Climate change
+
Climate scenarios

What can we expect?




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Set-up of presentation

- What is climate (change)?
- Observed climate change
- Climate scenarios: IPCC, KNMI'06, Deltacommissie
- Uncertainties in climate projections

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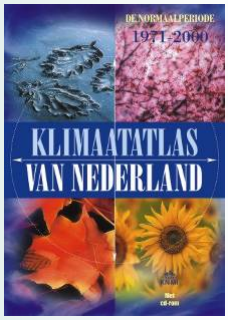
What is climate?

"The **average weather in a given region** over a longer period for among others temperature, precipitation, humidity, sunshine and wind. Also chance of **extremes** is part of the description of a climate"

Often a peiod of **30 years** used to describe a climate



Period 1971-2000

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What is climate change?

Climate change is nothing new:

Natural influences:

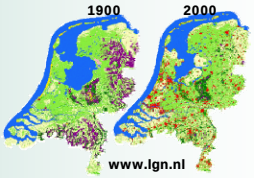
- Internal variations (El Niño)
- Variations in solar intensity and position of the earth (ice ages)
- Volcanic eruptions

Human influences

- Changes in land use
- Emissions of greenhouse gasses

www.netwerk.nl

www.fines.be



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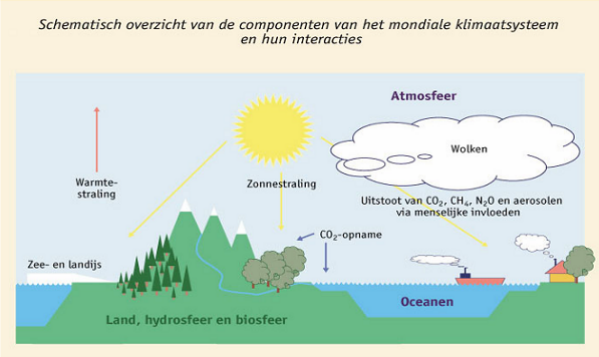
Greenhouse-effect



- Natural and enhanced greenhouse-effect
- Greenhouse gasses, a.o. CO_2, retain radiation
- Natural greenhous-effect increases the temperature from -18°C to +15°C

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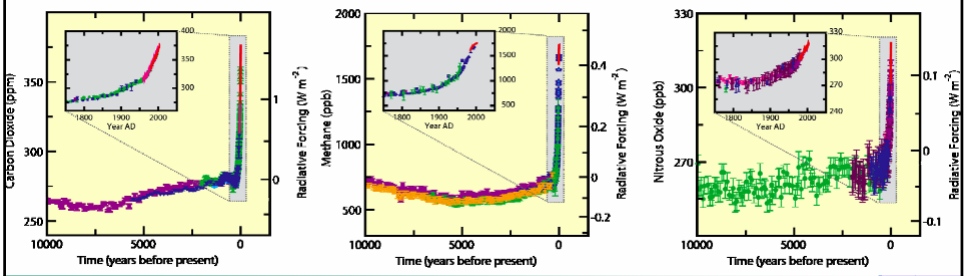
Increase of Green House Gasses



- Concentrations are higher than the pre-industrial concentrations in the past 10,000 years
- Increase of concentrations of CO_2, CH_4 en N_2O is mainly due to human activities

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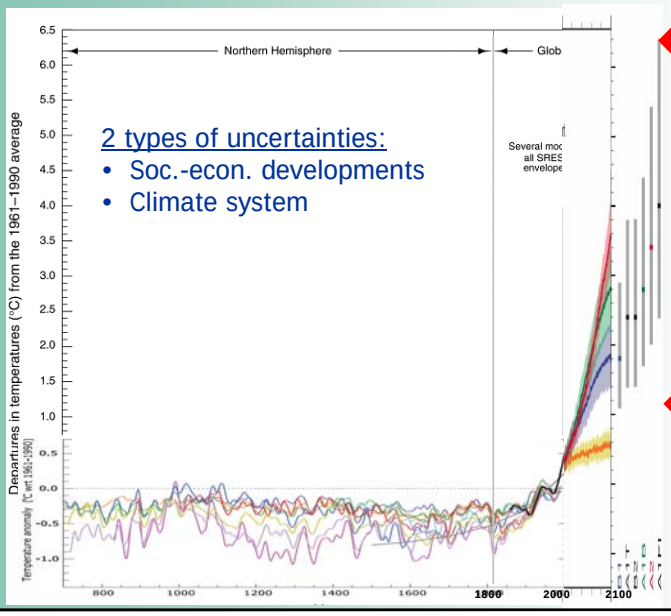
IPCC projections



