IPCC

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

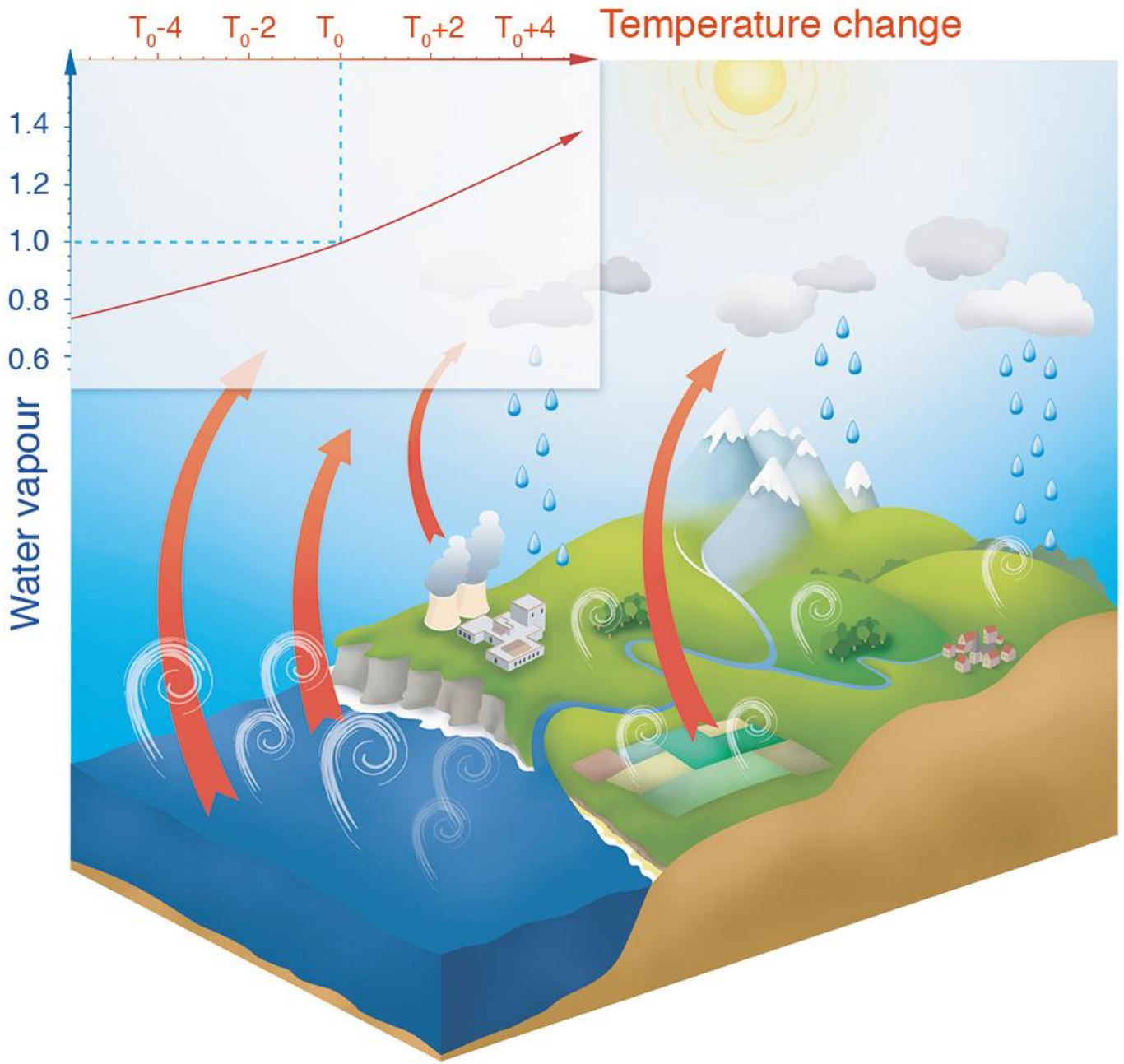
WMO UNEP

Climate Change and Effects

http://www.ozgurzeydan.com/

Climate Change and Effects

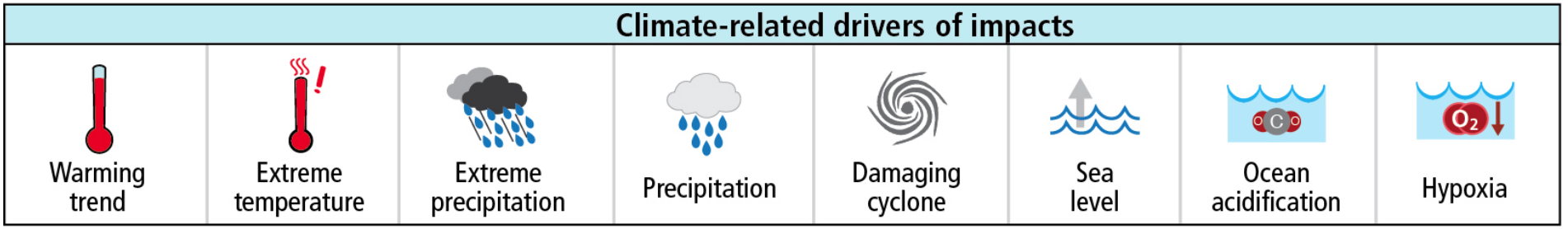
- Increasing global temperatures → changes climatic factors in long term.
- Climatic factors: temperature, evaporation, precipitation, wind
- Effects of climate change is regional!



http://www.climatechange2013.org/images/figures/WGI_AR5_FigFAQ8.1-1.jpg

Impacts of Climate Change

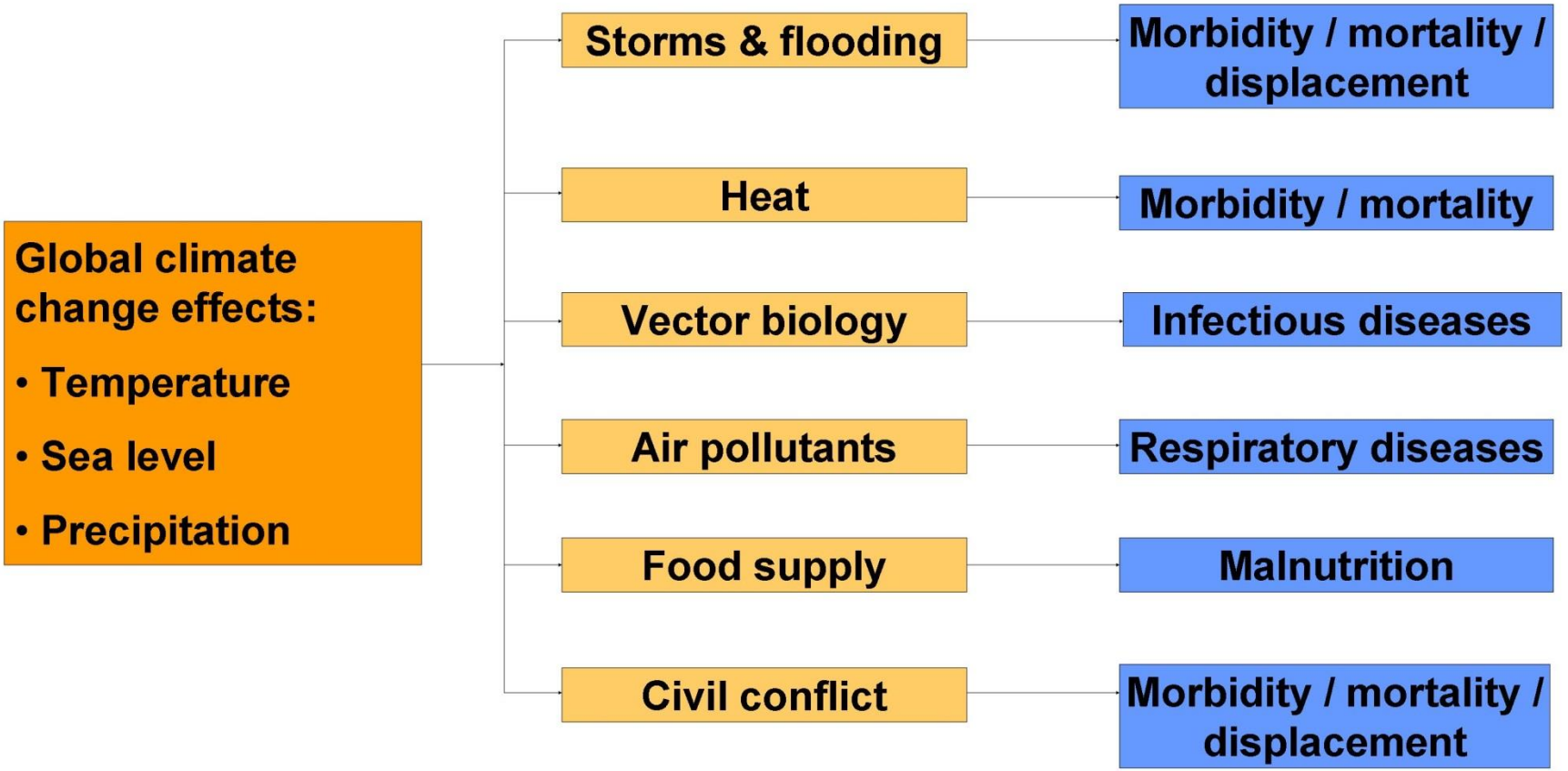
- Increasing temperature
- Shrinking ice sheets
- Sea level rise
- Extreme weather events
- Biodiversity losses
- Water stress
- Forest fires
- Change in land use
- Floods
- Droughts
- Ocean acidification
- Sectorial effects (energy, health, food, tourism)



