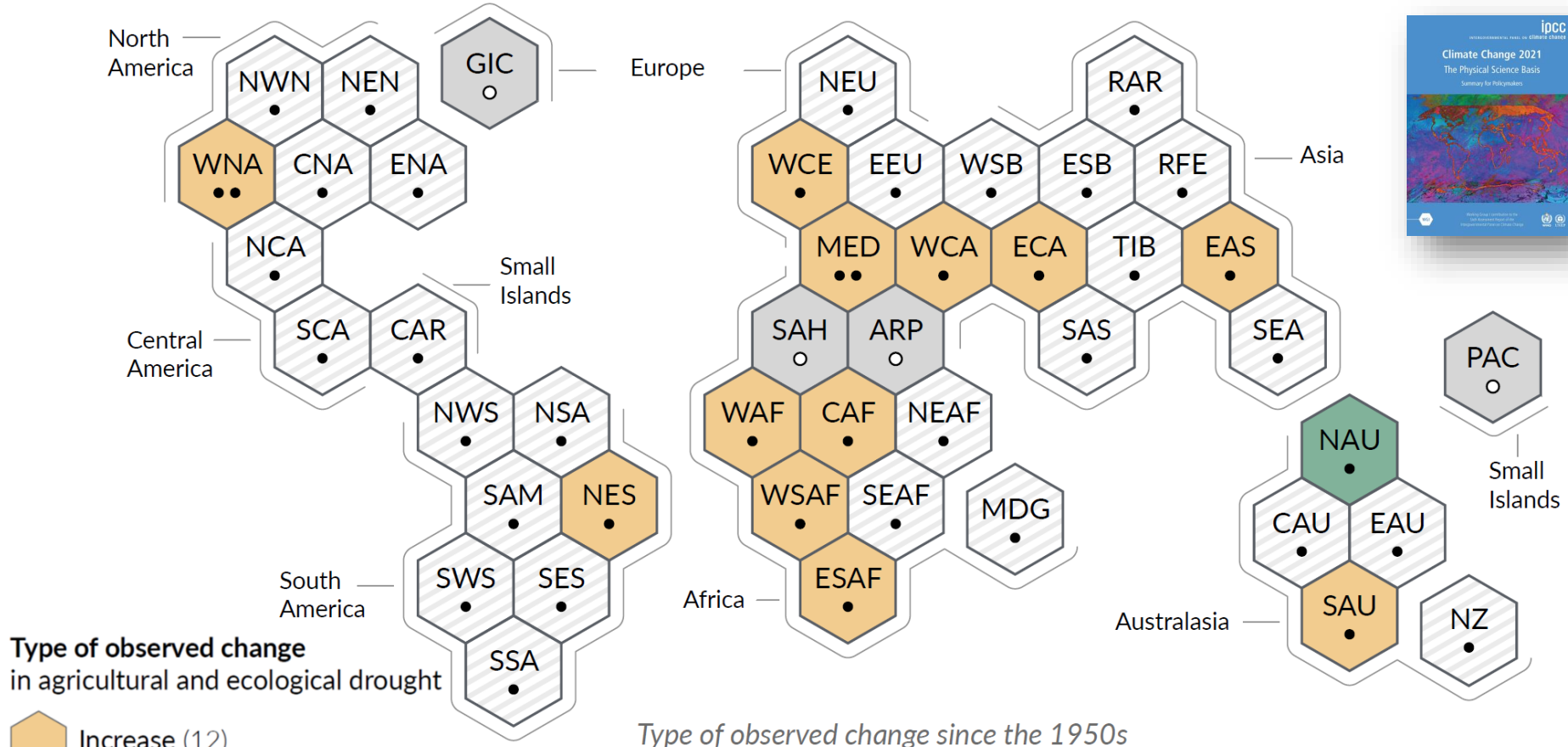
