



Introduction to Climate Change – a Baltic Sea Region Perspective

LEARNING OUTCOMES

After this lesson you will:

- Be able to explain the basics of the causes for climate change: greenhouse effect, gases, emissions
- Know the major consequences of the climate change
- Be aware of drivers and risks for hazards connected with the climate change in the Baltic Sea Region

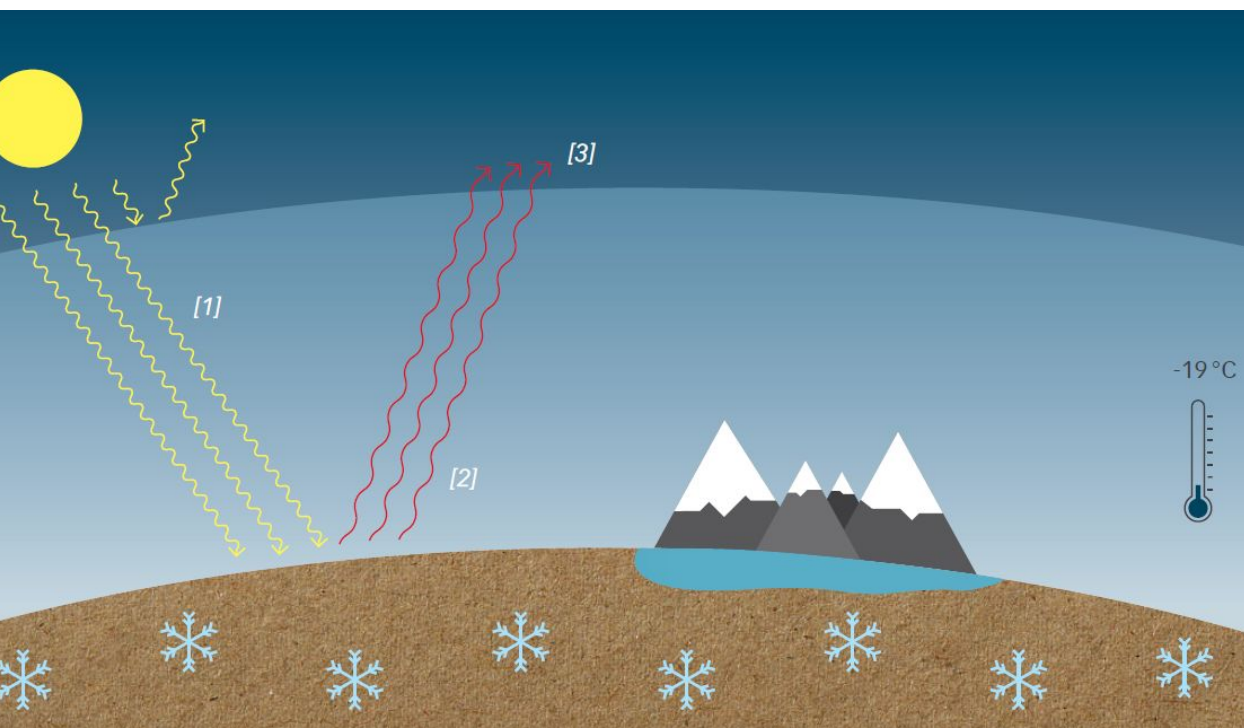


● Basics of the causes for climate change and the major effects

