



Koninklijk Nederlands
Meteorologisch Instituut
Ministerie van Infrastructuur en Milieu

Klimaatrisico's Landbouw in Nederland

Rob van Dorland

Werkconferentie Klimaatadaptatie en Landbouw
Nijkerk, 15 januari 2019



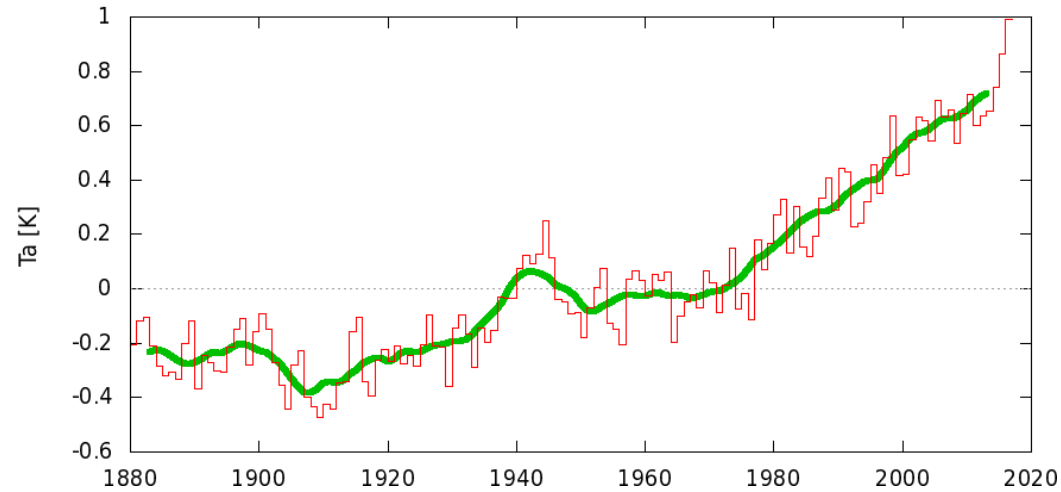
Veel weerrecords sneuvelden in 2018

26,3 °C op 13 oktober

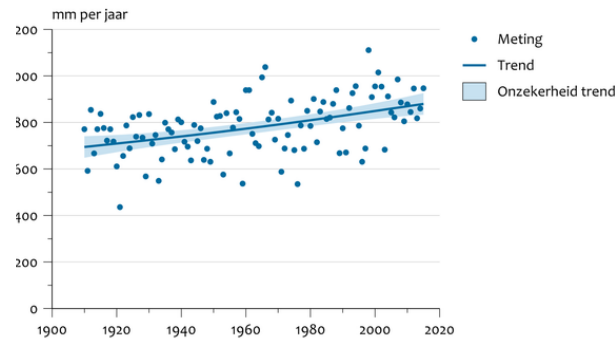
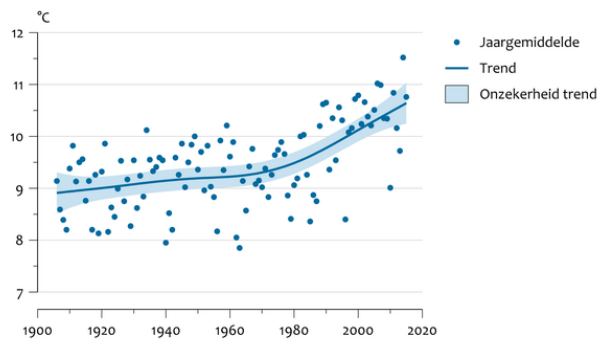
Mondiale en nationale ontwikkelingen klimaat



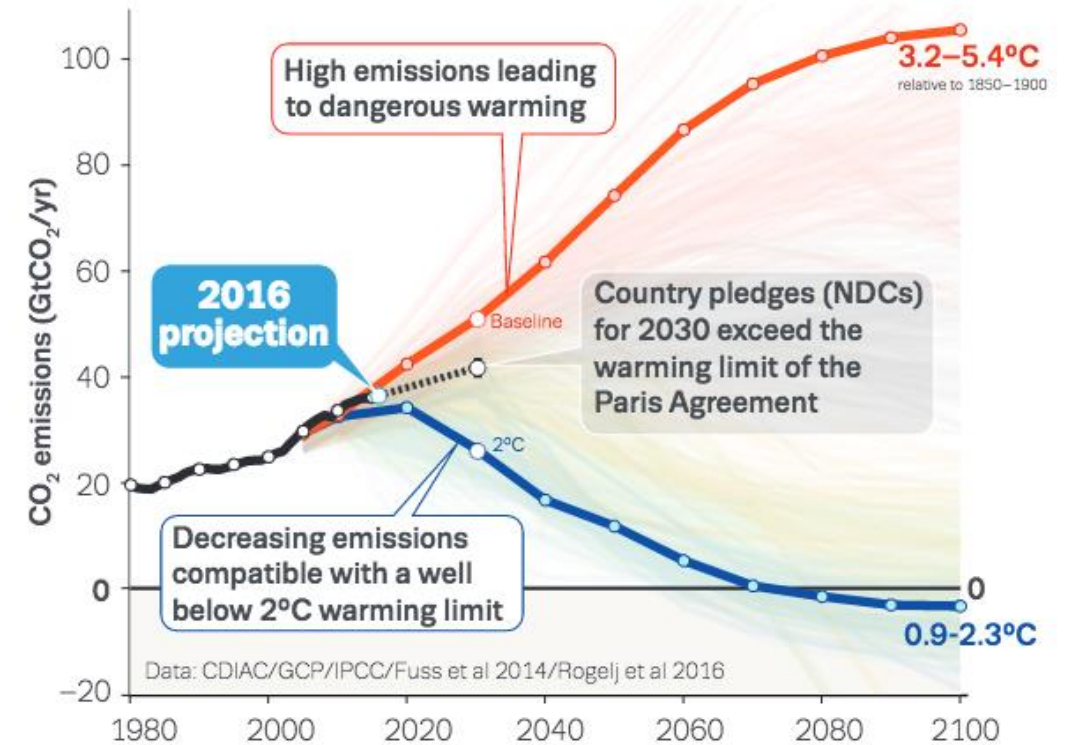
Mondiaal gemiddelde jaarstemperatuur



Temperatuur en neerslag in Nederland



Geprojecteerde CO₂-emissies



2018...