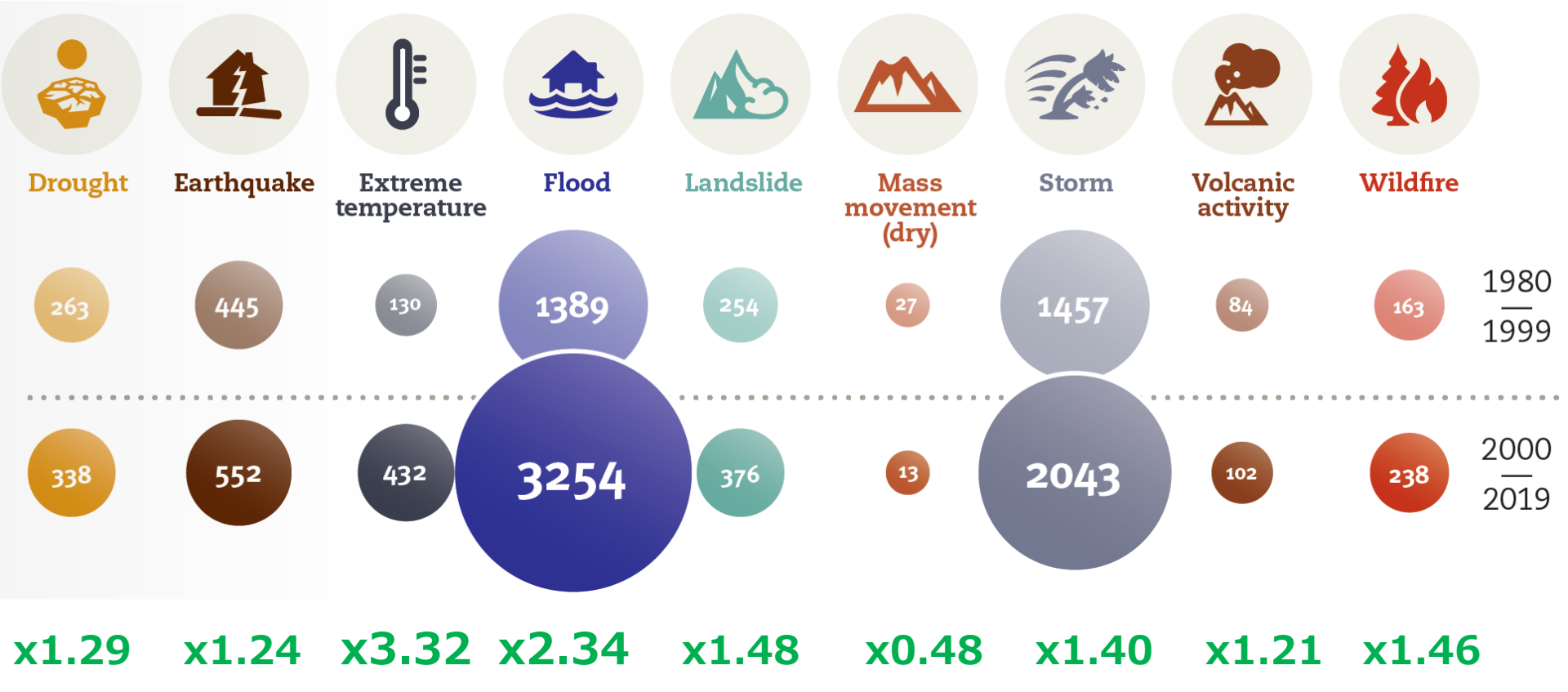