Impacts of Climate Change

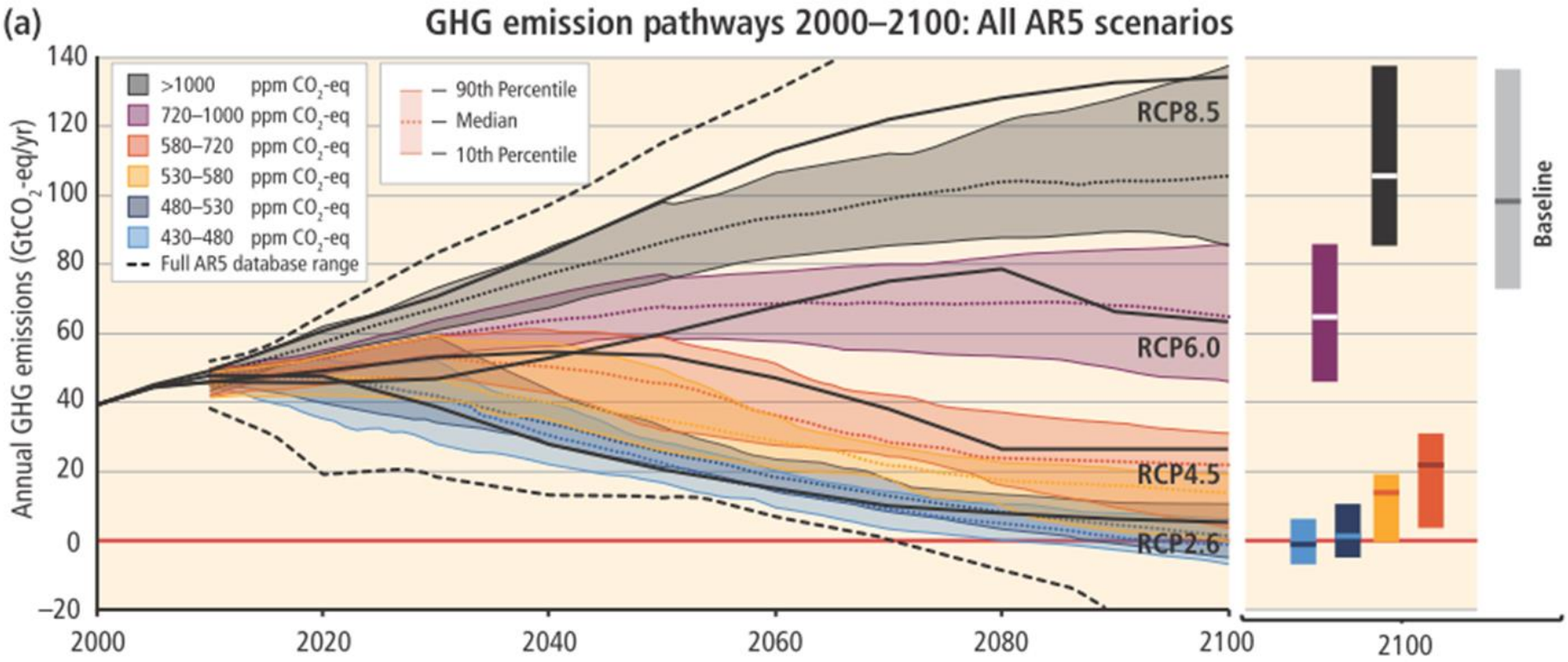
https://www.wwf.org.tr/basin_bultenleri/basin_bultenleri/?8100/yeni-ipcc-raporu-kuresel-isinmayi-birbucuk-derecede-tutmak-icin-acilen-harekete-gecilmeli#

Potential Impacts of Global Climate Change on Human Health



http://health.state.tn.us/environmental/climatechange.htm

Climate Change Scenarios



A Representative Concentration Pathway (RCP) is a greenhouse gas concentration (not emissions) trajectory adopted by the IPCC.

Four RCPs produced from *Integrated Assessment Models* were selected from the published literature and are used in the present IPCC Assessment as a basis for the *climate* predictions and *projections* presented in WGI AR5 Chapters 11 to 14 (IPCC, 2013b):

RCP2.6

One pathway where *radiative forcing* peaks at approximately 3 W/m^2 before 2100 and then declines (the corresponding ECP assuming constant emissions after 2100).

RCP4.5 and RCP6.0

Two intermediate stabilization pathways in which *radiative forcing* is stabilized at approximately 4.5 W/m^2 and 6.0 W/m^2 after 2100 (the corresponding ECPs assuming constant concentrations after 2150).