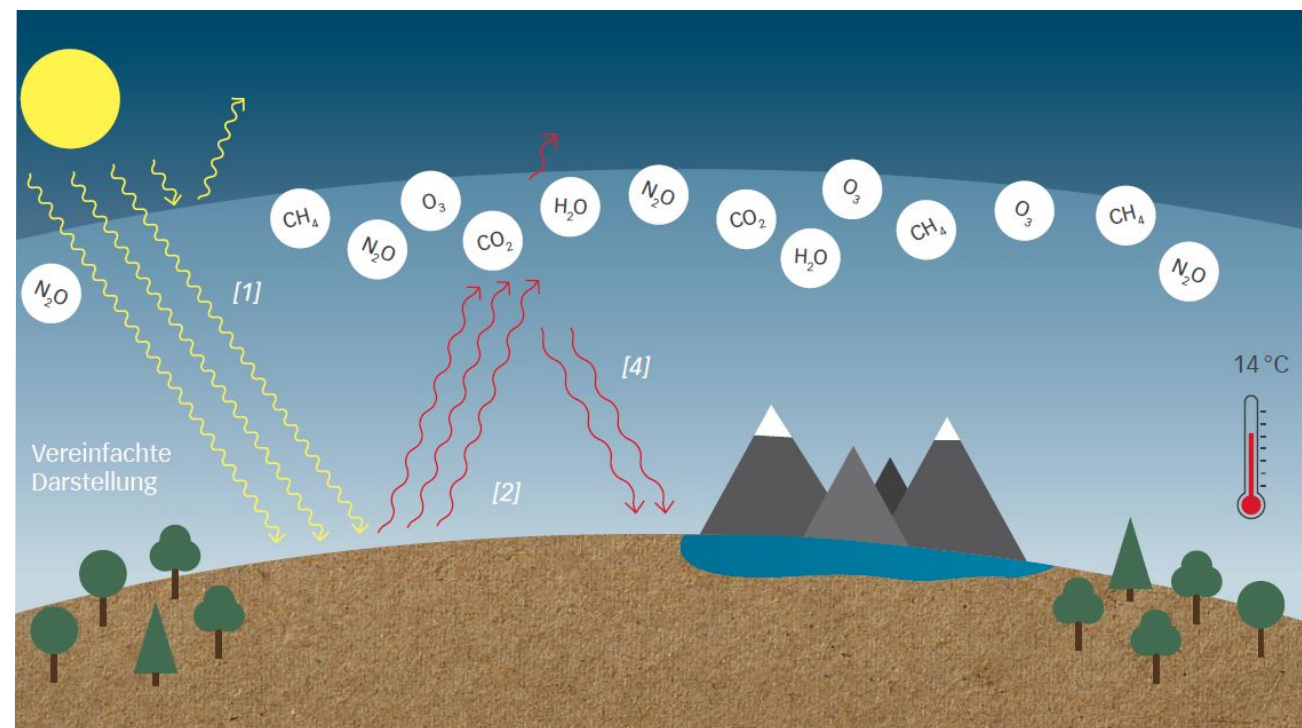
NATURAL GREENHOUSE EFFECT

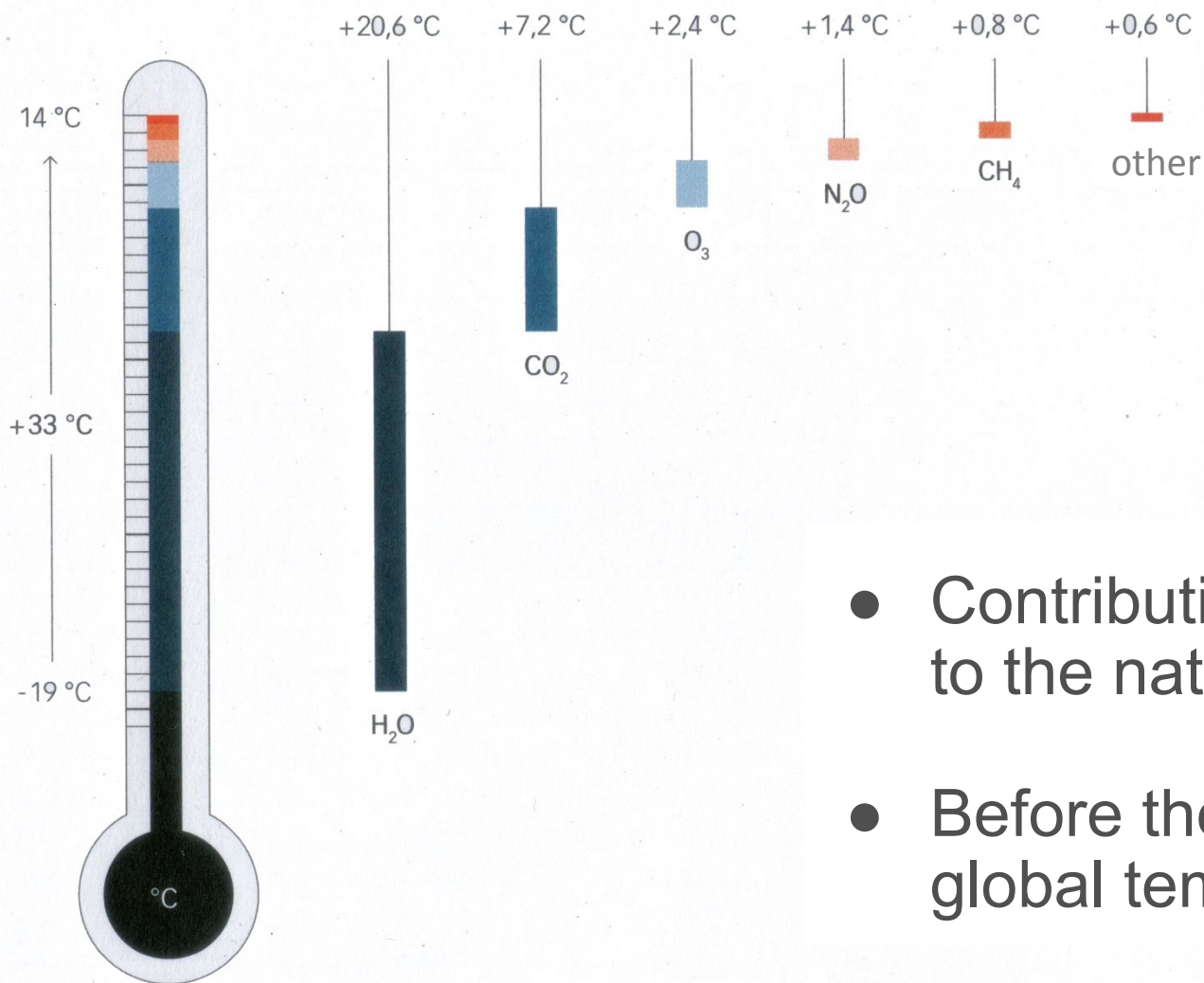
average global temperature **+14°C**

without greenhouse gases: **-19°C**



with greenhouse gases: **+14°C**





NATURAL GREENHOUSE EFFECT

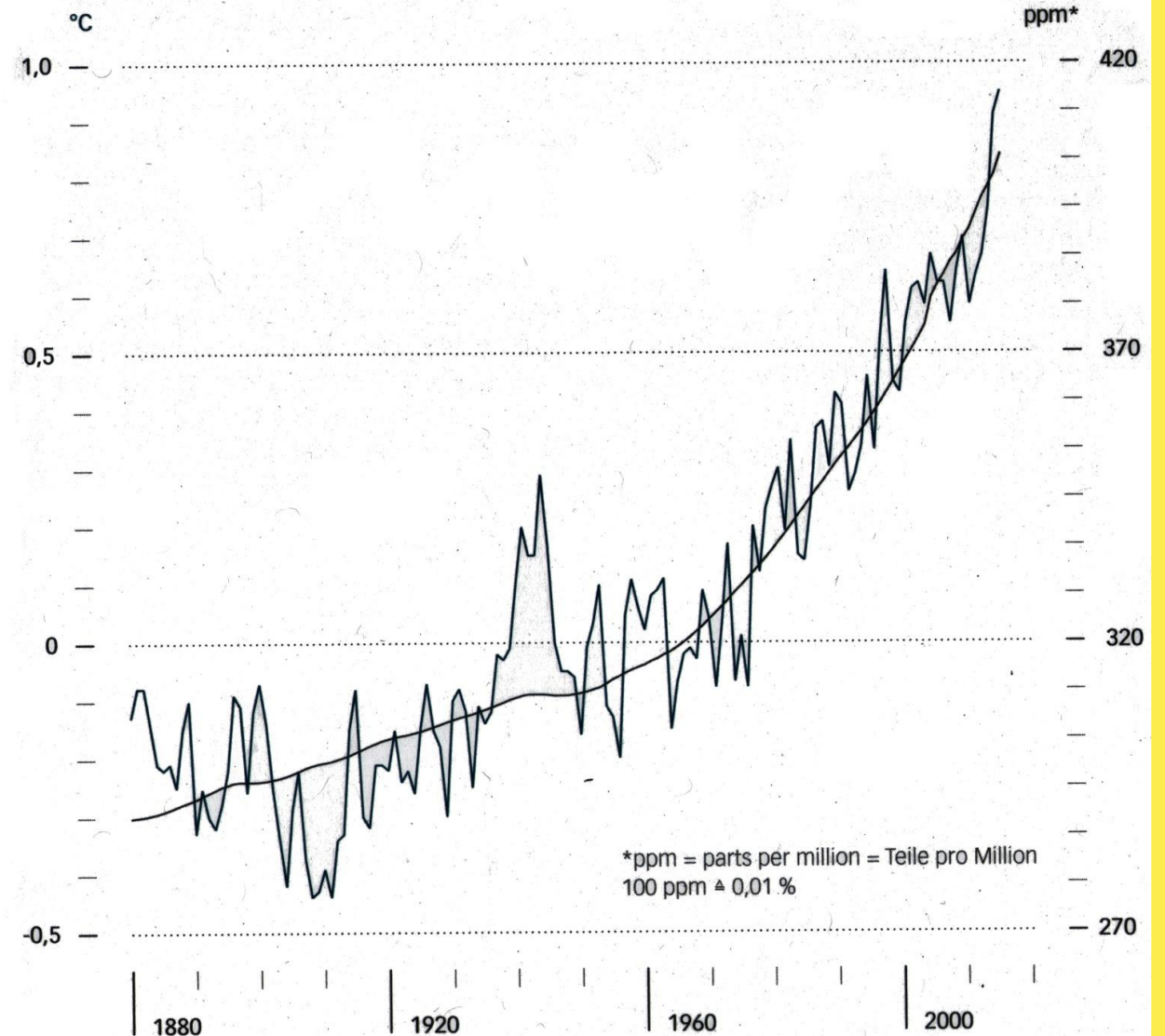
- Contribution of the greenhouse gases to the natural greenhouse effect
- Before the industrial revolution: global temperature in average +14°C