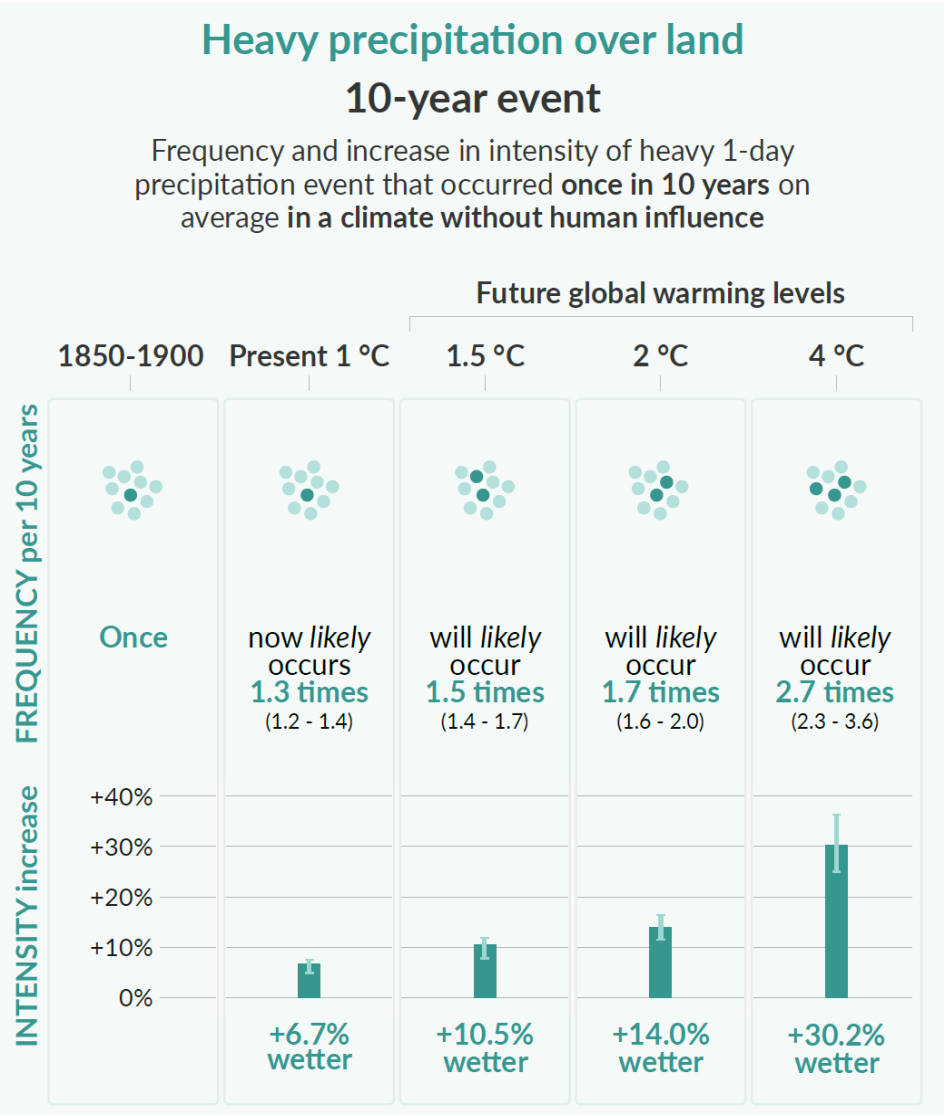