2 types of uncertainties:

- Soc.-econ. developments
- Climate system

+6,4°C

+1,1°C

IPCC, 2007

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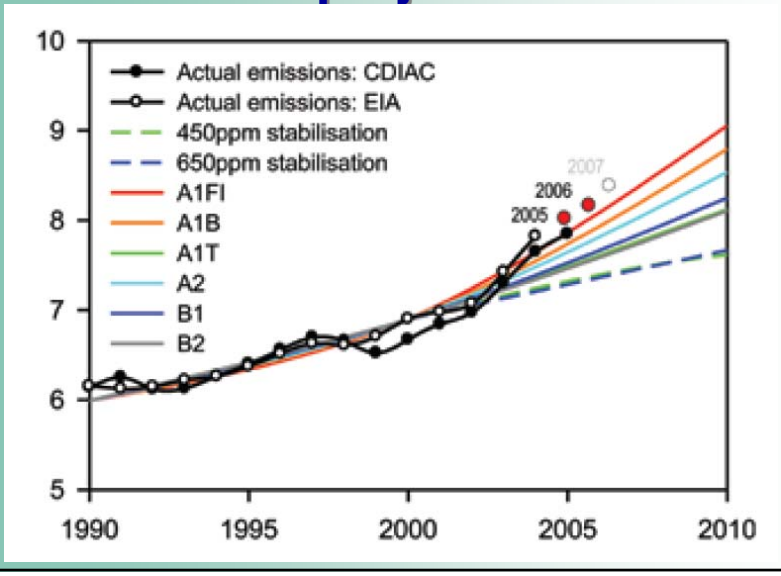
Emissions CO_2: observed and projections



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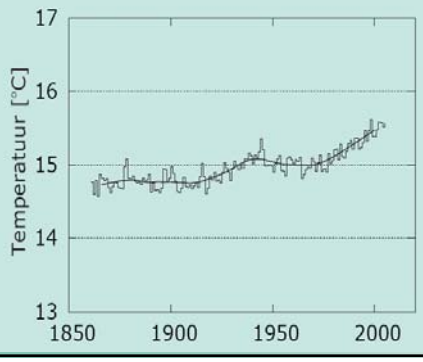
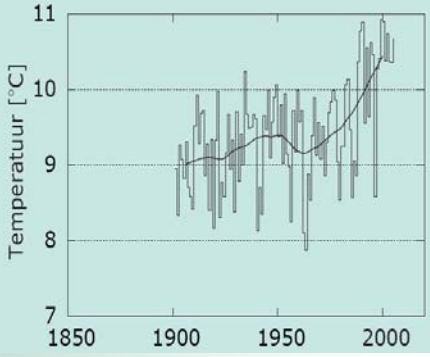
Yearly average temperature

- Significant increase of temperature on most of the European weather stations
- Larger year-to-year variation for region than globally, faster increase in Europe

World



Netherlands



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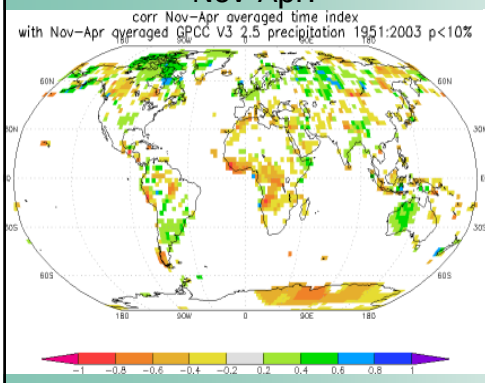
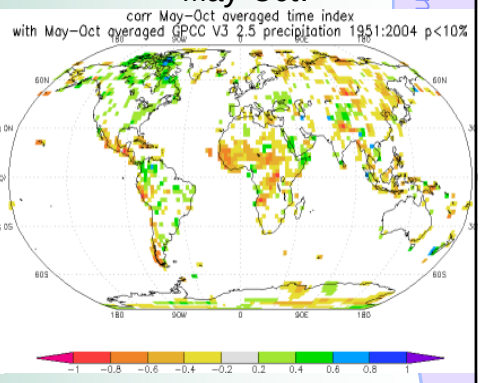
Precipitation

- Observed change in average precipitation compared to the natural variation, in the period 1951-2004

Nov-Apr.



May-Oct.