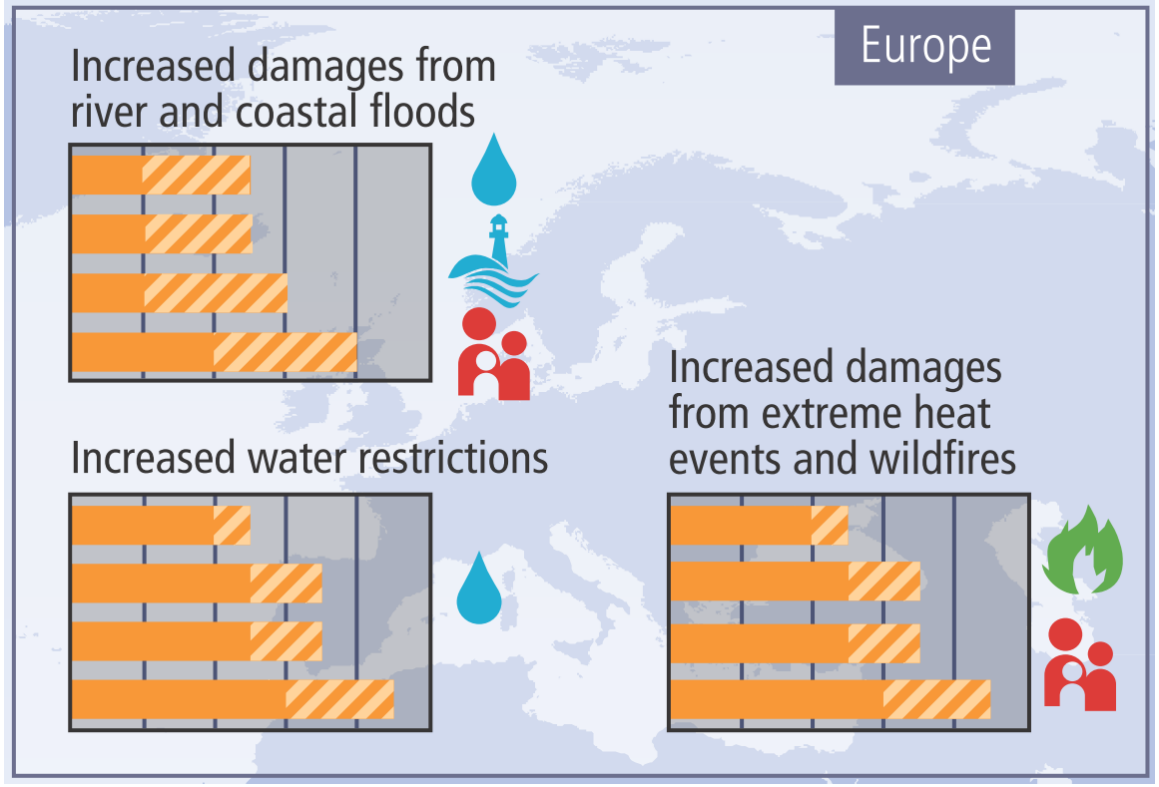
RCP8.5

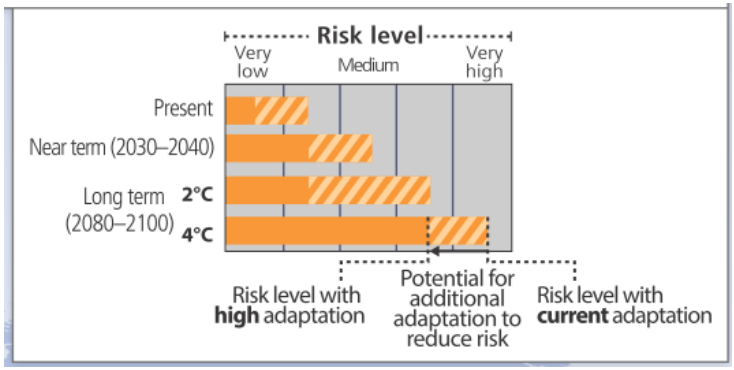
One high pathway for which *radiative forcing* reaches >8.5 W/m^2 by 2100 and continues to rise for some amount of time (the corresponding ECP assuming constant emissions after 2100 and constant concentrations after 2250).

Projected change in global mean surface air temperature and global mean sea level rise for the mid- and late 21st century relative to the reference period of 1986–2005.

		2046–2065		2081–2100	
	Scenario	**Mean**	***Likely* range[c]**	**Mean**	***Likely* range[c]**
Global Mean Surface Temperature Change (°C)[a]	RCP2.6	1.0	0.4 to 1.6	1.0	0.3 to 1.7
	RCP4.5	1.4	0.9 to 2.0	1.8	1.1 to 2.6
	RCP6.0	1.3	0.8 to 1.8	2.2	1.4 to 3.1
	RCP8.5	2.0	1.4 to 2.6	3.7	2.6 to 4.8
	Scenario	**Mean**	***Likely* range[d]**	**Mean**	***Likely* range[d]**
Global Mean Sea Level Rise (m)[b]	RCP2.6	0.24	0.17 to 0.32	0.40	0.26 to 0.55
	RCP4.5	0.26	0.19 to 0.33	0.47	0.32 to 0.63
	RCP6.0	0.25	0.18 to 0.32	0.48	0.33 to 0.63
	RCP8.5	0.30	0.22 to 0.38	0.63	0.45 to 0.82

Regional Key Risks





Representative key risks for each region for

Physical systems

- Glaciers, snow, ice and/or permafrost
- Rivers, lakes, floods and/or drought
- Coastal erosion and/or sea level effects

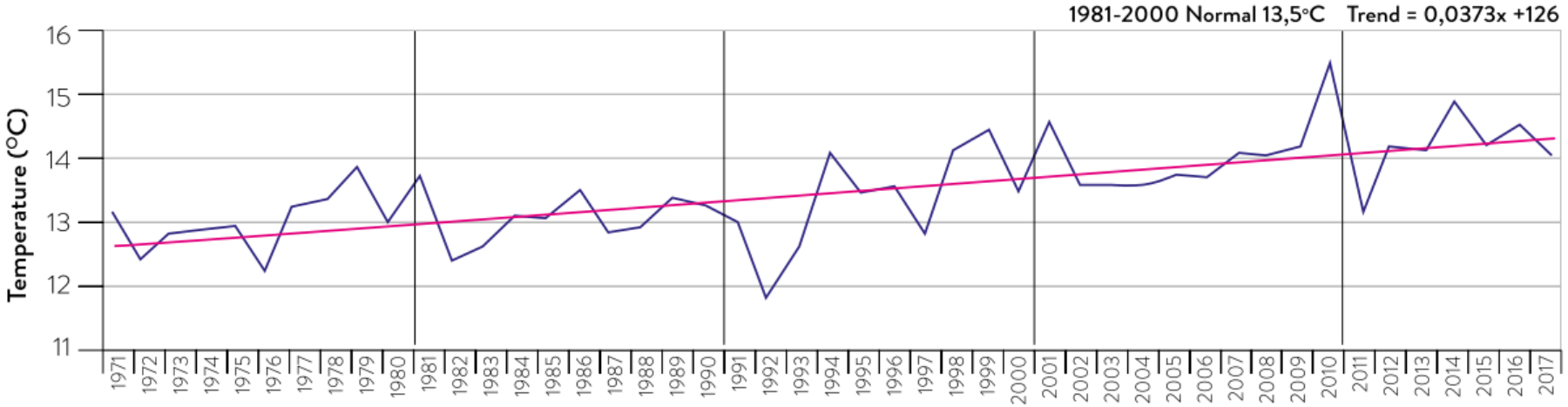
Biological systems

- Terrestrial ecosystems
- Wildfire
- Marine ecosystems

Human and managed systems

- Food production
- Livelihoods, health and/or economics

Annual mean temperatures in Turkey, (1971-2017)



Seventh National Communication of Turkey Under The UNFCCC
https://unfccc.int/sites/default/files/resource/496715_Turkey-NC7-1-7th%20National%20Communication%20of%20Turkey.pdf