Figure SPM.3: Synthesis of assessed observed and attributable regional changes.

The human cost of disasters: an overview of the last 20 years (2000-2019) by UNDRR
https://www.undrr.org/publication/human-cost-disasters-overview-last-20-years-2000-2019

Changes in the reporting cases
(by UNDRR based on EM-DAT)
1980-99 vs 2000-19





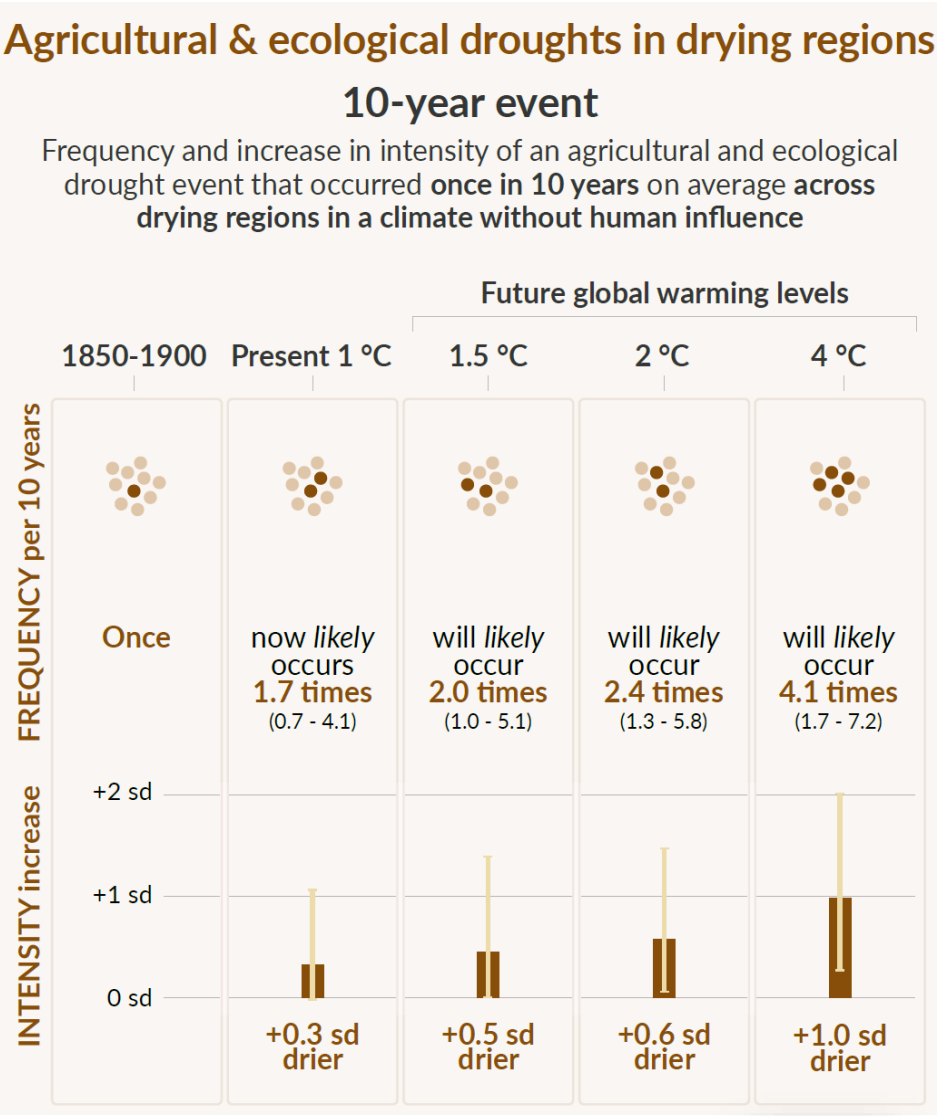
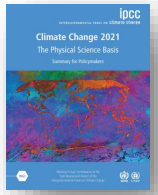
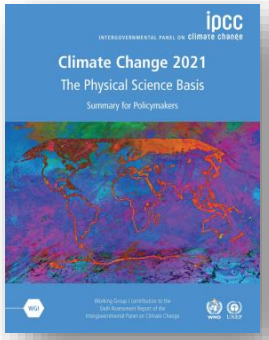