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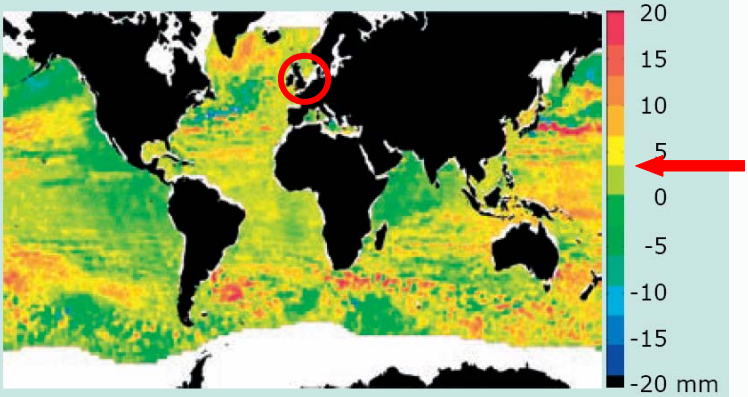
Sea level

- 20st century: 1.7 mm/jaar
- Between 1993-2004: about 3 mm/year



Source: Leuliette et al, 2004

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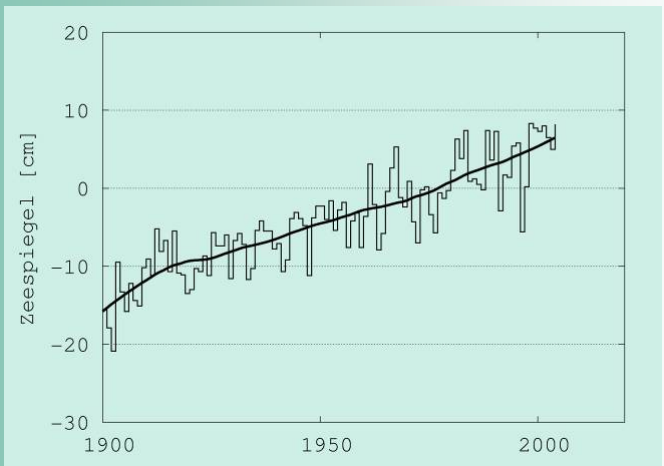
Sea level in the Netherlands

- 20st century: about 2 mm/year



Compared to NAP

Source: RIKZ/MNP

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What are climate scenarios?

Consistent pictures of a possible future climate

They indicate the magnitude of changes in e.g. temperature, precipitation, evaporation, wind and sea level

For adaptations in:

water management, coastal protection, agriculture, energy, environmental protection, tourism, etc.

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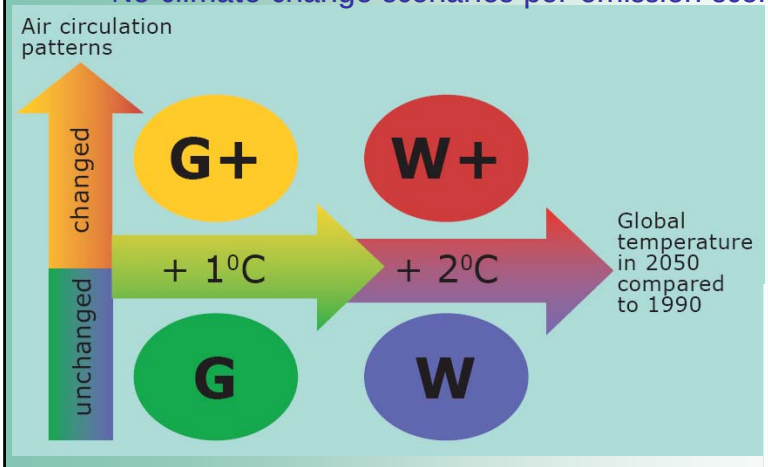
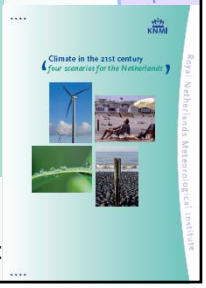
KNMI'06 scenarios

No climate change scenarios per emission scenario!