TEMPERATURE CHANGES

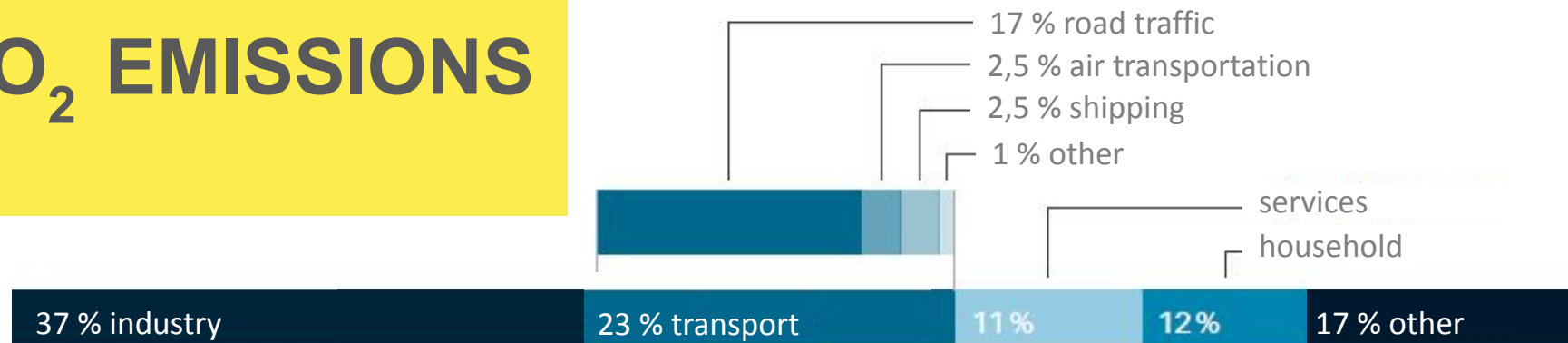
Temperature levels compared
to CO₂-concentrations
since the beginning of the
industrial era 1880–

Temperature deviation

CO₂ Concentration

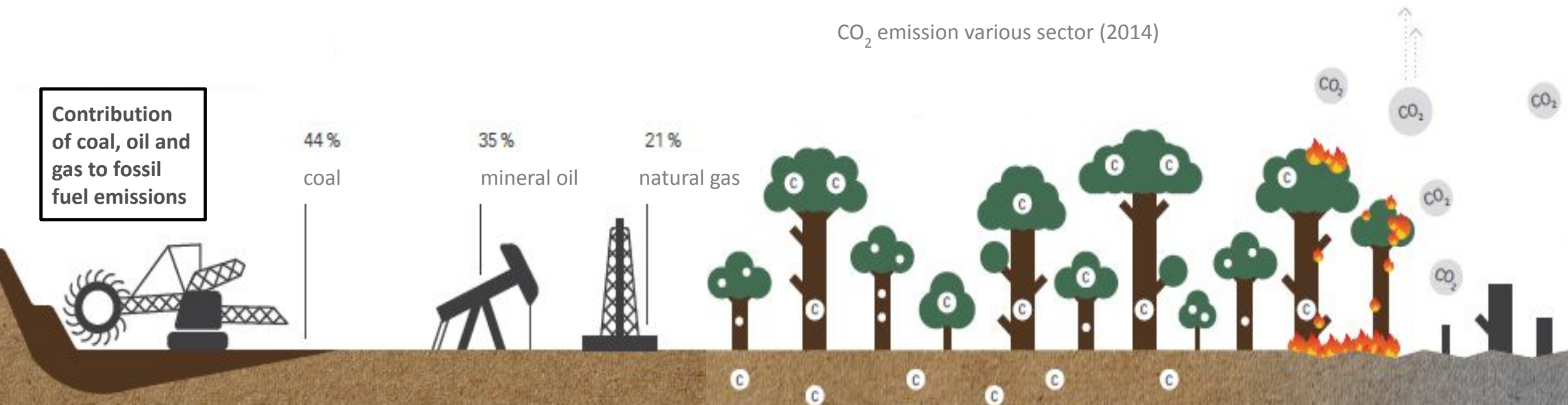


GLOBAL CO₂ EMISSIONS by sector



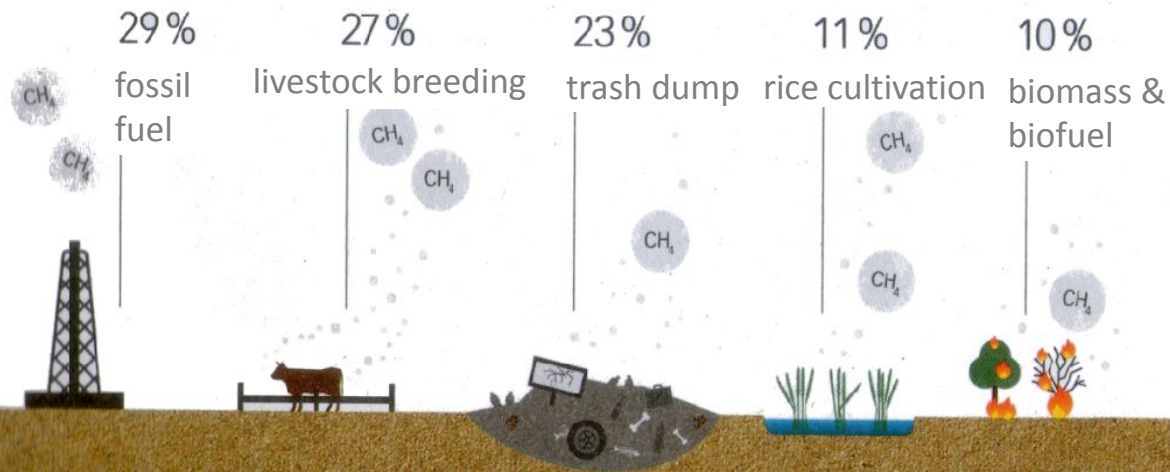
CO₂ emission various sector (2014)

Contribution
of coal, oil and
gas to fossil
fuel emissions

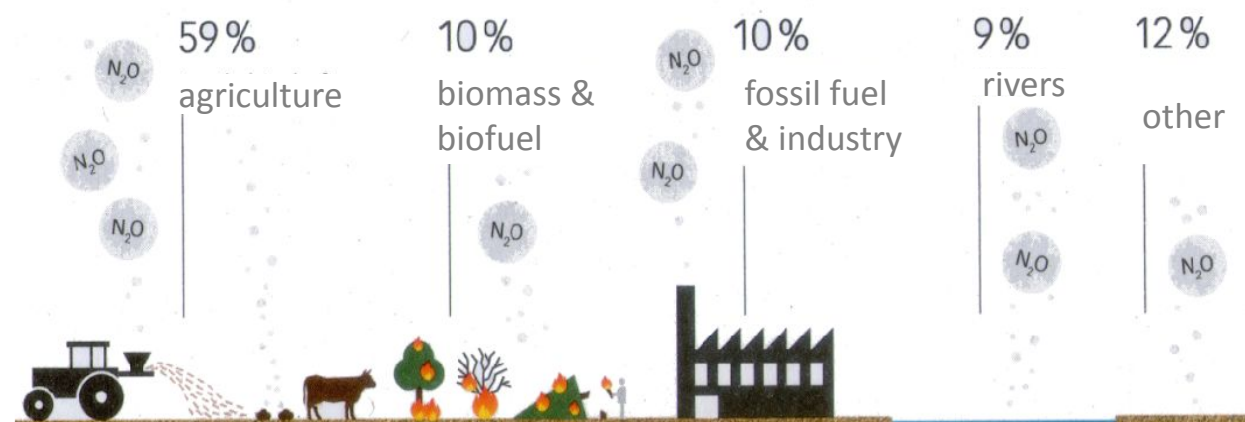


GLOBAL CH₄ & N₂O EMISSIONS by sector (2000-2009)