Tendency Analysis for Annual Total Precipitation

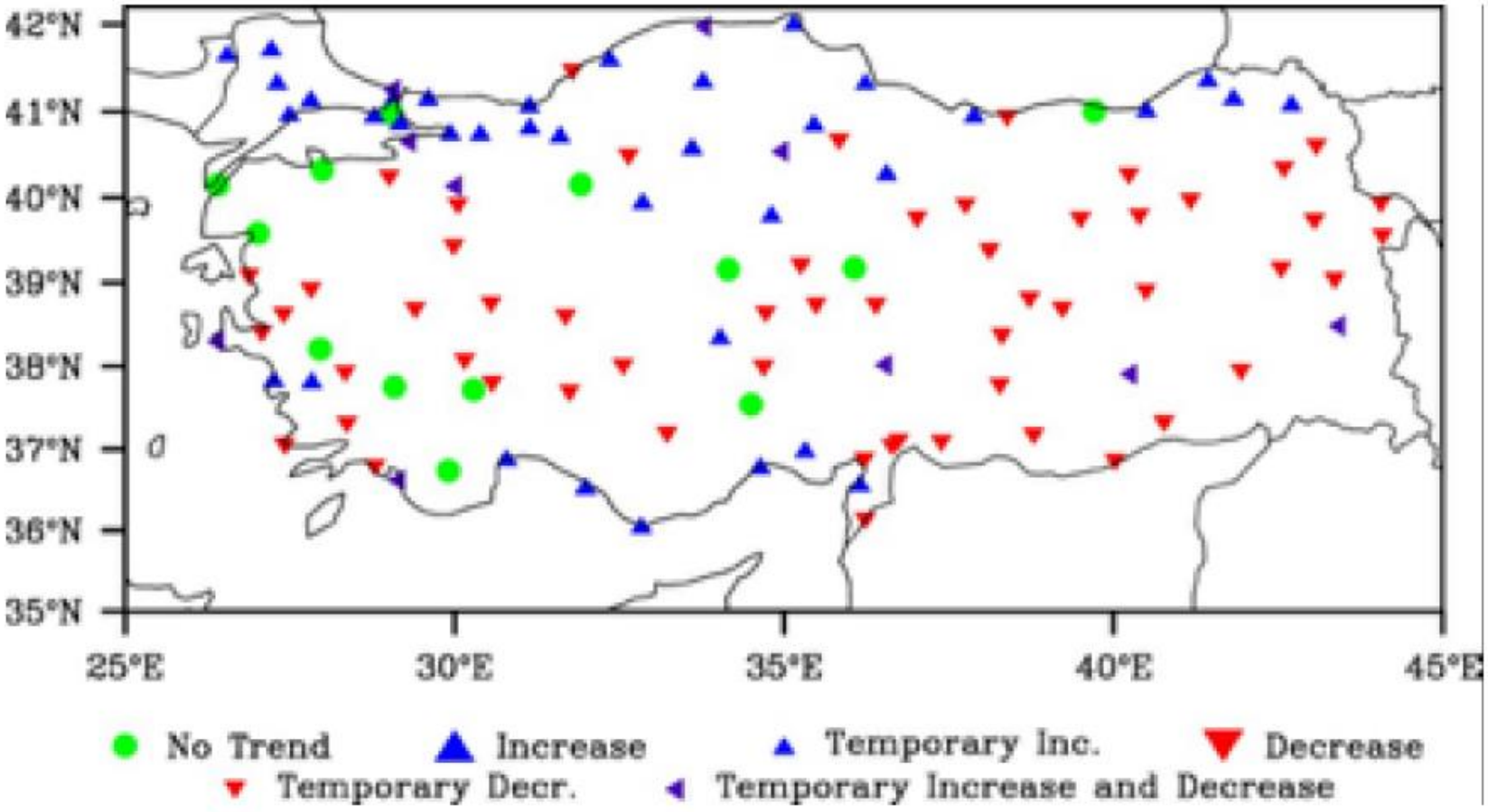


Figure 6. 4 Tendency Analysis for Annual Total Precipitation (Source: Efe et al. 2015)

Seventh National Communication of Turkey Under The UNFCCC

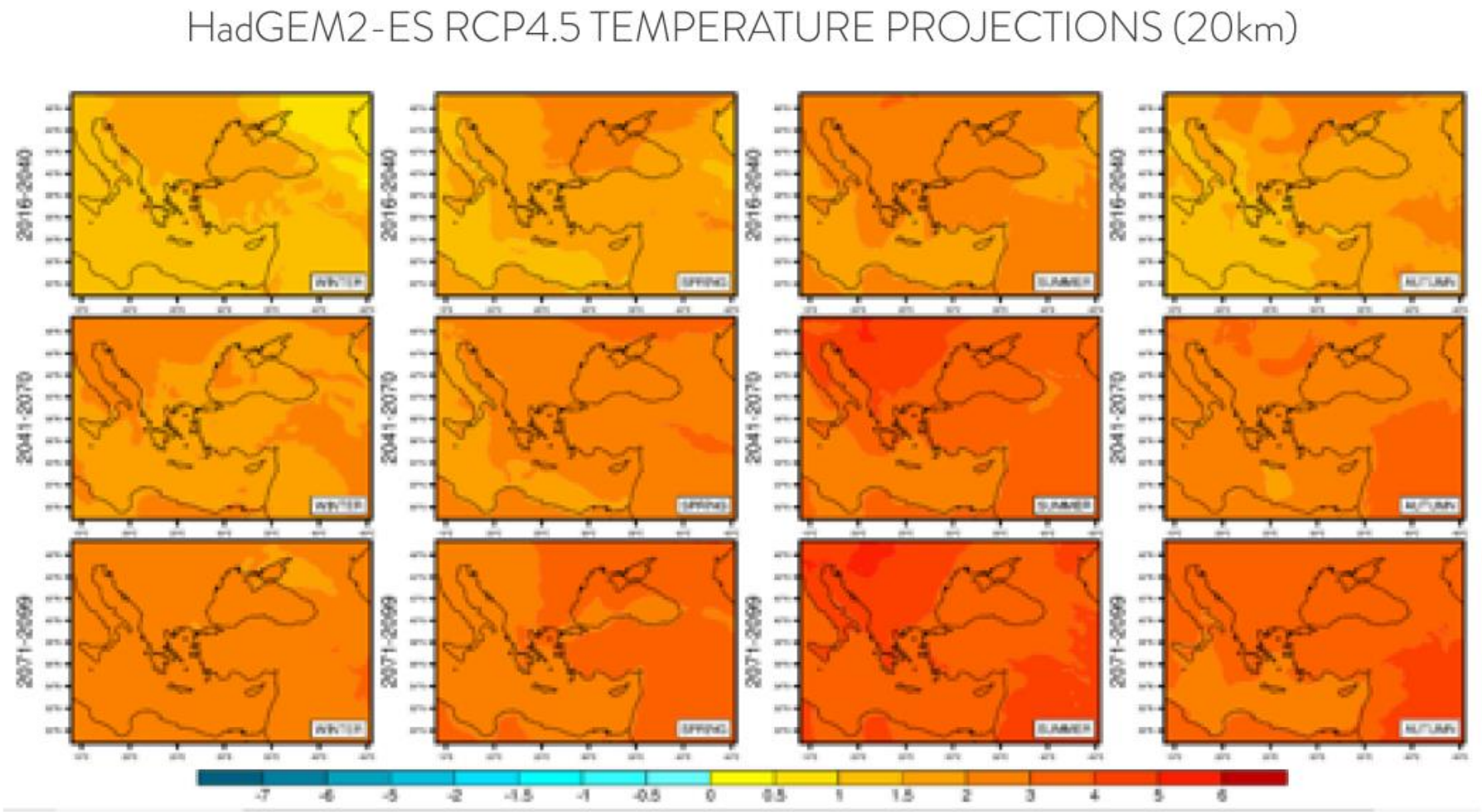


Figure 6. 5 TSMS temperature projections according to RCP4.5
(Source: Turkish State Meteorological Service, 2015)