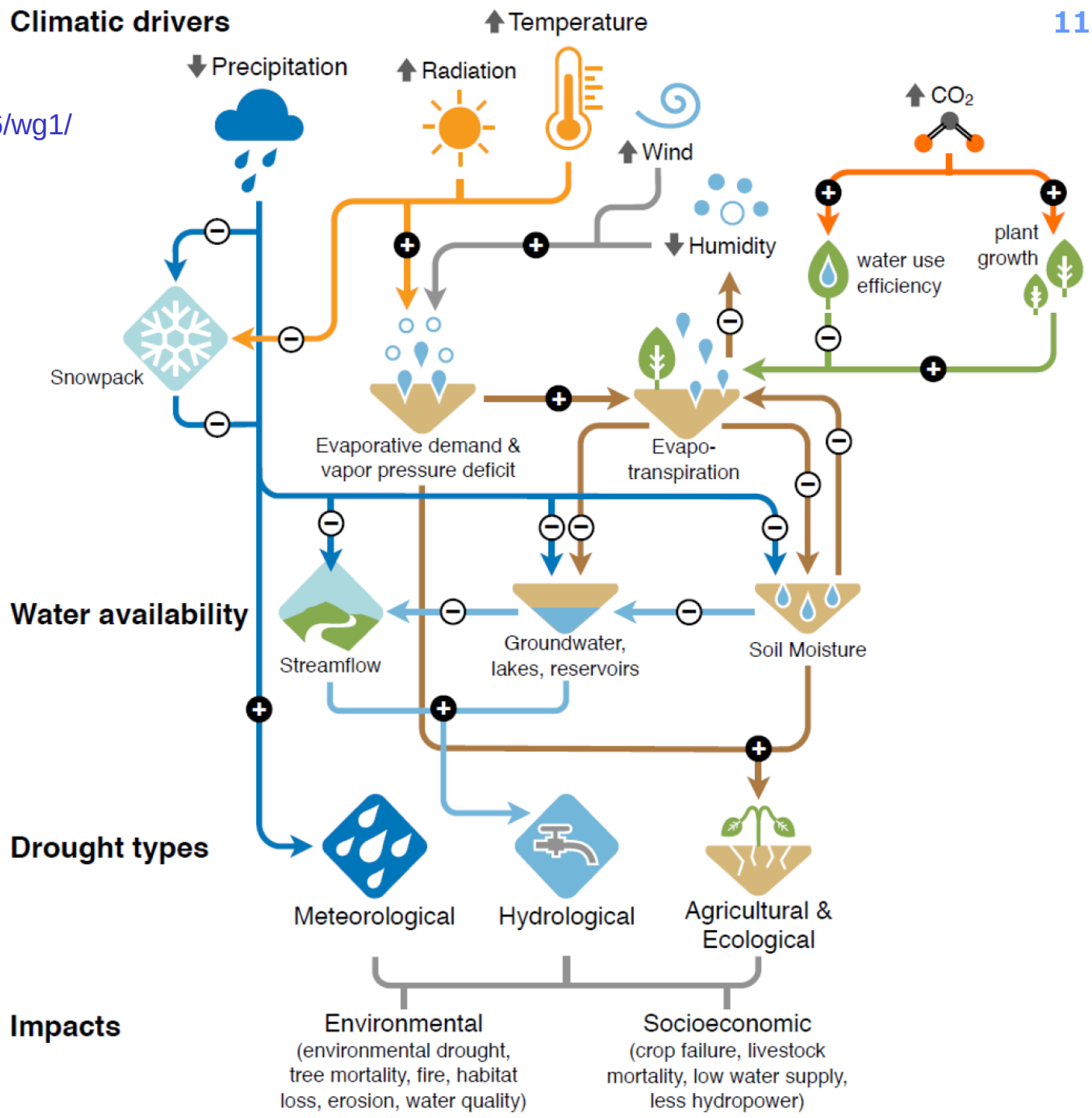
Figure SPM.6: Projected changes in the intensity and frequency of extreme precipitation over land and agricultural and ecological droughts in drying regions.