CH₄ Emissions

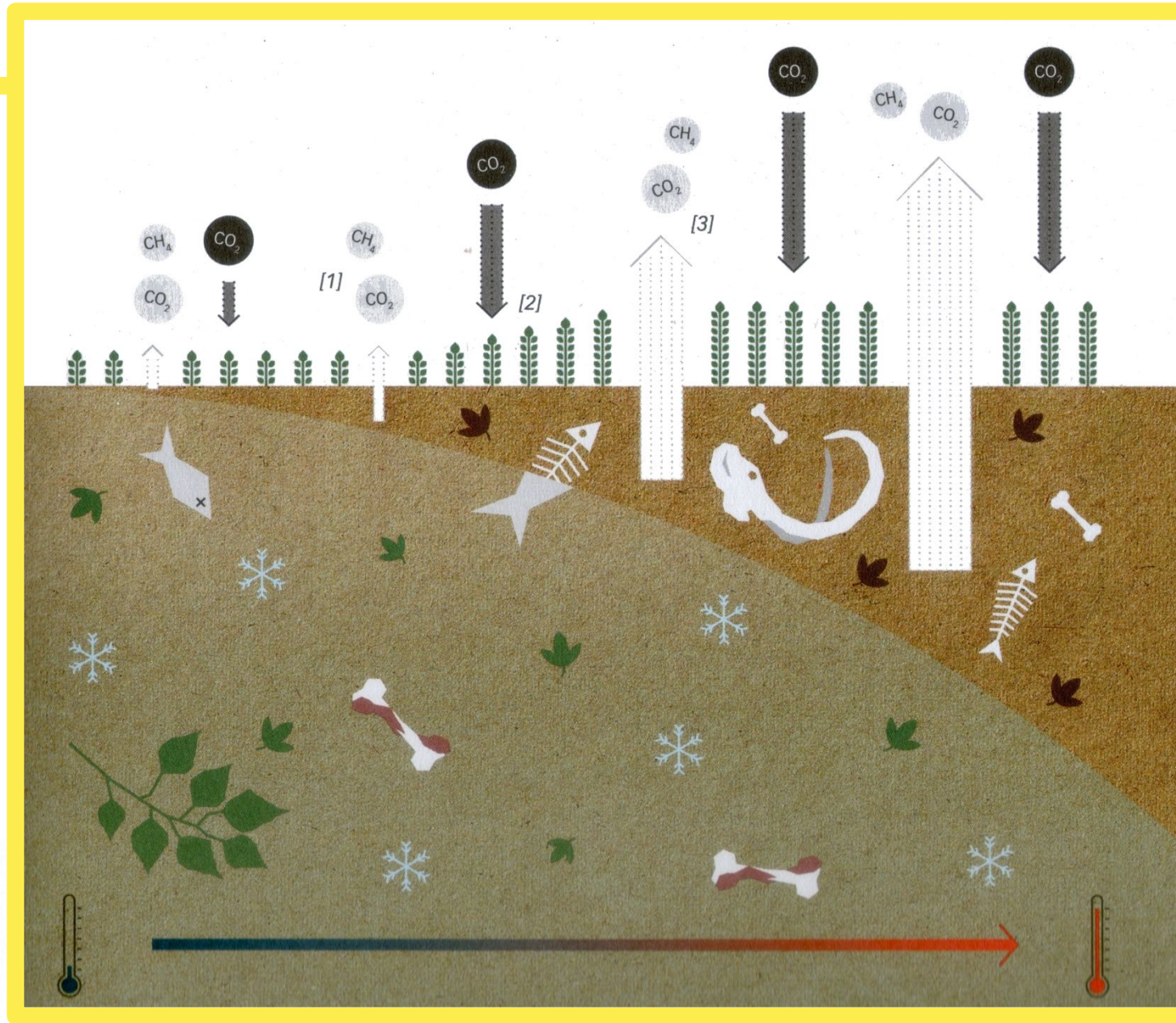


N₂O Emissions



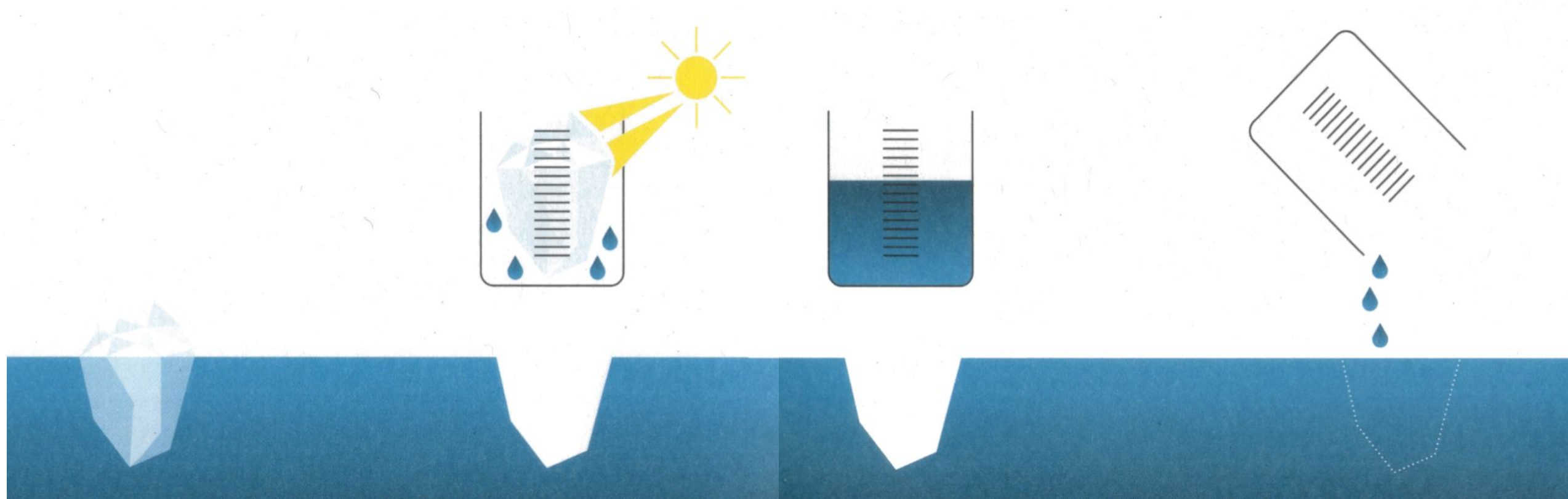
PERMAFROST THAWING

- Release of CO_2 , CH_4
- Self-reinforcing process called permafrost carbon feedback (PCF)