Wateroverlast

Hagelschade



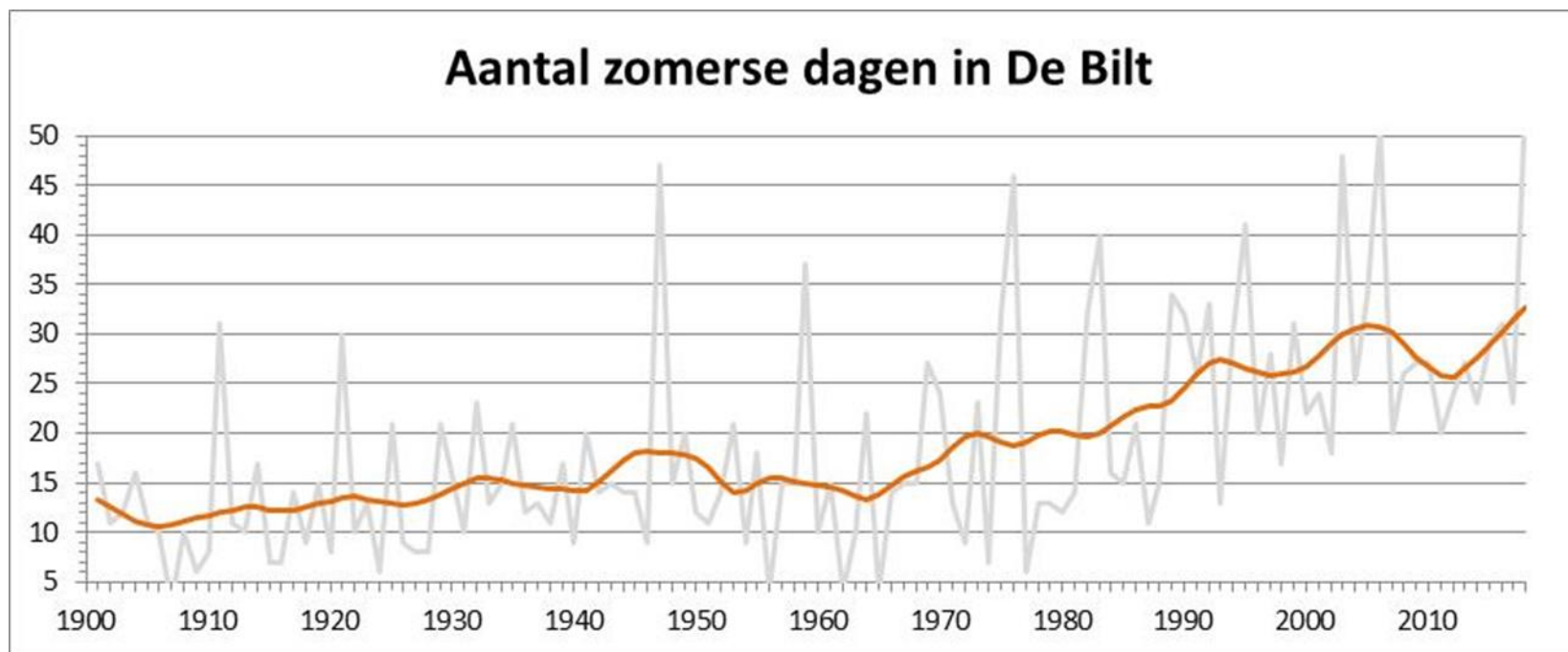


Hitte en droogte in zomer 2018





Temperatuurtrend aantal zomerse dagen

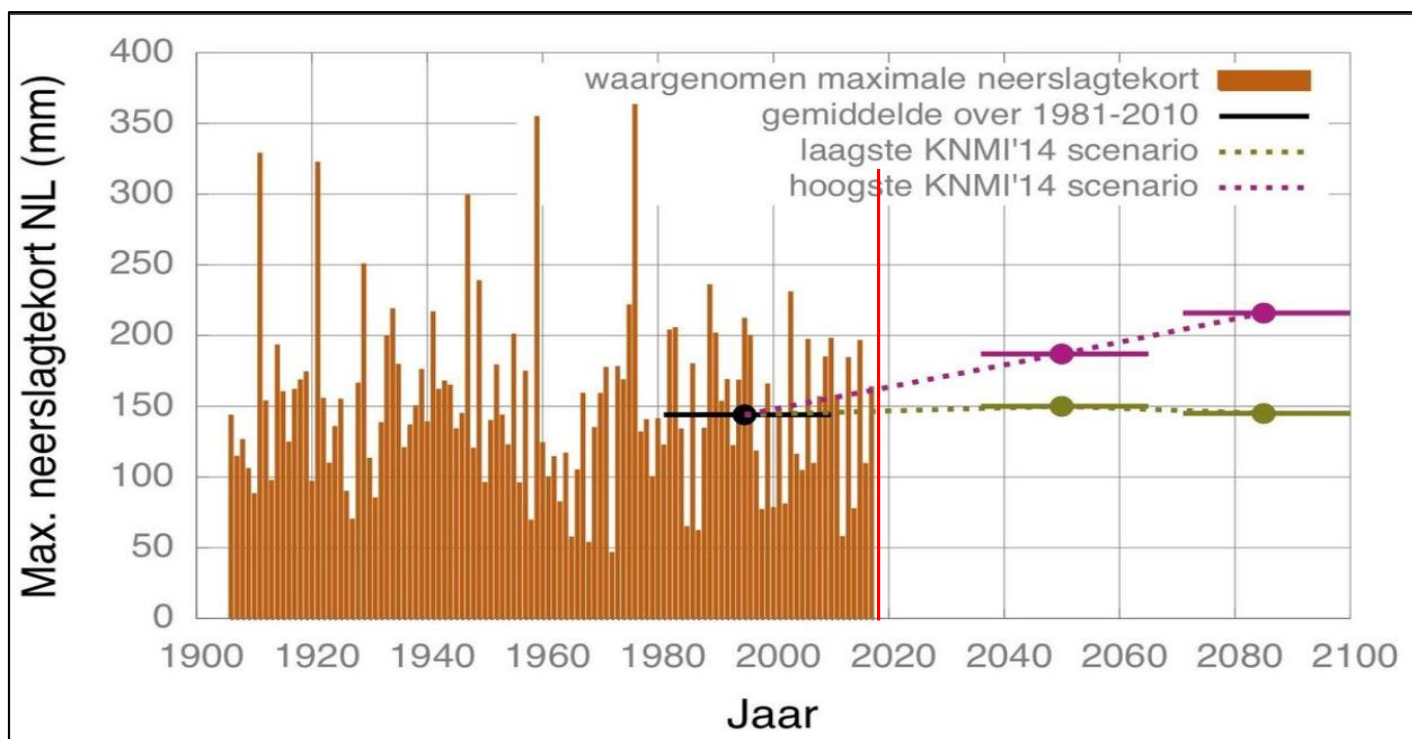


- zomerse dag: maximum temperatuur van 25°C of hoger
- stijgende trend
- record 2018: 55 zomerse dagen



Toekomst: kans op meer droogte?

- twee scenario's geven meer droogte, in twee verandert er weinig
- onderzoek naar of drogere scenario's waarschijnlijker zijn



Droogte 2018: 309 mm neerslagtekort