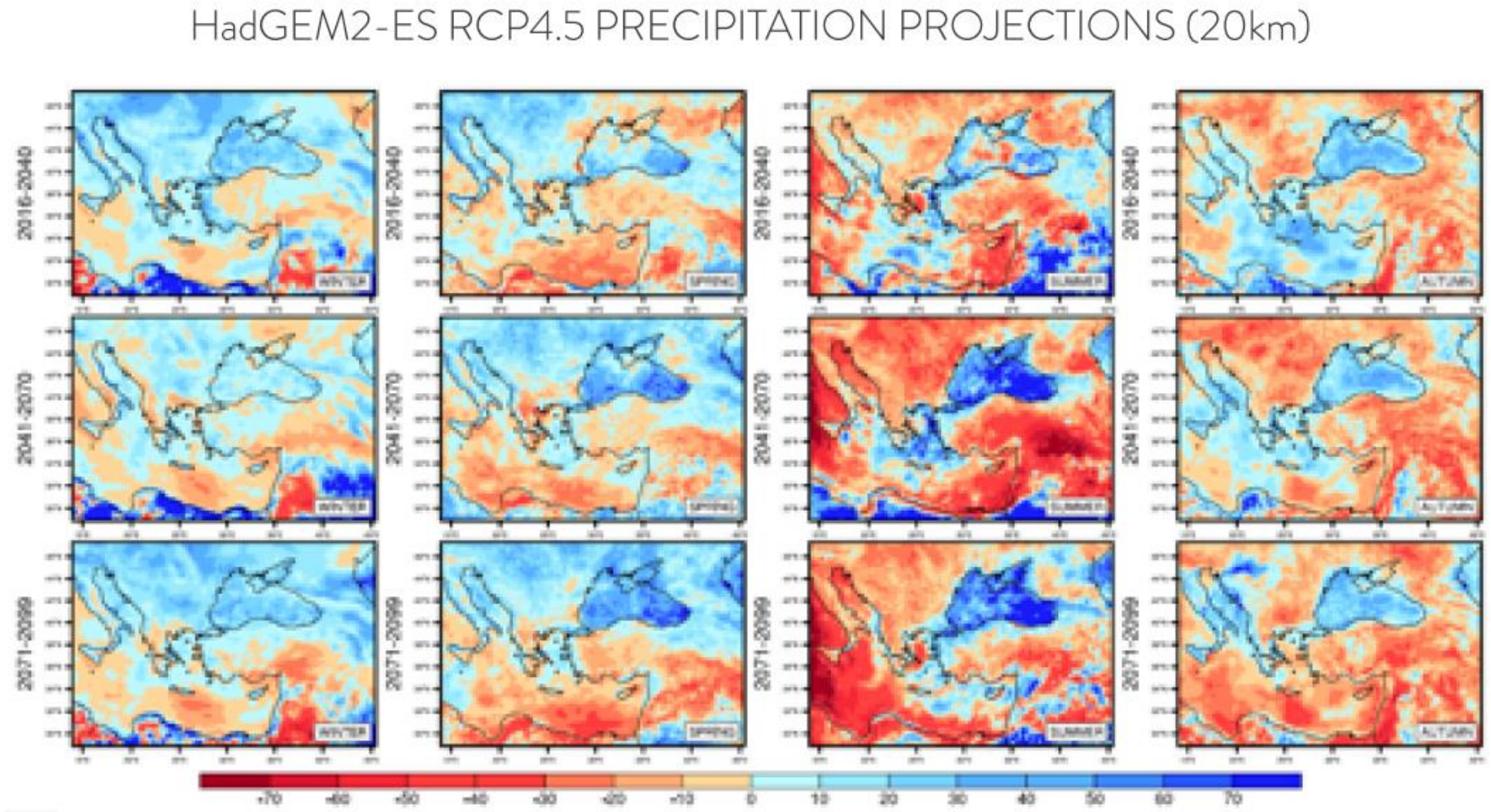


Figure 6. 6 TSMS precipitation projections according to RCP4.5

(Source: Turkish State Meteorological Service, 2015)

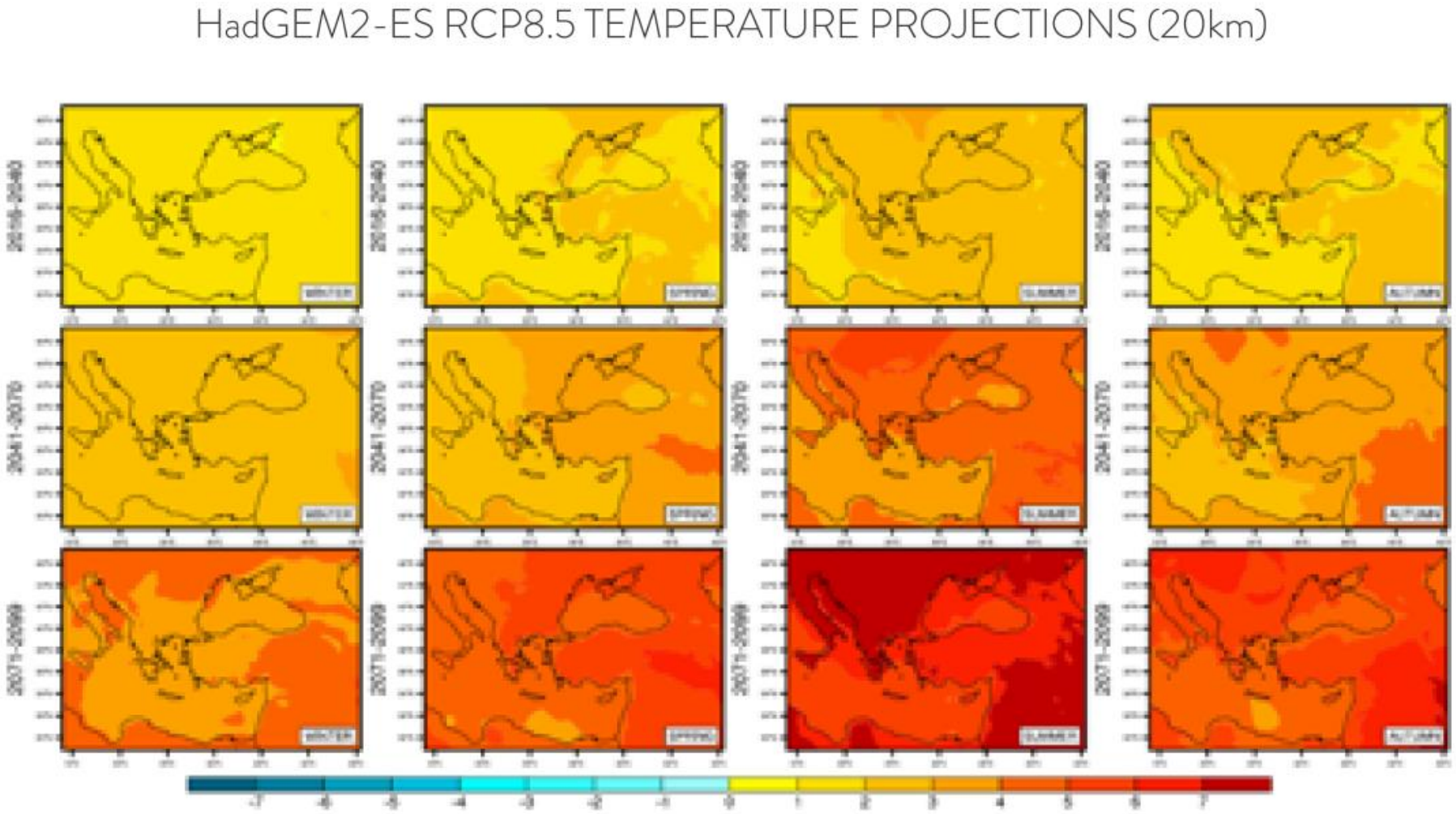


Figure 6. 9 TSMS temperature projections according to RCP8.5
(Source: Turkish State Meteorological Service, 2015)