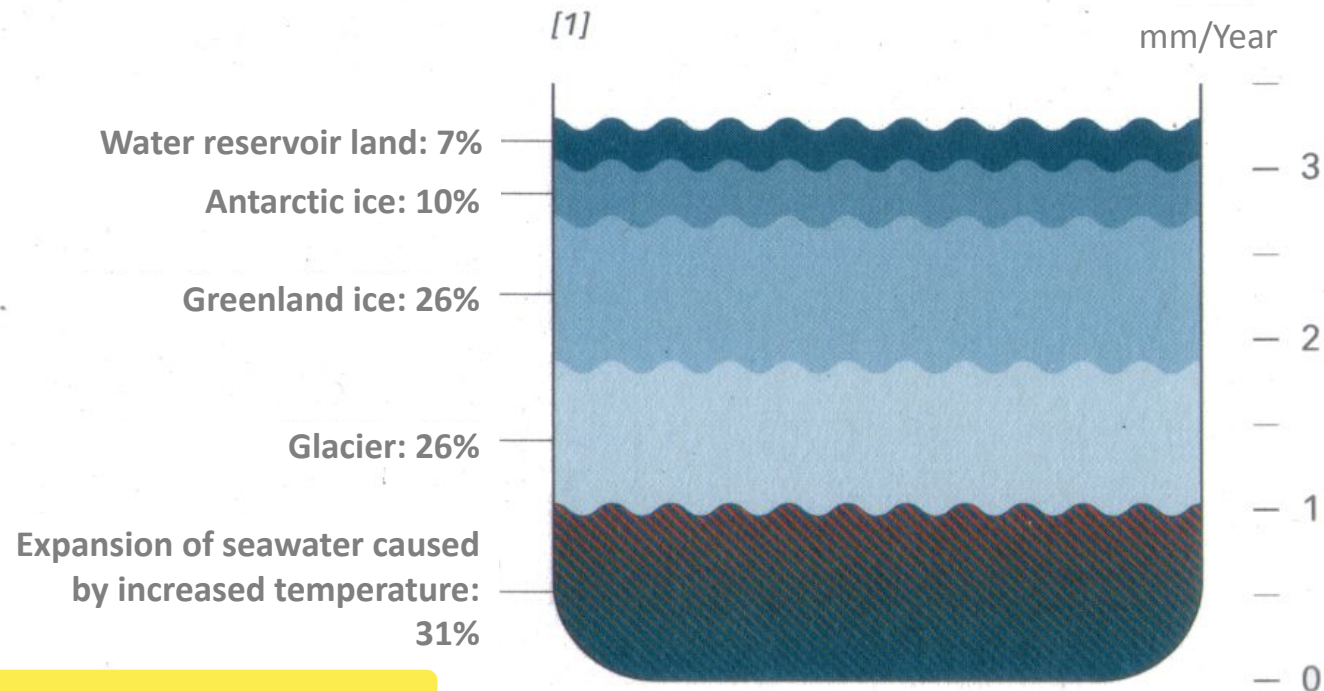


SEA ICE MELTING

If sea ice is melting the sea level is constant

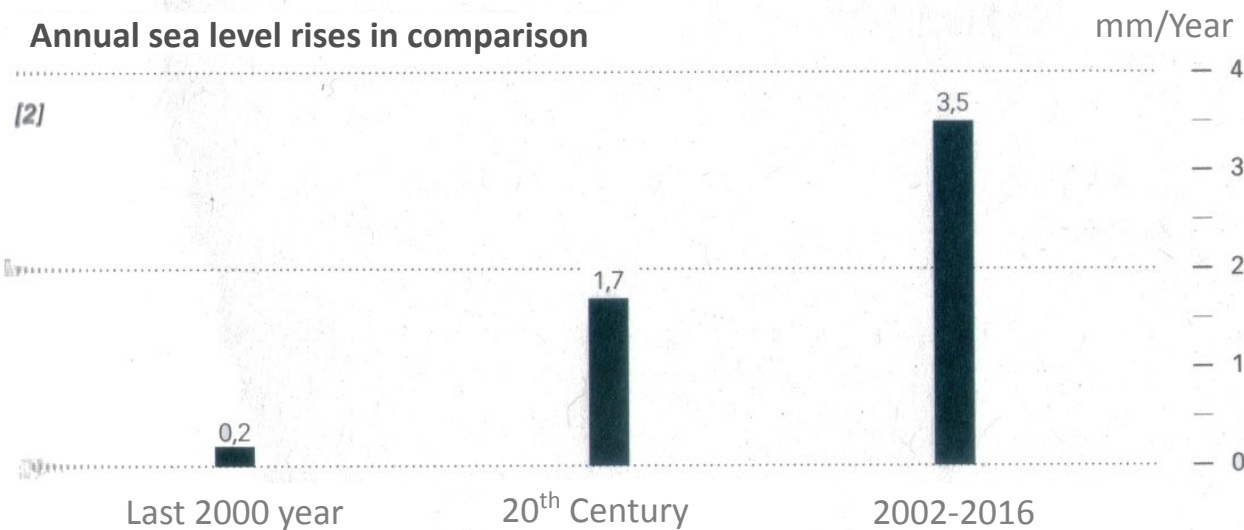


MEAN SEA LEVEL RISE



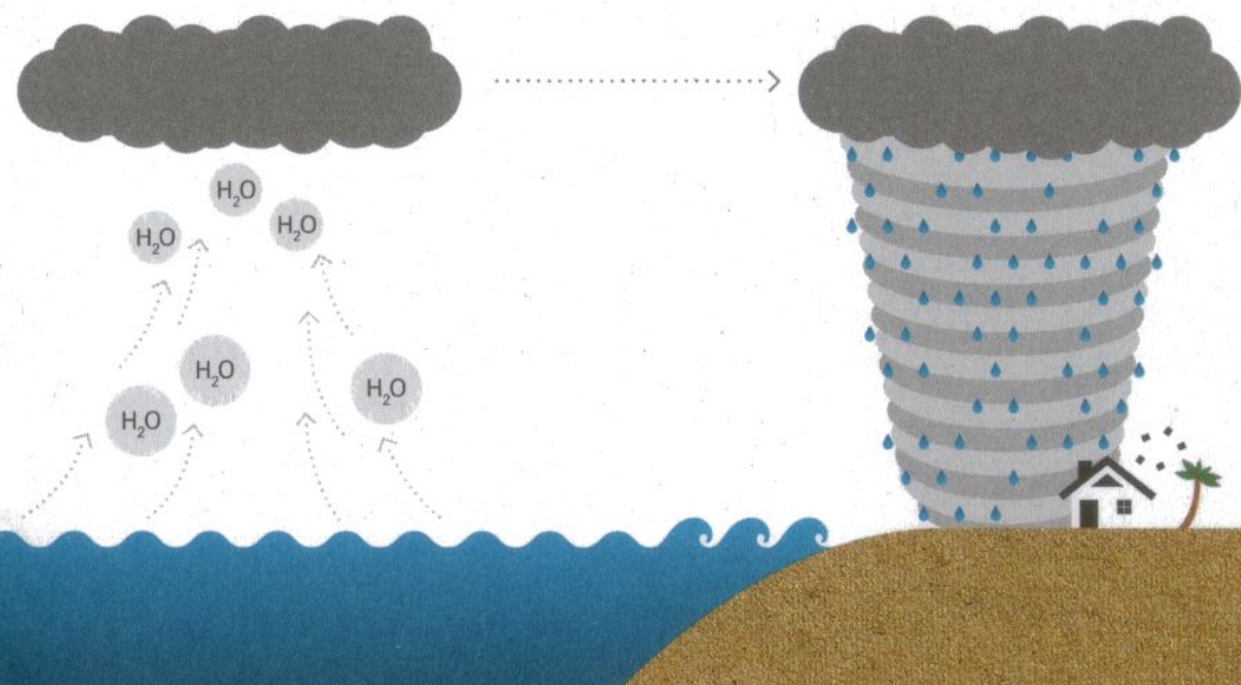
Factors contributing to sea-level rise (2014)