In huidig klimaat:
eens in de 30 jaar

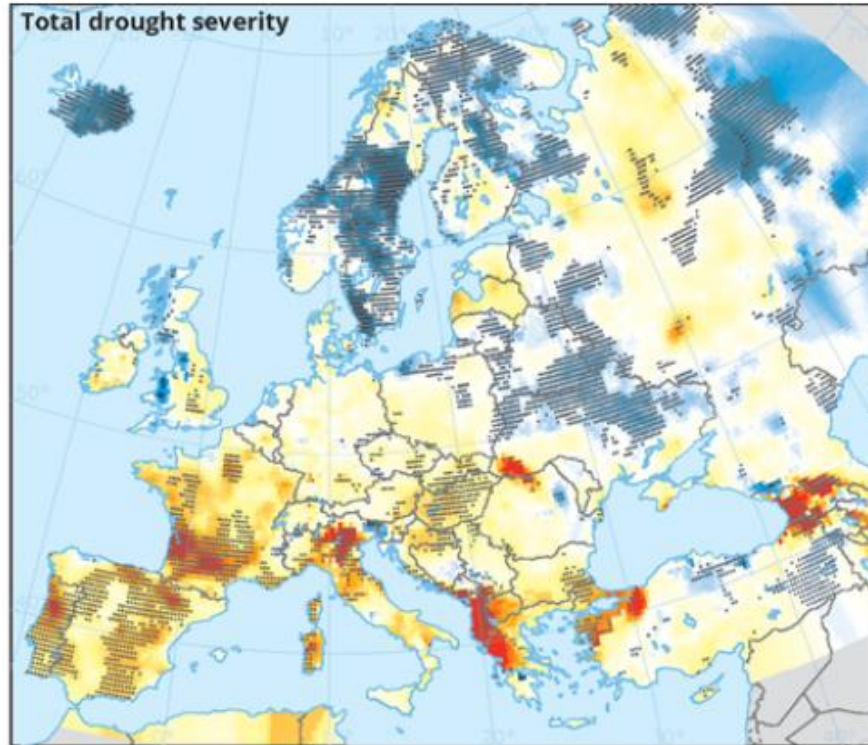
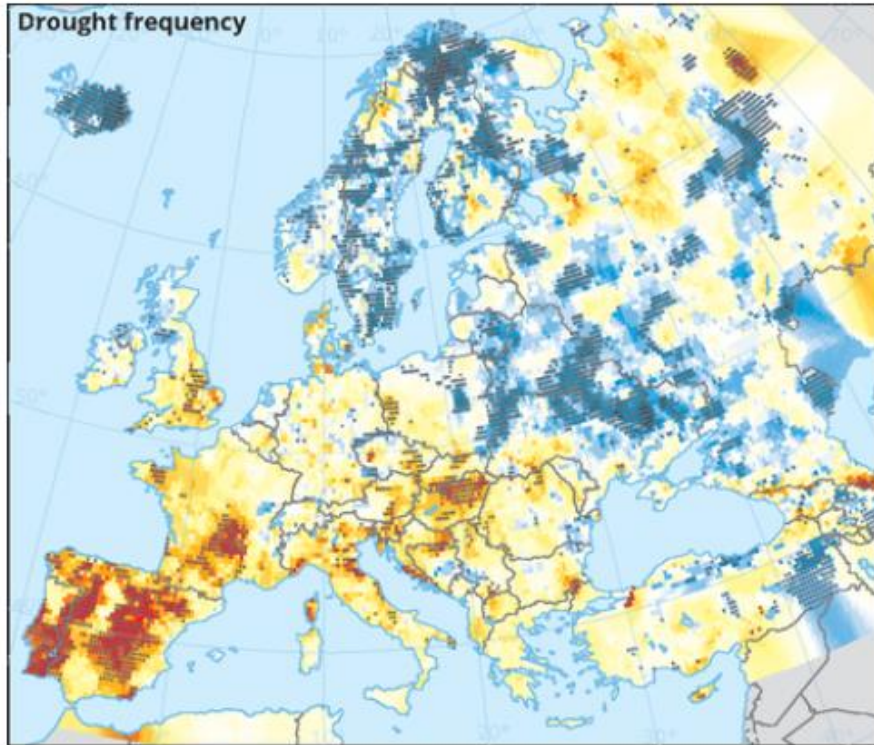
Voor hoog scenario
in 2050: eens in
de 15 jaar

Voor laag scenario
neemt de kans
nauwelijks toe

Geen trend in droogte

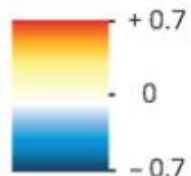


Trend, 1950-2012: Nederland op de grensgebied van meer/minder droogte



Observed trends in frequency and severity of meteorological droughts

Drought frequency
(events/decade)