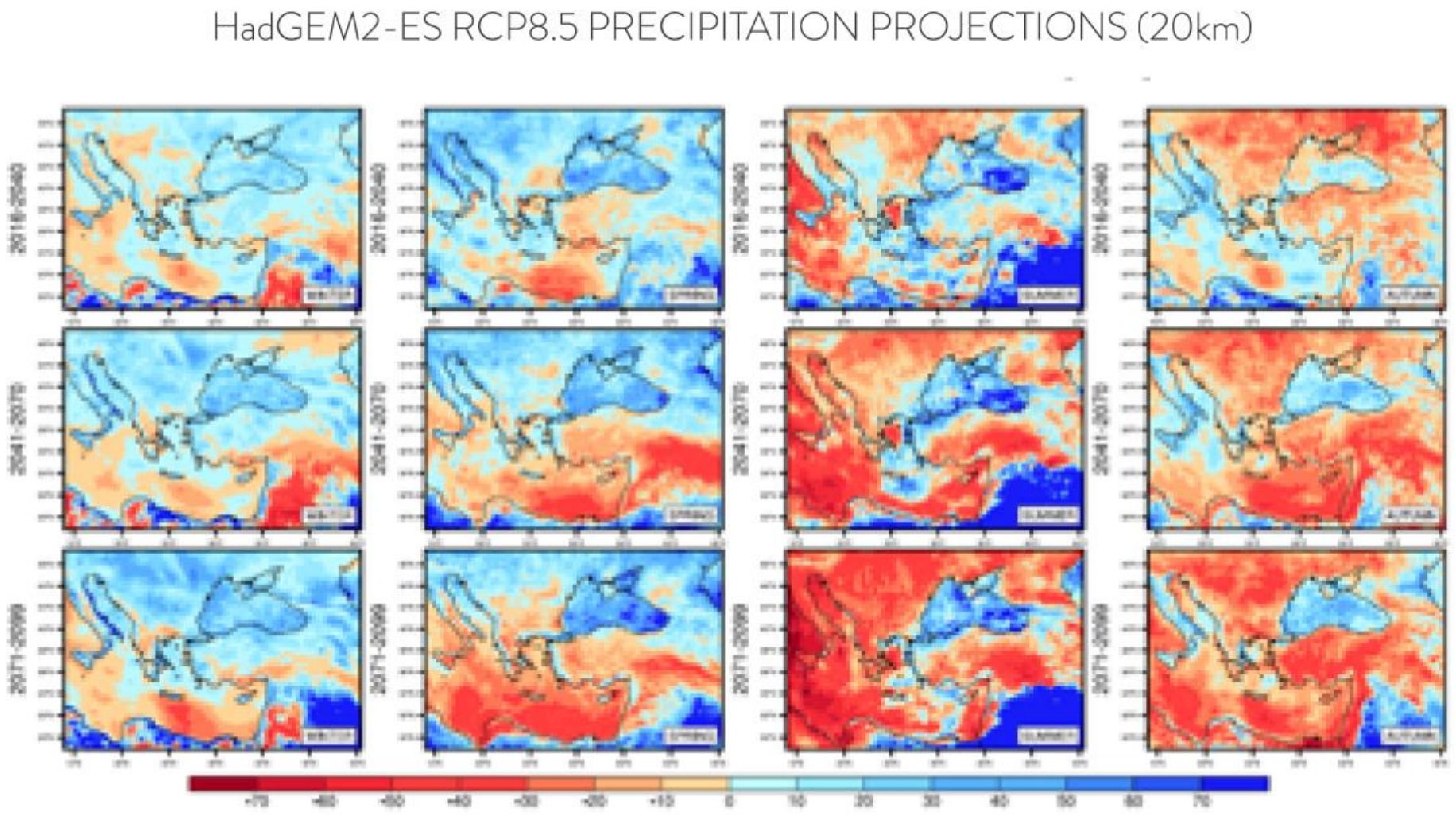


Figure 6. 10 TSMS precipitation projections according to RCP8.5
(Source: Turkish State Meteorological Service, 2015)

Climate Change Vulnerabilities

- European Environmental Agency defines “vulnerability” as “The degree to which a system is susceptible to and unable to cope with, injury, damage or harm”

Vulnerabilities of Turkey

Temperature	Rise by 2-3°C in average
Precipitation	Precipitation will significantly reduce
Agriculture	Food production will be affected due to factors like desertification, increase in fire risk, fast spread of pests
Forestry	Forest fires
Water resources	Coastal erosion, flood and inundation Algal blooms will also deteriorate the ecological balance in the lakes
Human health	Deaths and injuries related to extreme climate events Diseases transmitted via water and food Respiratory diseases Allergic diseases Diseases transmitted by vectors and rodents

Sixth National Communication of Turkey

Further Reading

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GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE VULNERABILITIES OF CERTAIN EUROPEAN COUNTRIES

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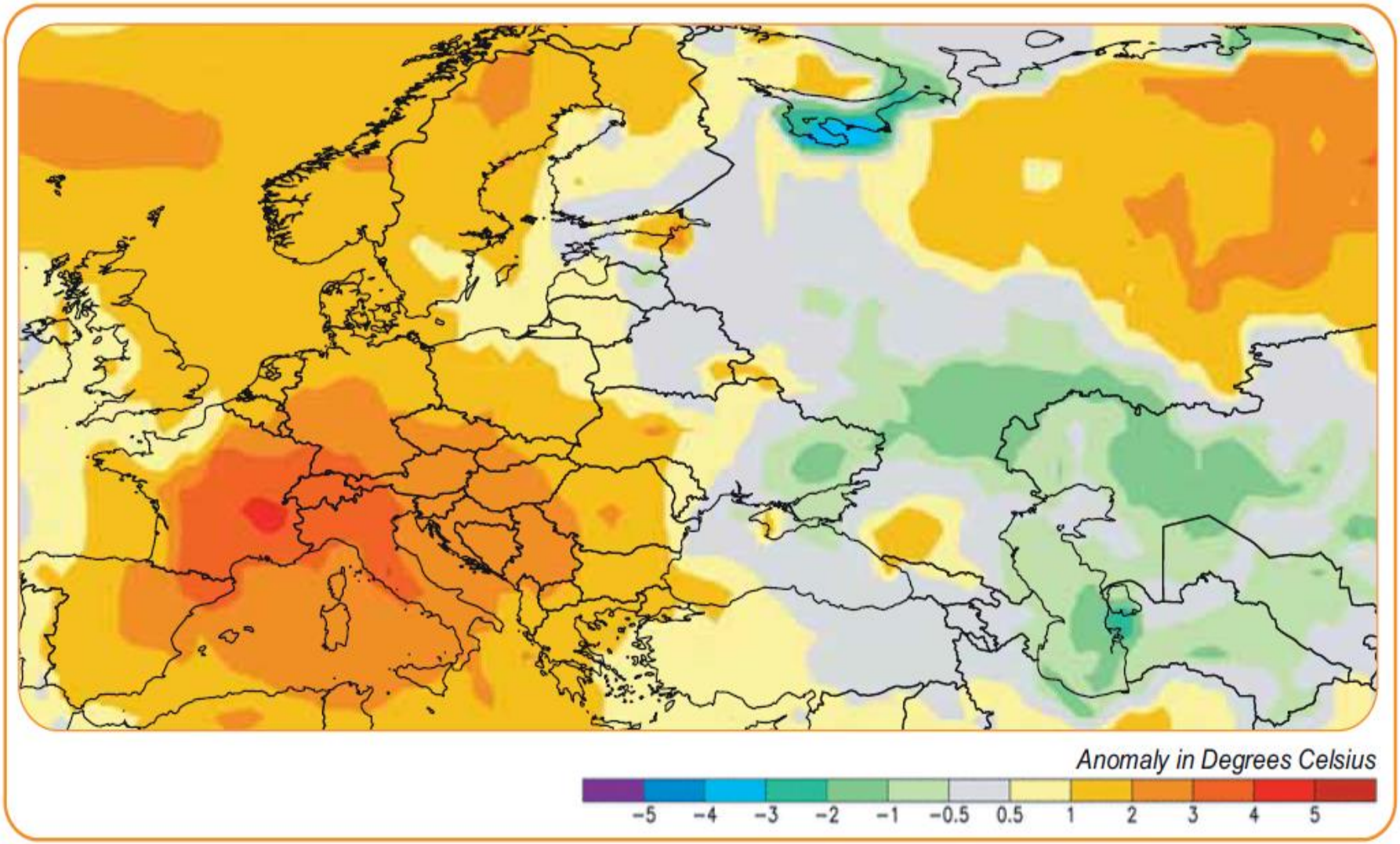
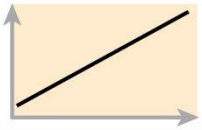
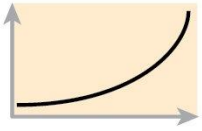
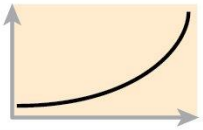
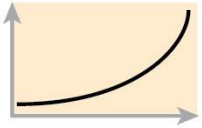
http://journalofyoungscientist.usamv.ro/pdf/vol_V_2017/Art22.pdf