Annual sea level rises in comparison

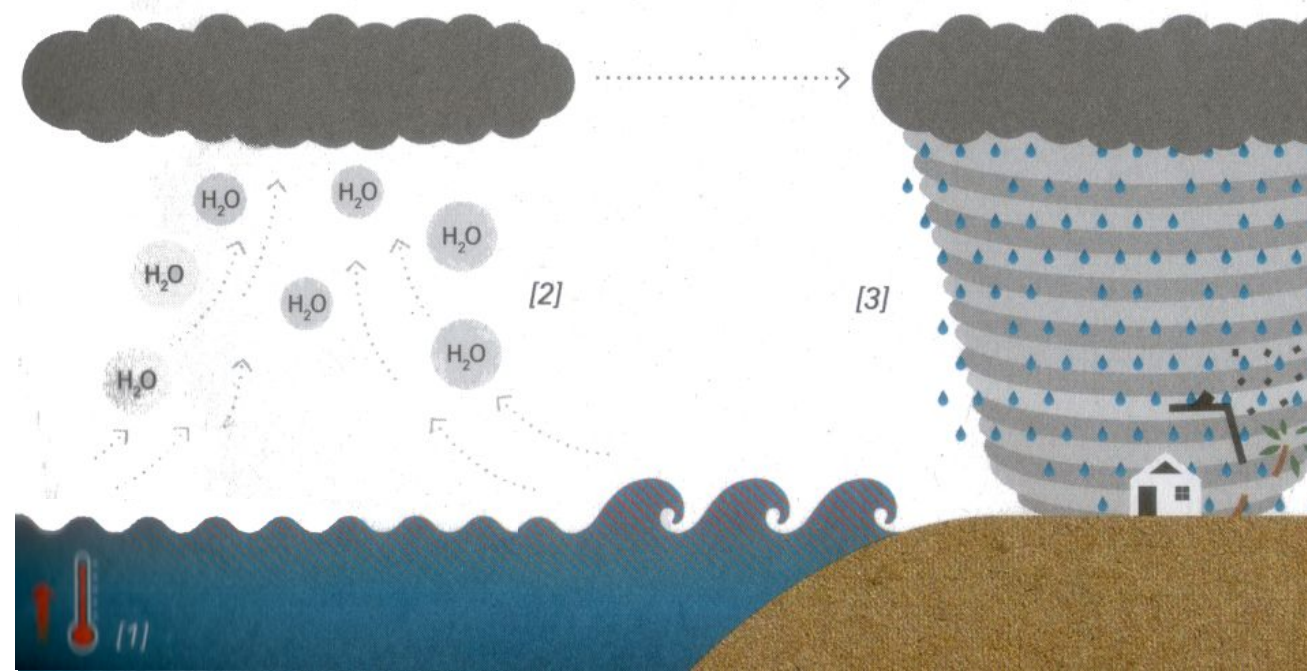


EXTREME WEATHER – more severe storms with more intensive rainfall

initial scenario



intensification through Climate Change



ADDITIONAL CLIMATE RELATED DEATHS

- estimation worldwide (2010)



225.000

malnutrition



85.000

diarrhoea



35.000

heat &
cold



30.000

meningitis



20.000

vector-borne
diseases



2.750

floods &
landslides



2.500

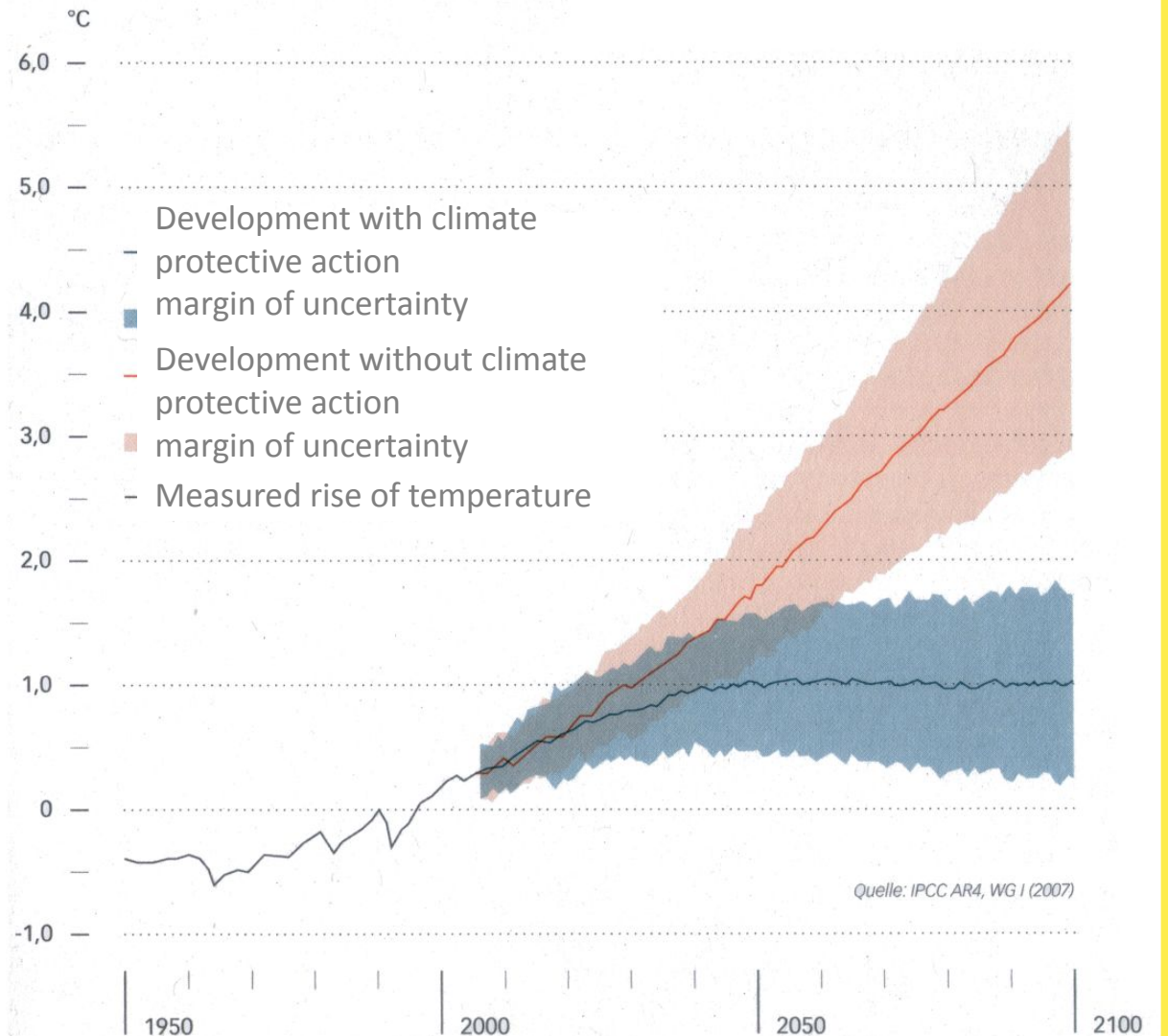
storms

TEMPERATURE SCENARIOS

Projected global average temperature rise up to the year 2100 depending of greenhouse gas emissions.