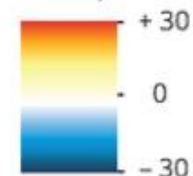


Outside coverage

• Significance of trends

0 500 1 000 1 500 km

Total drought severity
(score/decade)

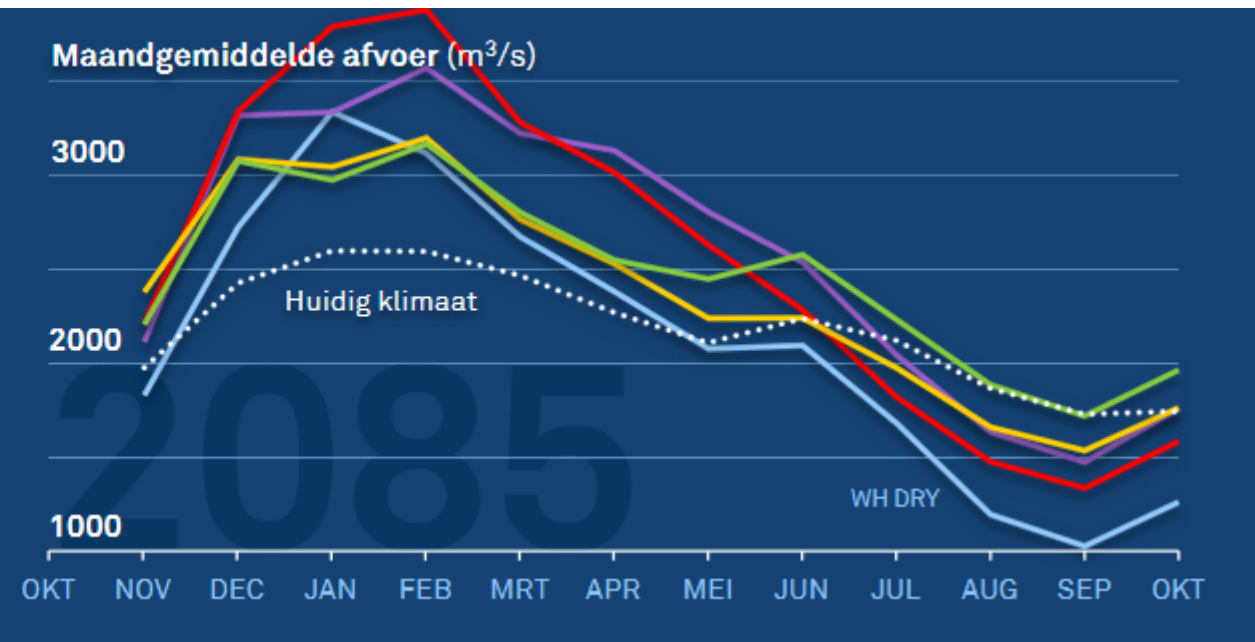
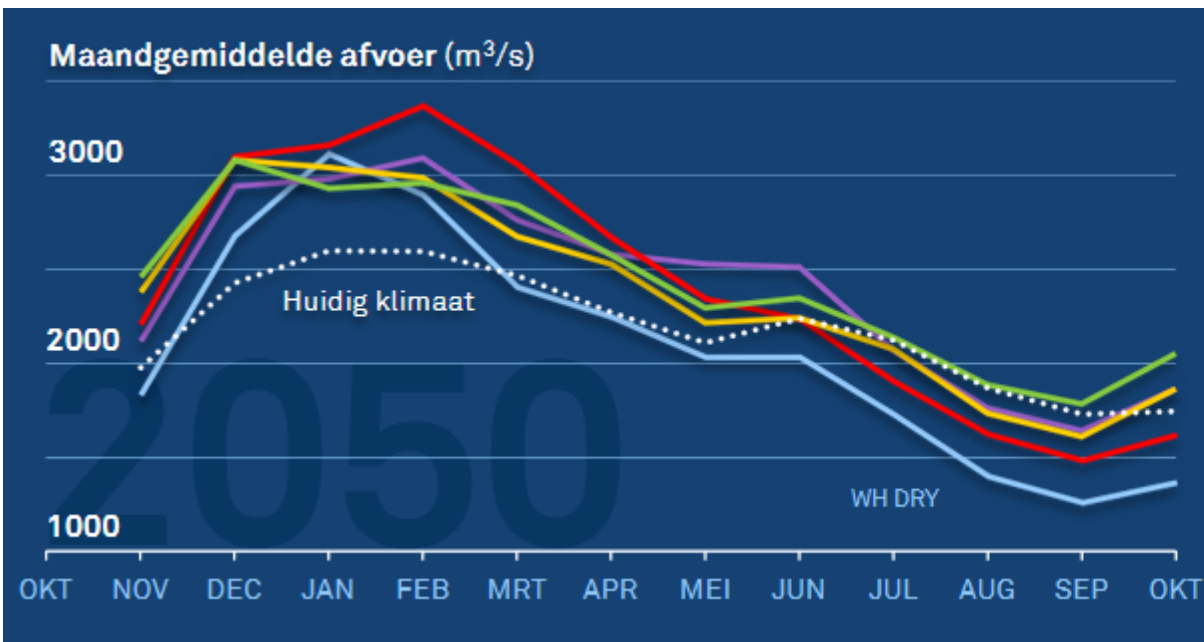


Rivierafvoeren



- ## Rijn
- 2050, extreem scenario: in de winter + 20%; in de zomer -20%
 - Alle scenario's: extremen nemen toe en komen vaker voor