Floods

2003 Europa Heat Wave



This map, produced from both in situ and satellite information (NDC/NOAA), shows the extreme deviation from the average as recorded from June to August 2003. In some areas the difference exceeds 4°C. Climatological base period is 1988-2003.

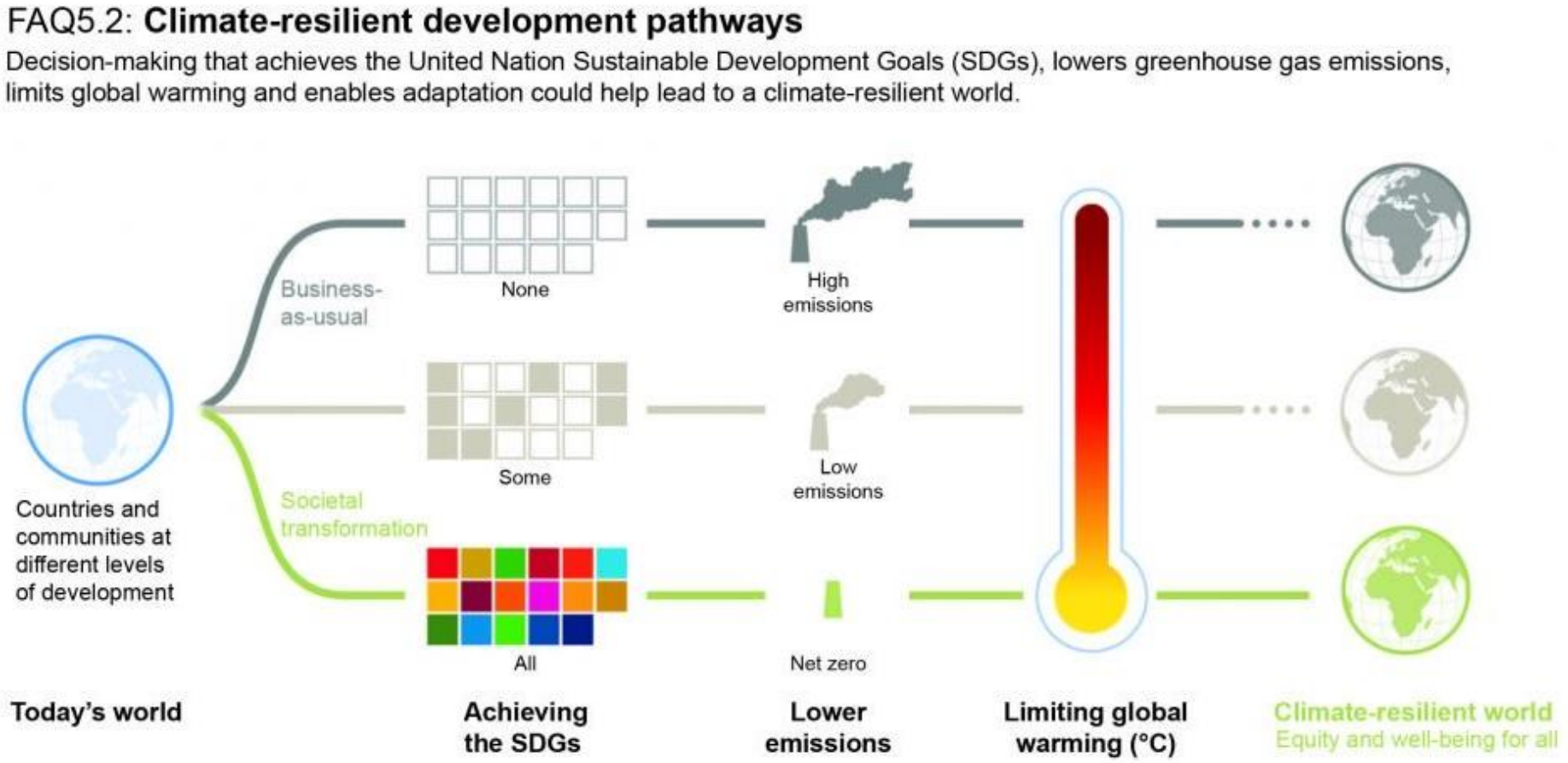
Sector	Climate change drivers	Sensitivity to climate change	Sign	Other drivers	Relative impact of climate change to other drivers
Winter tourism	• Temperature • Snow		Negative	• Population • Lifestyle • Income • Aging	Much less
Summer tourism	• Temperature • Rainfall • Cloudiness		Negative for suppliers in low altitudes and latitudes Positive for suppliers in high altitudes and latitudes Neutral for tourists	• Population • Income • Lifestyle • Aging	Much less
Cooling demand	• Temperature • Humidity • Hot spells		Positive for suppliers Negative for consumers	• Population • Income • Energy prices • Technology change	Less
Heating demand	• Temperature • Humidity • Cold spells		Negative for suppliers Positive for consumers	• Population • Income • Energy prices • Technology change	Less
Health services	• Temperature • Precipitation		Positive for suppliers Negative for consumers	• Aging • Income • Diet/lifestyle	Less
Water infrastructure and services	• Temperature • Precipitation • Storm Intensity • Seasonal Variability		Negative for water users Positive for suppliers Spatially heterogeneous	• Population • Income • Urbanization • Regulation	Less in developing countries Equal in developed countries
Transportation	• Temperature • Precipitation • Storm intensity • Seasonal variability • Freeze/thaw cycles		Negative for all users Positive for transport construction industry	• Population • Income • Urbanization • Regulation • Mode shifting • Consumer and commuter behavior	Much less in developing countries Less in developed countries
Insurance	• Temperature • Precipitation • Storm intensity • Seasonal variability • Freeze/thaw cycles		Negative for consumers Neutral for suppliers	• Population • Income • Regulation • Product innovation	Less or equal in developing countries Equal or more in developed countries

Climate Change Mitigation

- Climate mitigation is any action taken to permanently eliminate or reduce the long-term risk and hazards of climate change to human life, property.

- The International Panel on Climate Change (IPCC) defines mitigation as: "An anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases."

Climate Change Mitigation



https://www.ipcc.ch/sr15/

Climate Change Adaptation

- Climate adaptation refers to the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences.
- The IPCC defines adaptation as the, "adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities."