- With protective actions kept at one degree
- Without protective actions exponential growth

Change in temperature



● Climate change hazards in the Baltic Sea Region

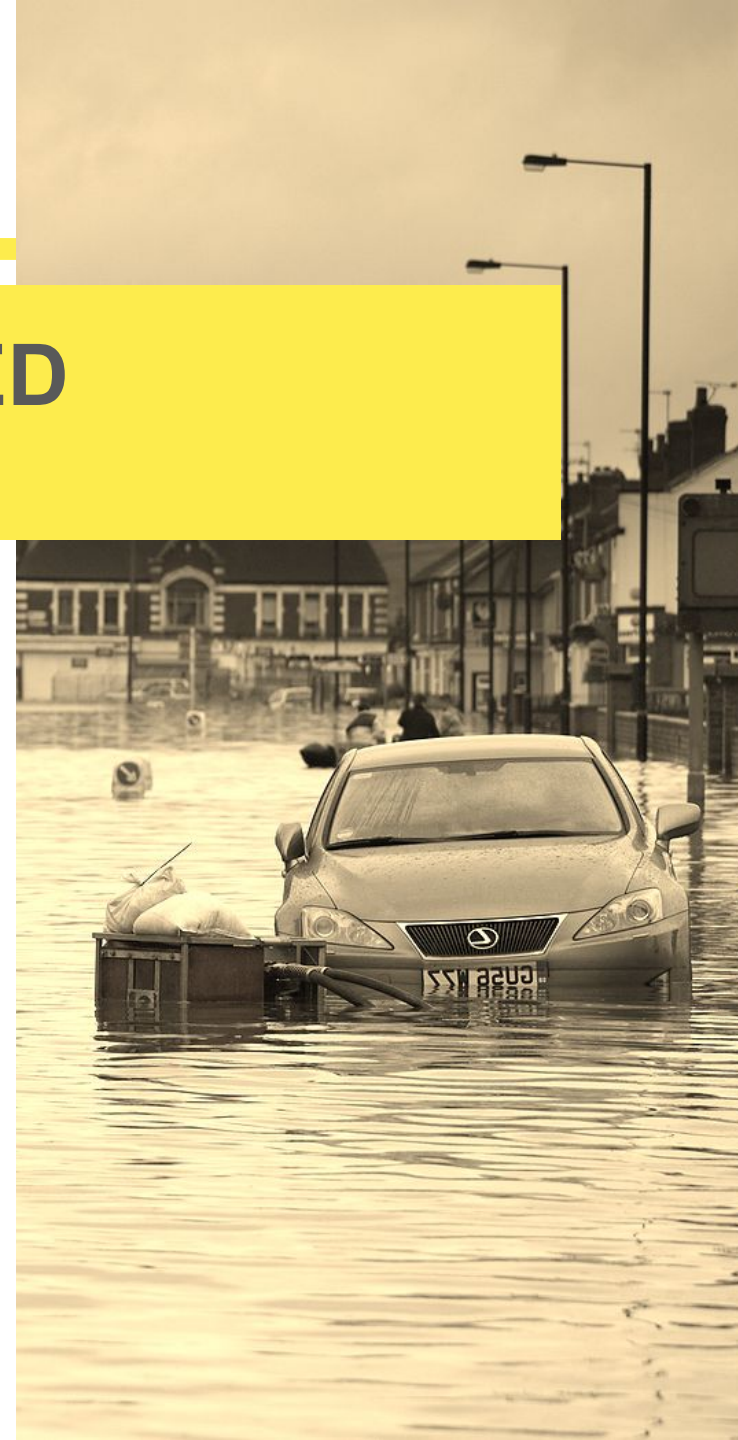
CLIMATE CHANGE WEATHER RELATED HAZARDS IN THE BALTIC SEA REGION

- Heavy precipitation events (rain, snow)
- Strong winds
- Extreme temperatures (heat, cold)
- Black ice and freezing rain



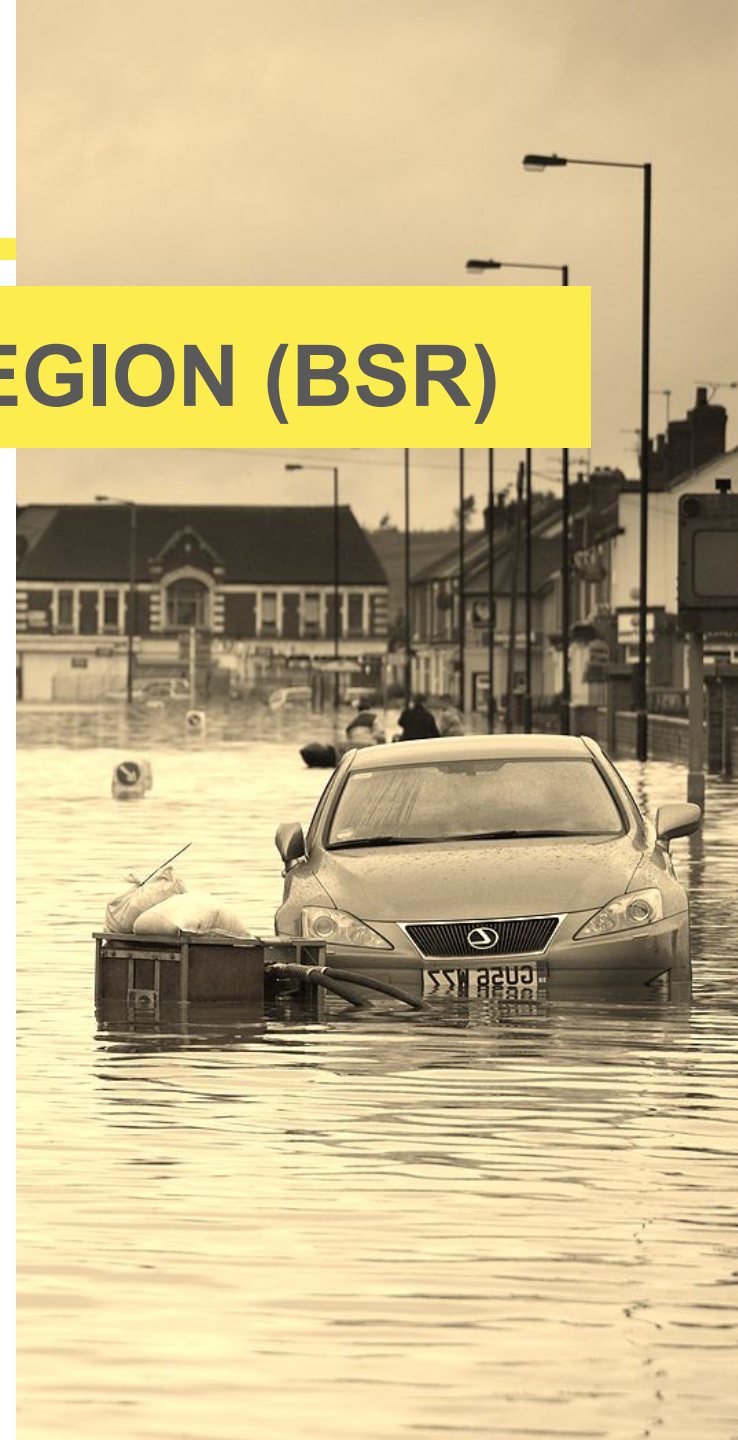
CONSEQUENCES OF CLIMATE RELATED HAZARDS FOR SOCIETIES

- Direct and secondary consequences
- Direct: loss of life and property, infrastructure damage, traffic blockades
- Secondary: e.g. landslides, mudslides, floods
- Cascading effects: e.g. power disruption – disruptions for telecommunications, heating



FLOOD EVENTS IN THE BALTIC SEA REGION (BSR)

- Fluvial floods, flooding of rivers (heavy precipitation)
- Pluvial floods, flash floods (heavy precipitation, exceeding drainage capacity)
- Coastal flooding
- Sea level rise can create permanent flooding



FURTHER CONSEQUENCES IN THE BSR

- Drought: Increasing drought frequencies in spring and autumn
- Forest fires and wildfires
- Coastal erosion