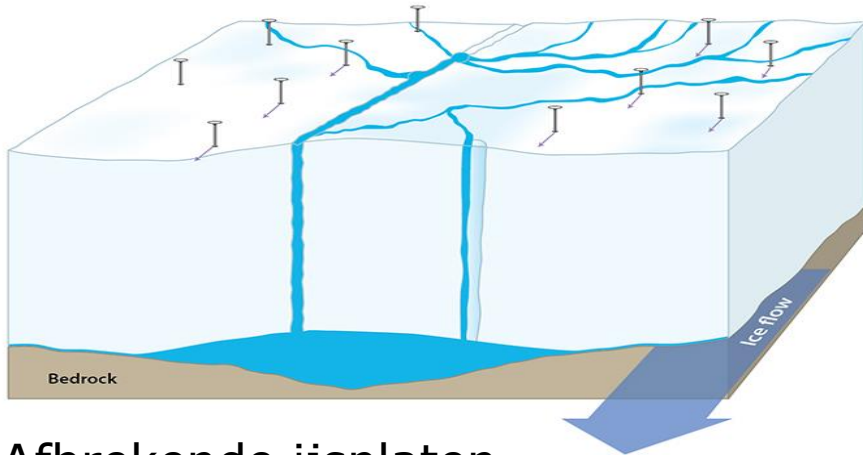
Afvoer van de Rijn bij Lobith



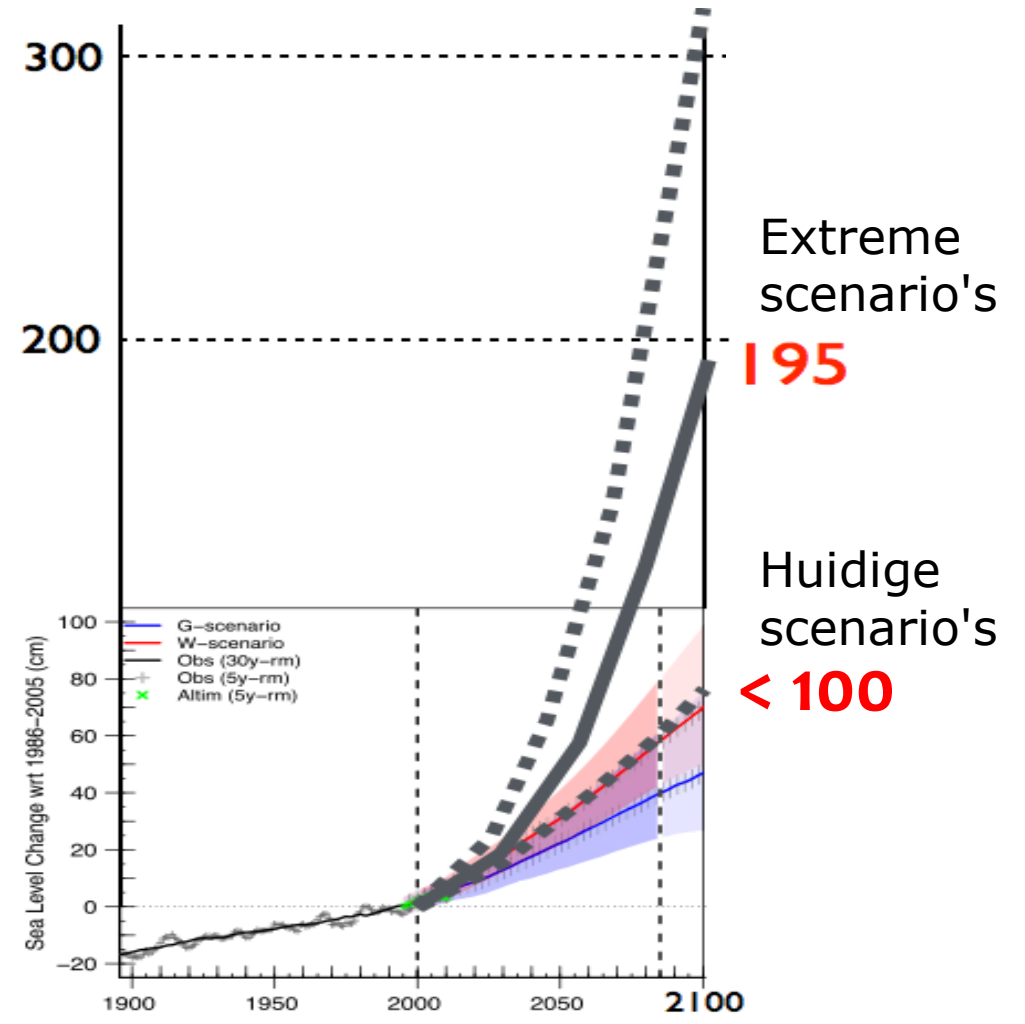
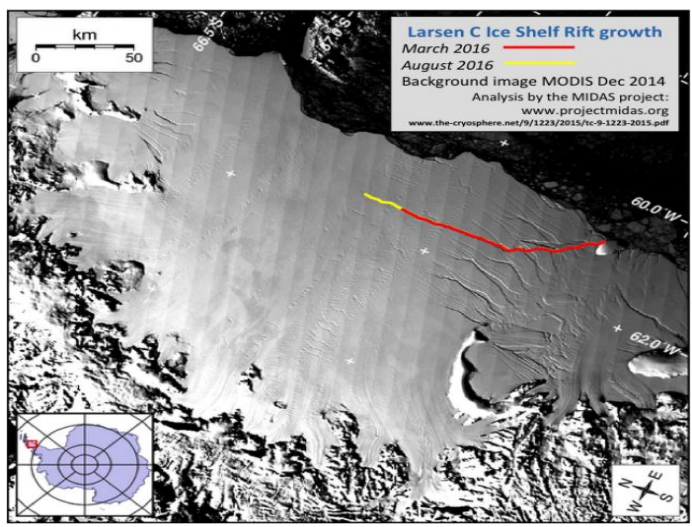