More information:



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General picture

Characteristics of all KNMI'06 scenarios:

- Temperature continues to rise
- Winters on average wetter
- Intensity of extreme rainfall increases
- Changes in wind climate small
- Sea level continues to rise

Together the scenarios represent a "forecast" for the future climate

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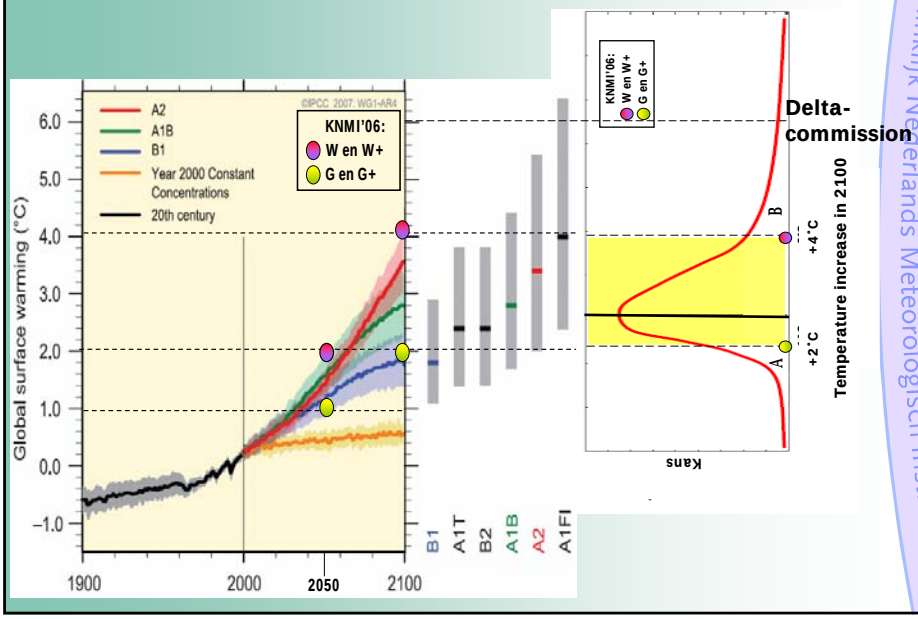
Selection KNMI'06 scenarios



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Scenarios other countries

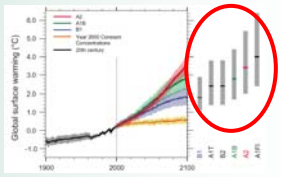
1. Regional scenarios per emission scenarios
2. Scenarios made with a limited number of GCM's en RCM's

Advantage KNMI'06:

- Insight in range for the future: uncertainty due to socio-econ. developements and due to incomplete knowledge climate system included

Disadvantage KNMI'06:

- No model runs that can be linked directly to the scenarios



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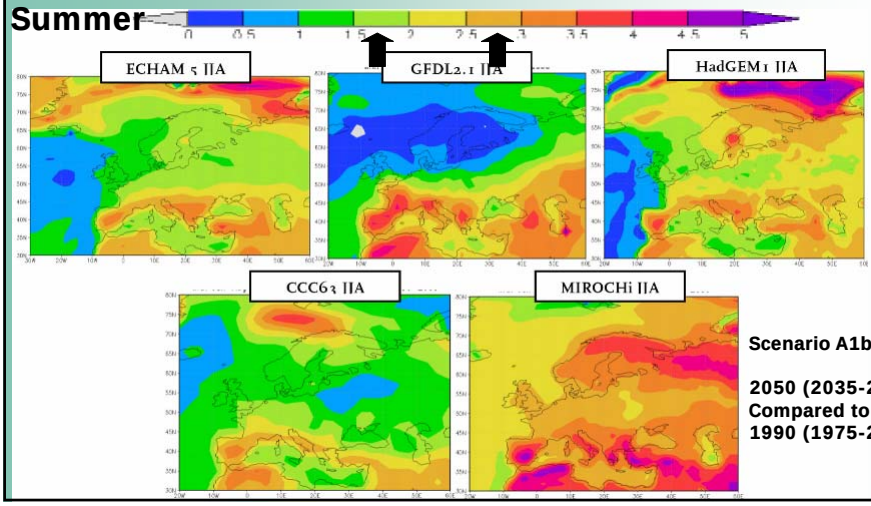
Temperature projections

- Winter: Northern Europe stronger warming
- Summer: Southern Europe stronger warming