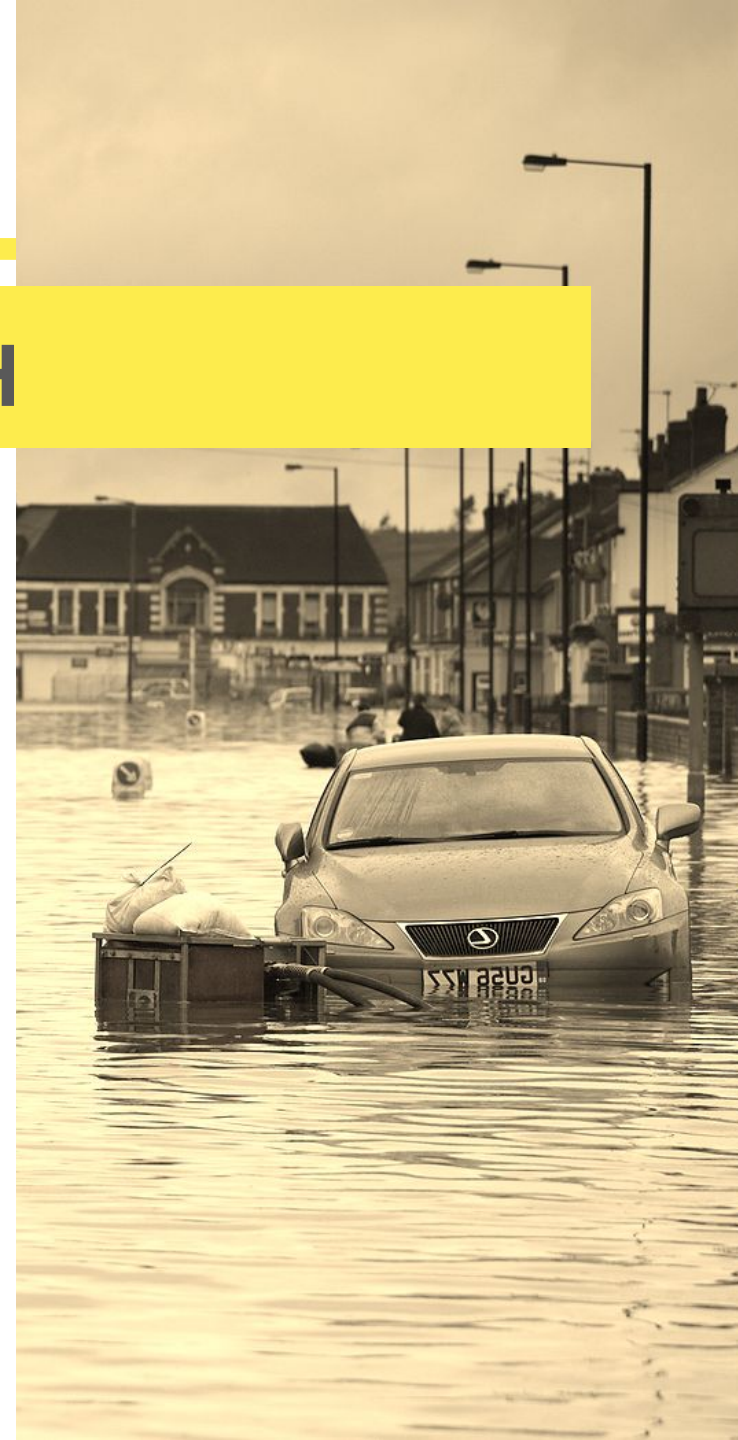
CONSEQUENCES FOR THE ECOSYSTEMS IN THE BSR

- Plant diseases
- Animal diseases (epizootic, vector-born)
- Biodiversity loss, ecosystem change



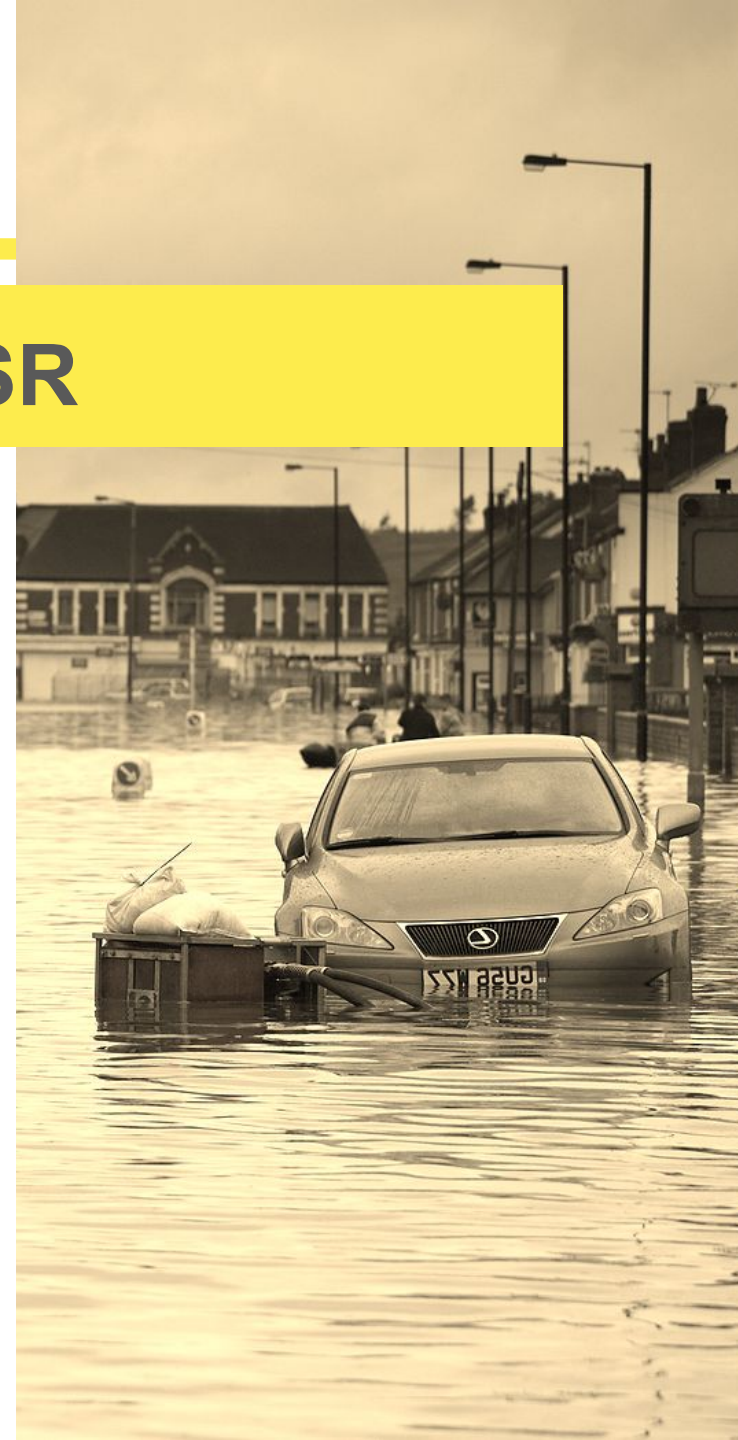
CONSEQUENCES FOR HUMAN HEALTH

- Zoonotic diseases (animal to human)
- Effects on health from heat waves
- Risks for accidents due to the slippery and icy roads



TRANSBOUNDARY IMPACTS IN THE BSR

- Decreased food security
- Climate refugees
- Supply losses and business disruptions



KEY MESSAGES

Climate Change - the basic causes and effects

- Carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄)
- Permafrost thawing, sea ice melting
- Sea level rise, extreme weather

Climate Change hazards in the Baltic Sea Region

- Most essentials hazards and their consequences
- The effects on the ecosystem and the human health