De ijskap van de Zuidpool

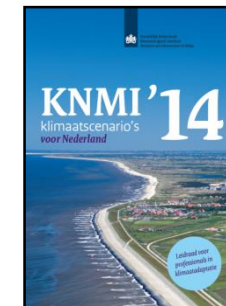
Poreus ijs



Afbrekende ijsplaten

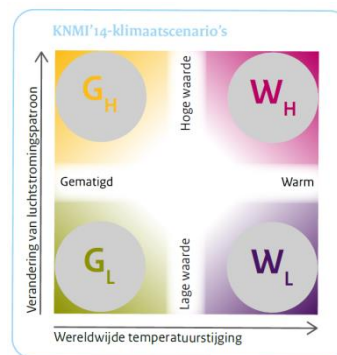
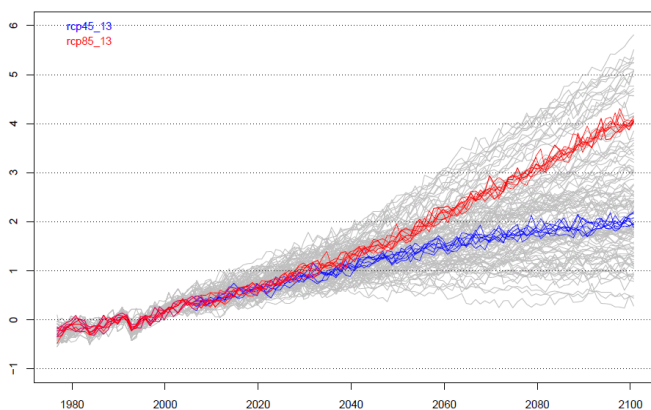


KNMI'14 scenario's

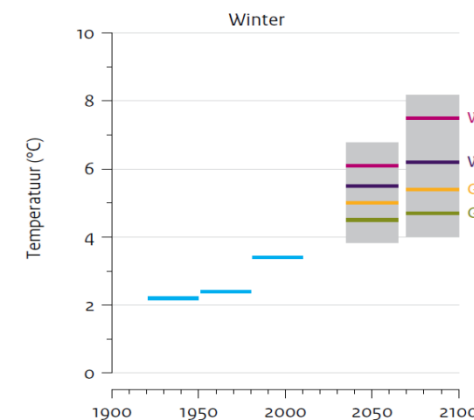


- > Gebaseerd op IPCC AR5 klimaatprojecties (CMIP5)

- > lokale interpretatie



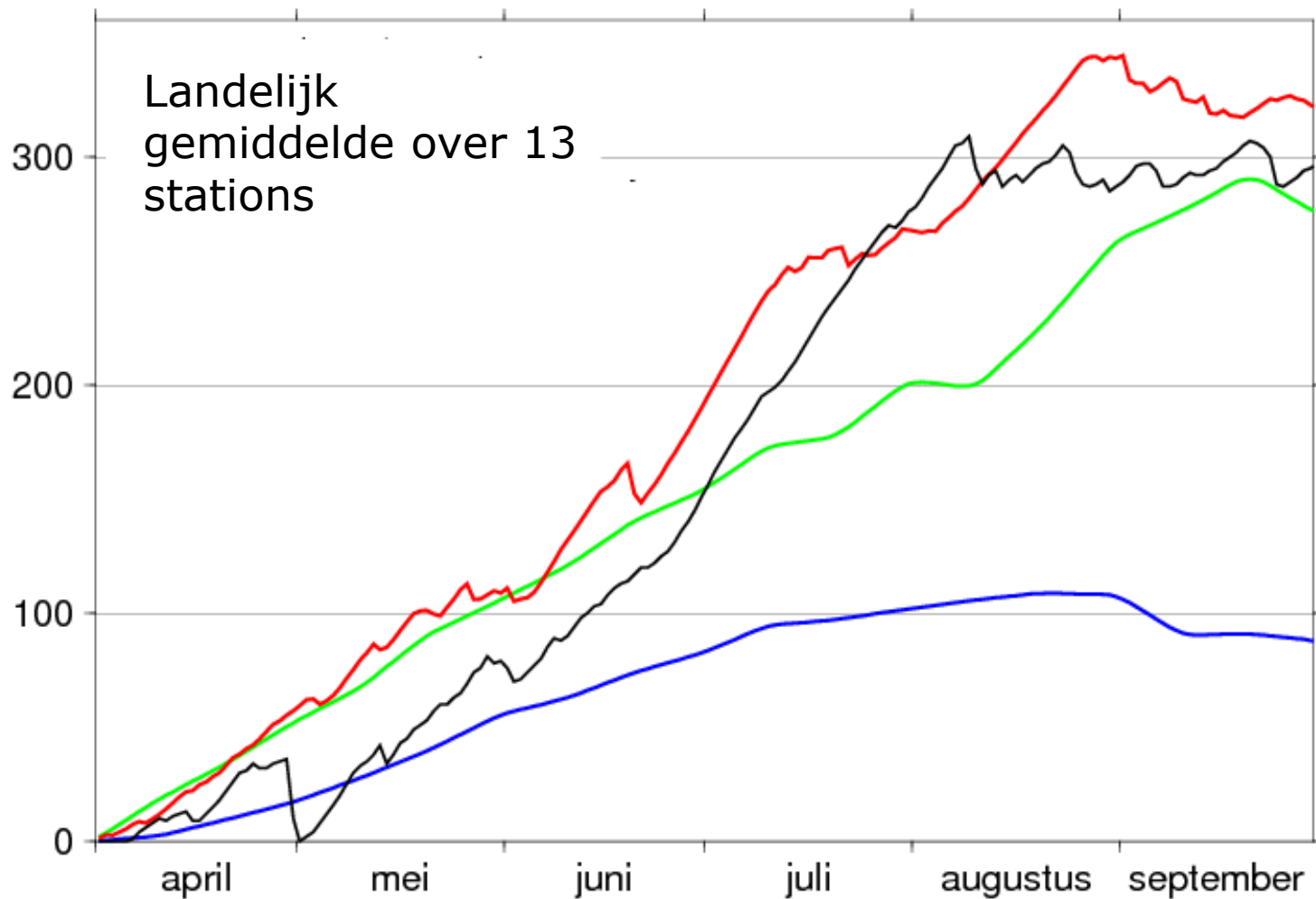
Scenario change values for the climate around 2050 (2050-2050)	Scenario change values for the climate around 2085 (2075-2080)						Natural emission change for 2085 (2075-2080)					
	G _H		W _H		G _L			W _L				
	High value	Low value	High value	Low value	High value	Low value		High value	Low value			
150 to 150 km	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5



- > Basis voor het Nederlandse Nationale Adaptatie Strategie inclusief het Delta Programma