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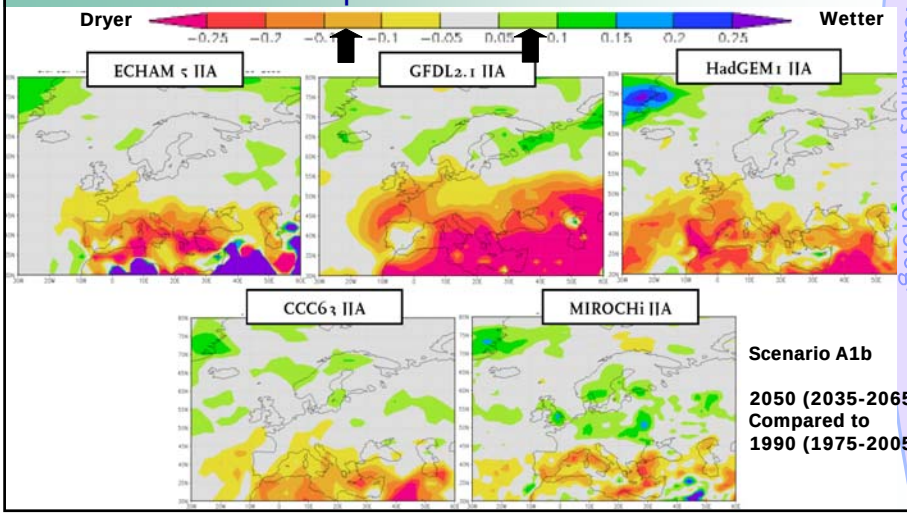
Summer precipitation projections

- Southern Europe: decrease
- Northern Europe: **increase or decrease**



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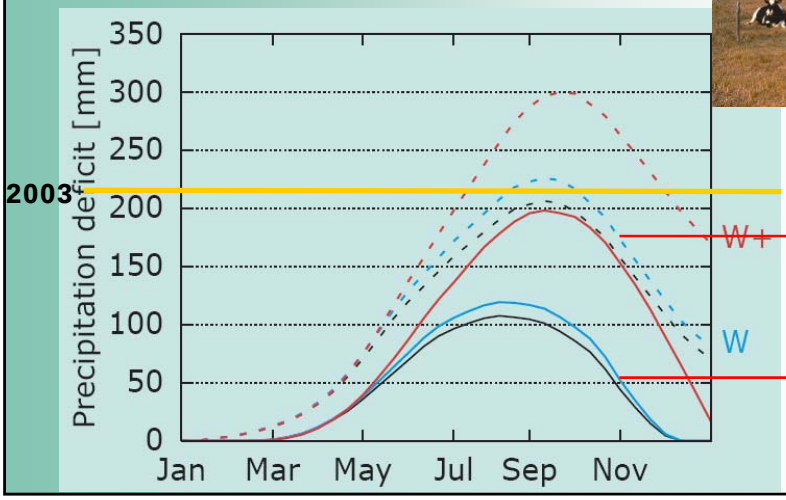
Drought

- Prec. deficit = rainfall - pot. evaporation
- 1906-2000 and climate scenarios for 2050



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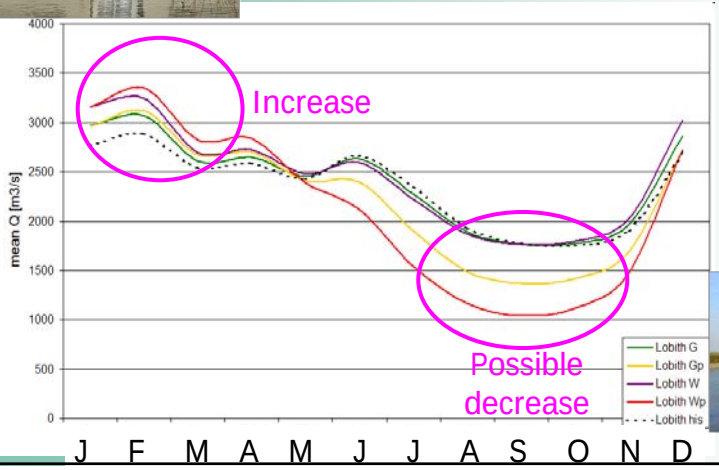
River discharges

Average discharge of Rhine near Lobith around 2050

Source: VU/RIZA (preliminary results)



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How to use climate scenarios?

- For what purpose are scenarios used?
  - Inventarisation impacts
  - Inventarisation adaptation options
  - Policy
- Which scenario and which time horizon is most relevant?

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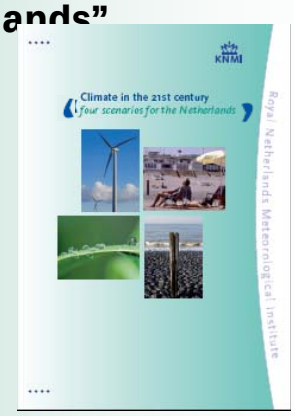
ologisch Instituut

More information?

Brochure:
"Climate in the 21st century: four scenarios for the Netherlands"



Website:
www.knmi.nl/
klimaatscenarios/

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Questions?

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