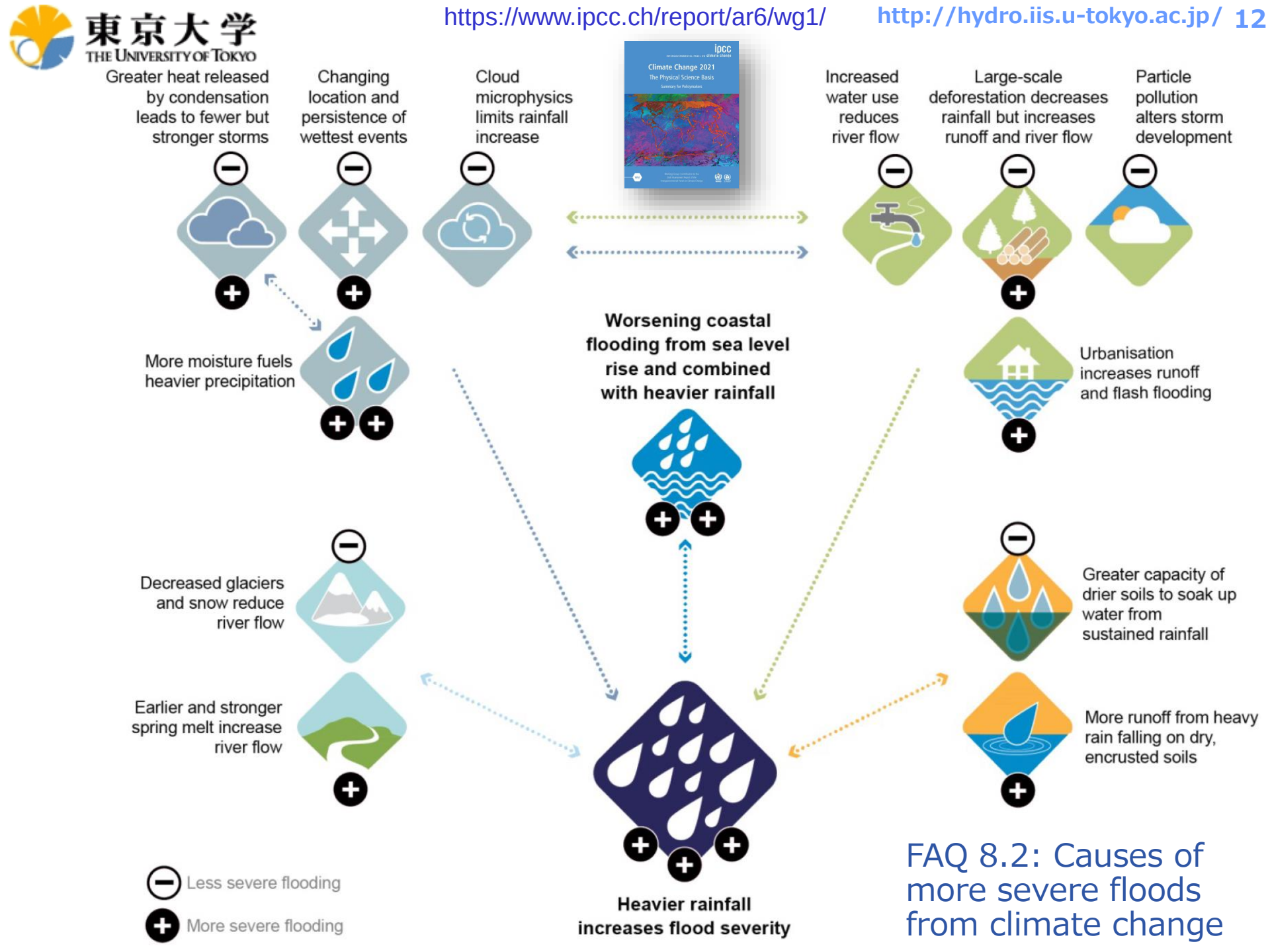


https://www.ipcc.ch/report/ar6/wg1/

Figure 8.6: Climatic drivers of drought, effects on water availability, and impacts. Plus and minus signs denote the direction of change that drivers have on factors such as snowpack, evapotranspiration, soil moisture, and water storage.