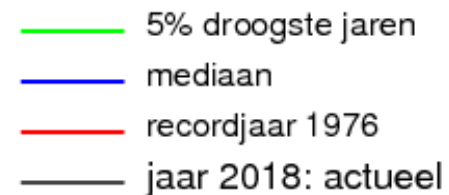


Verloop over jaar



Landelijk gemiddeld:

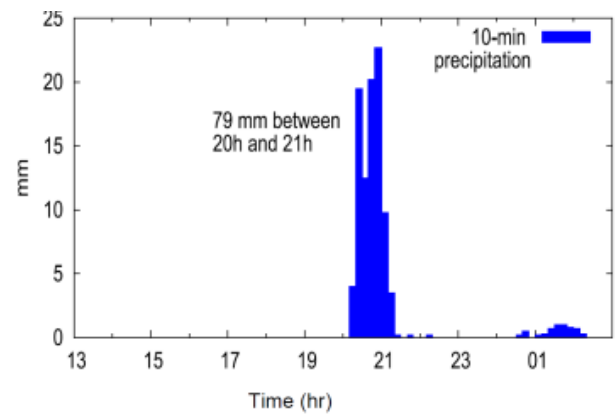
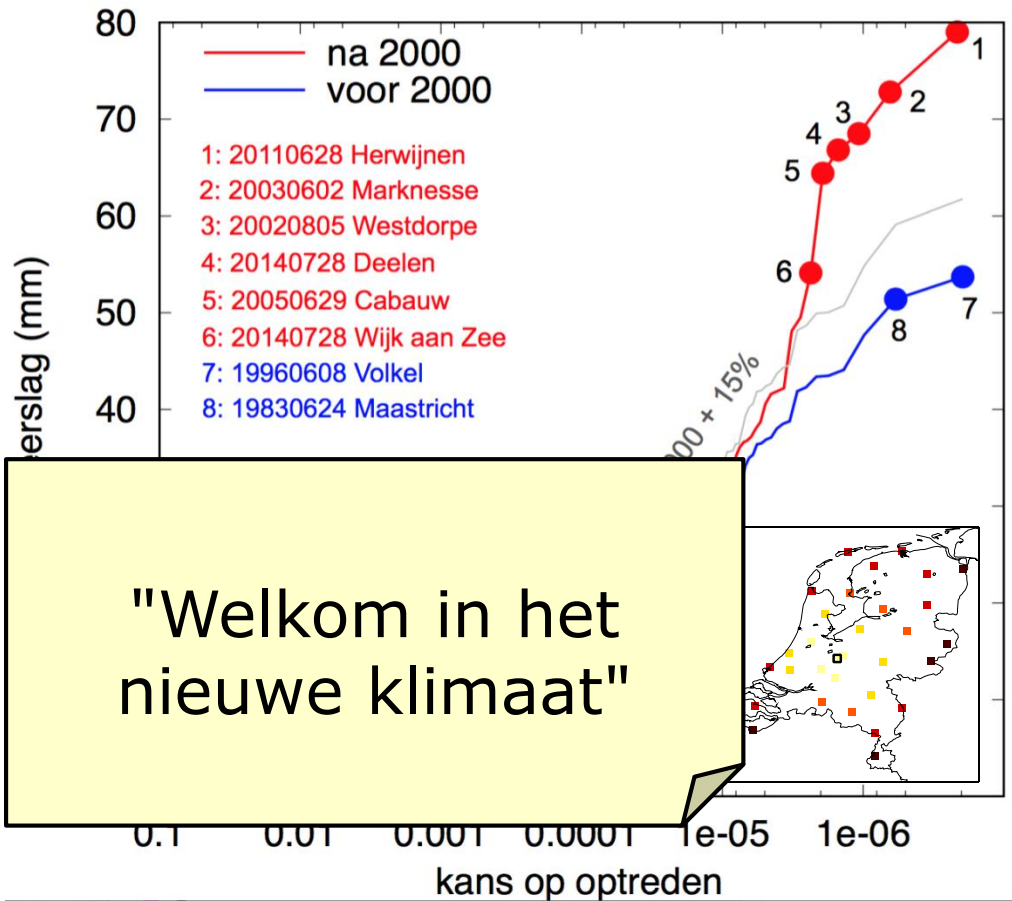
- Maximale neerslagtekort 306 mm
- Bereikt op 8 augustus 2018