Climate Change Agreements Timeline

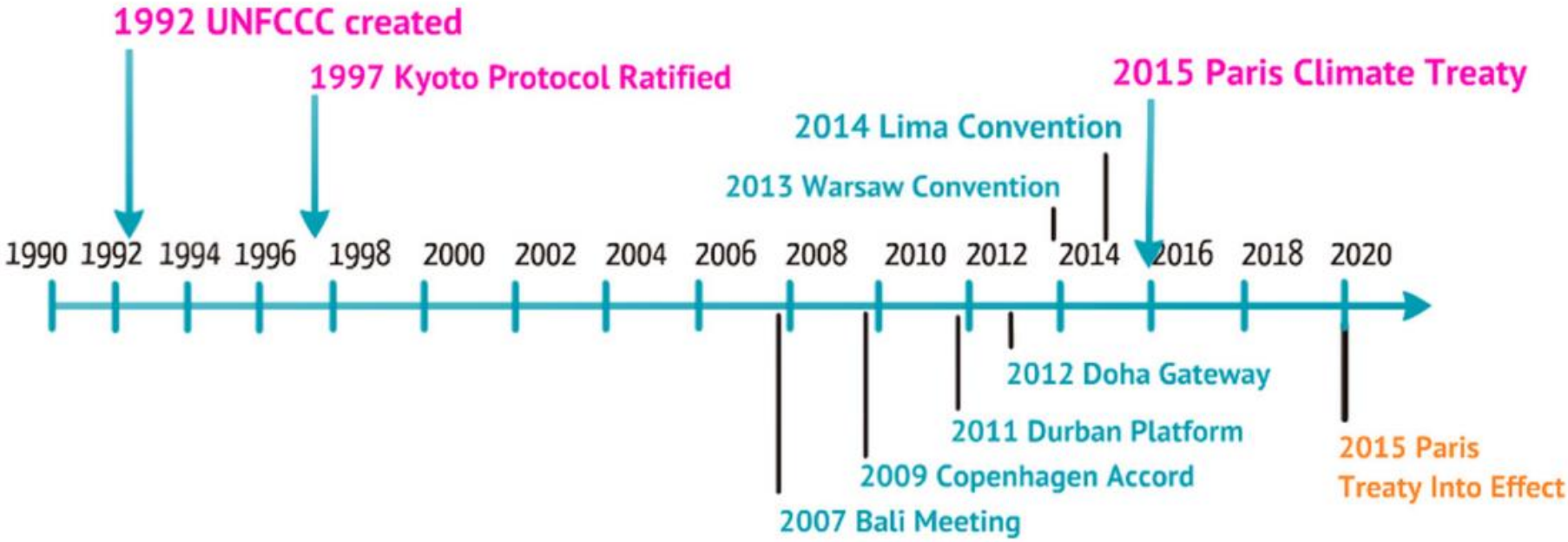


Fig. 1. Timeline of major international climate agreements and meetings under the UNFCCC.

https://scripps.ucsd.edu/centers/cmbc/wp-content/uploads/sites/39/2015/12/Eddebbar-et-al.-2015-The-Oceans-and-the-UNFCCC.pdf

The Paris climate agreement: key points

Temperatures

2100

- Keep warming "well below 2 degrees Celsius"
- Continue efforts to limit the rise in temperatures to 1.5 degrees Celsius"

Financing

2020-2025

- Rich countries must provide 100 billion dollars from 2020, as a "floor"
- Amount to be updated by 2025

Specialisation

- Developed countries must continue to "take the lead" in the reduction of greenhouse gases
- Developing nations are encouraged to "enhance their efforts" and move over time to cuts

Emissions goals

2050

- Aim for greenhouse gases emissions to peak "as soon as possible"
- From 2050: rapid reductions to achieve a balance between emissions from human activity and the amount that can be captured by "sinks"

Burden sharing

- Developed countries must provide financial resources to help developing countries
- Other countries are invited to provide support on a voluntary basis

Review mechanism

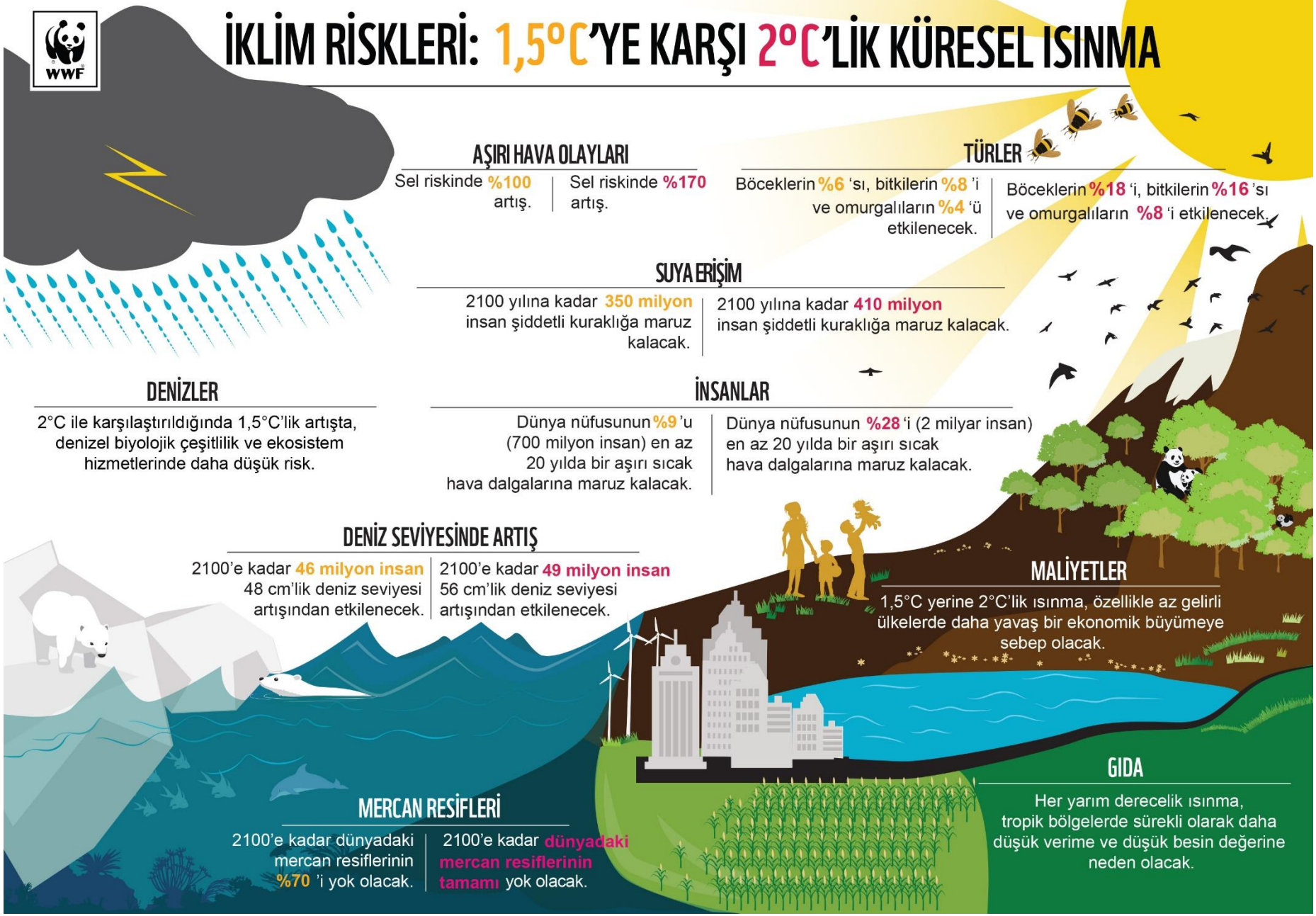
2025

- A review every five years. First mandatory world review: 2025
- Each review will show an improvement compared with the previous period

Climate-related losses

- Vulnerable countries have won recognition of the need for "averting, minimising and addressing" losses suffered due to climate change

İKLİM RİSKLERİ: 1,5°C'YE KARŞI 2°C'LİK KÜRESEL ISINMA



https://www.wwf.org.tr/basin_bultenleri/basin_bultenleri/?8100/yeni-ipcc-raporu-kuresel-isinmayi-birbucuk-derecede-tutmak-icin-acilen-harekete-gecilmeli#