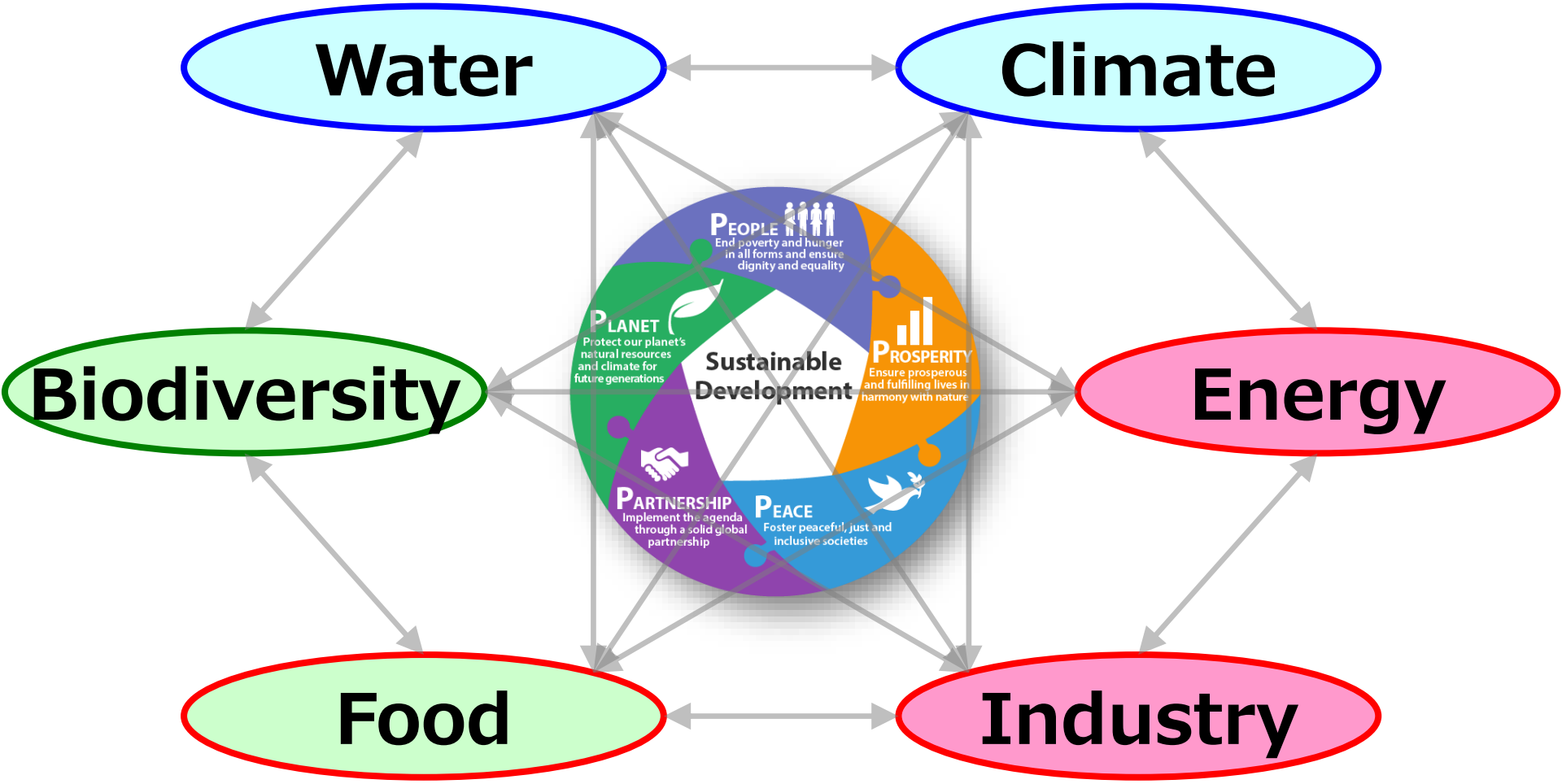






FAQ 8.2: Causes of more severe floods from climate change

"SDGs Nexus"


Water
Climate
Biodiversity
Energy
Food
Industry
PEOPLE
End poverty and hunger in all forms and ensure dignity and equality
PLANET
Protect our planet's natural resources and climate for future generations
Sustainable Development
PROSPERITY
Ensure prosperous and fulfilling lives in harmony with nature
PARTNERSHIP
Implement the agenda through a solid global partnership
PEACE
Foster peaceful, just and inclusive societies

Remarks

- Climate change is the “water change.”
  - Water is the delivering mechanism of climate change impacts to society.
- Climate change adaptation should be/can be integrated into water resources management, land planning, disaster risk management, and sustainable development.
  - Reducing vulnerability and exposure to present climate variability is the first step towards adaptation to future climate change and nourishes climate resilient water management on local scales.