Na 2000 zijn er relatief vaak extreem zware buien opgetreden

Ursom van de neerslag



Effecten van toename gemiddelde temperatuur



Meer ziekteverwekkers en exoten



Minder strooidagen

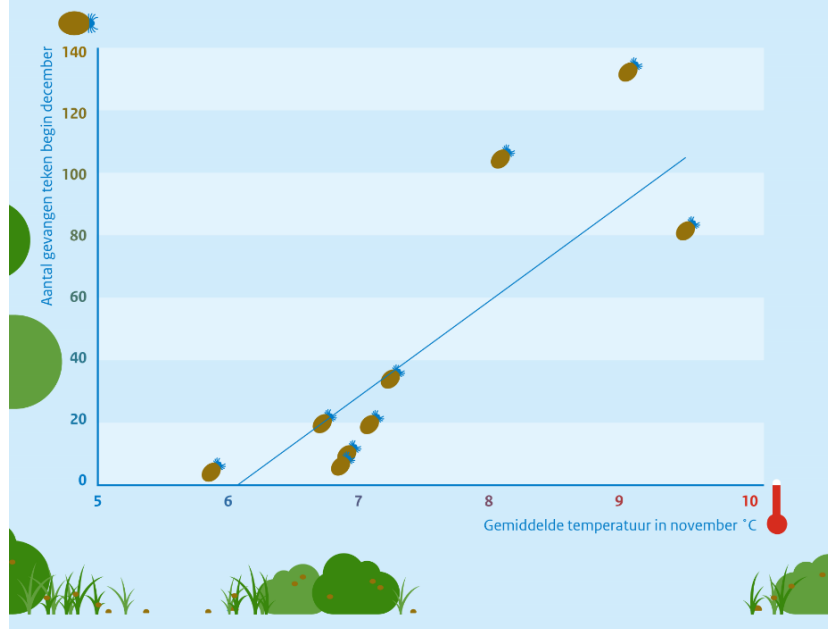


Lang groeiseizoen > meer pollen

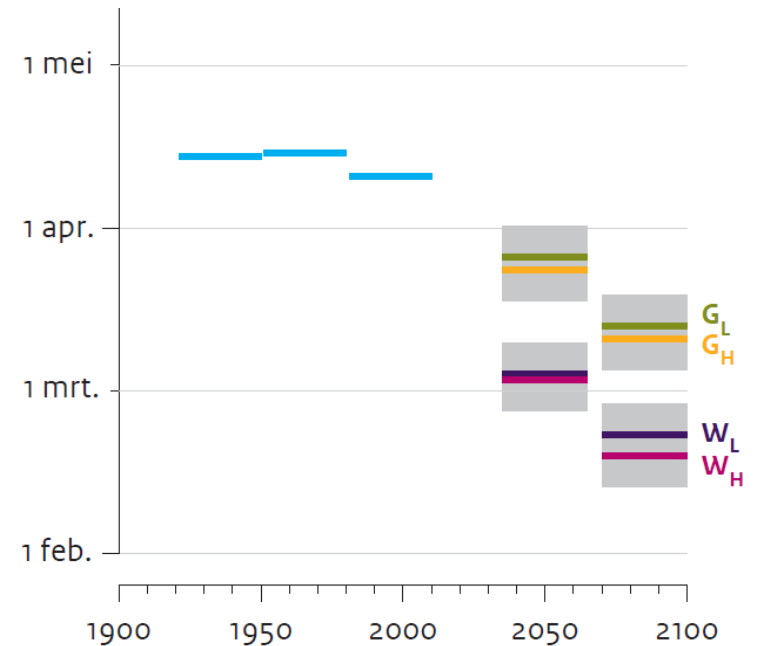


Hoe warmer in november, des te meer teken begin december

Aantal gevangen teken op 13 locaties door heel Nederland in de jaren 2006-2014



groeiseizoen begint straks bijna een maand eerder >



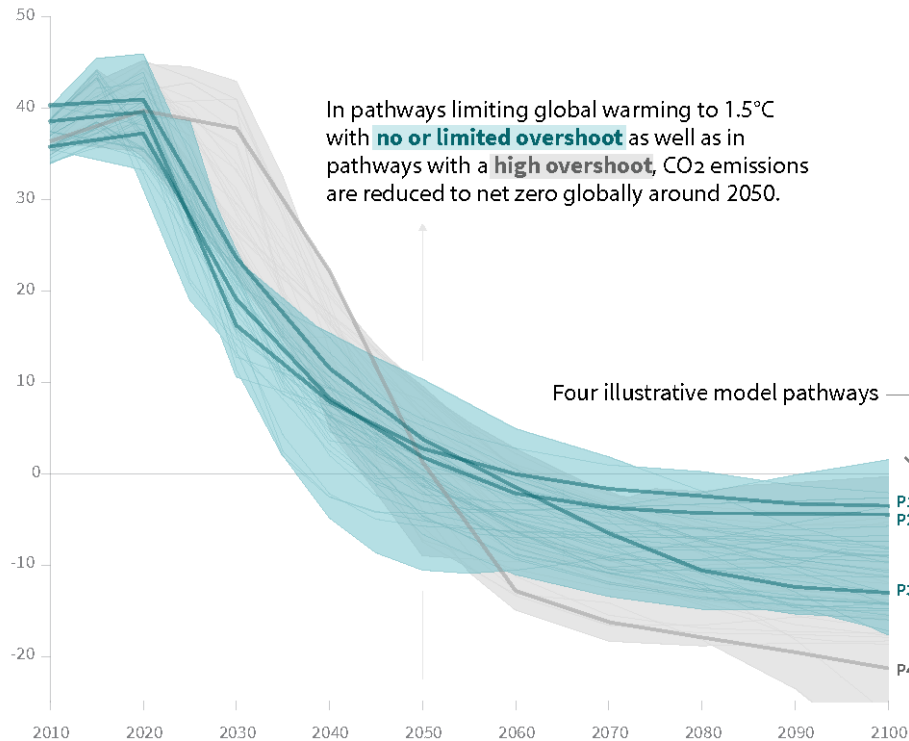
Global emissions pathway characteristics

General characteristics of the evolution of anthropogenic net emissions of CO₂, and total emissions of methane, black carbon, and nitrous oxide in model pathways that limit global warming to 1.5°C with no or limited overshoot. Net emissions are defined as anthropogenic emissions reduced by anthropogenic removals. Reductions in net emissions can be achieved through different portfolios of mitigation measures illustrated in Figure SPM3B.

IPCC Special Report on 1.5°C global warming

Global total net CO₂ emissions

Billion tonnes of CO₂/yr



Timing of net zero CO₂

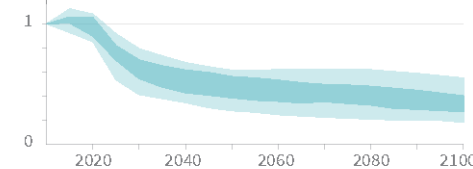
Line widths depict the 5-95th percentile and the 25-75th percentile of scenarios



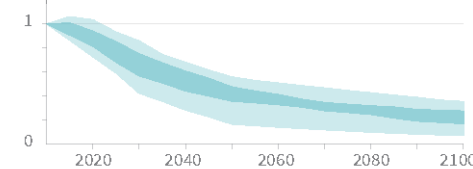
Non-CO₂ emissions relative to 2010

Emissions of non-CO₂ forcers are also reduced or limited in pathways limiting global warming to 1.5°C with **no or limited overshoot**, but they do not reach zero globally.

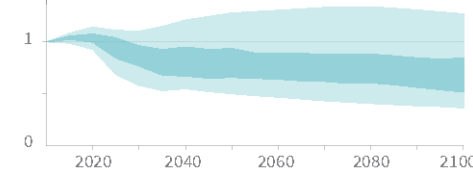
Methane emissions



Black carbon emissions



Nitrous oxide emissions

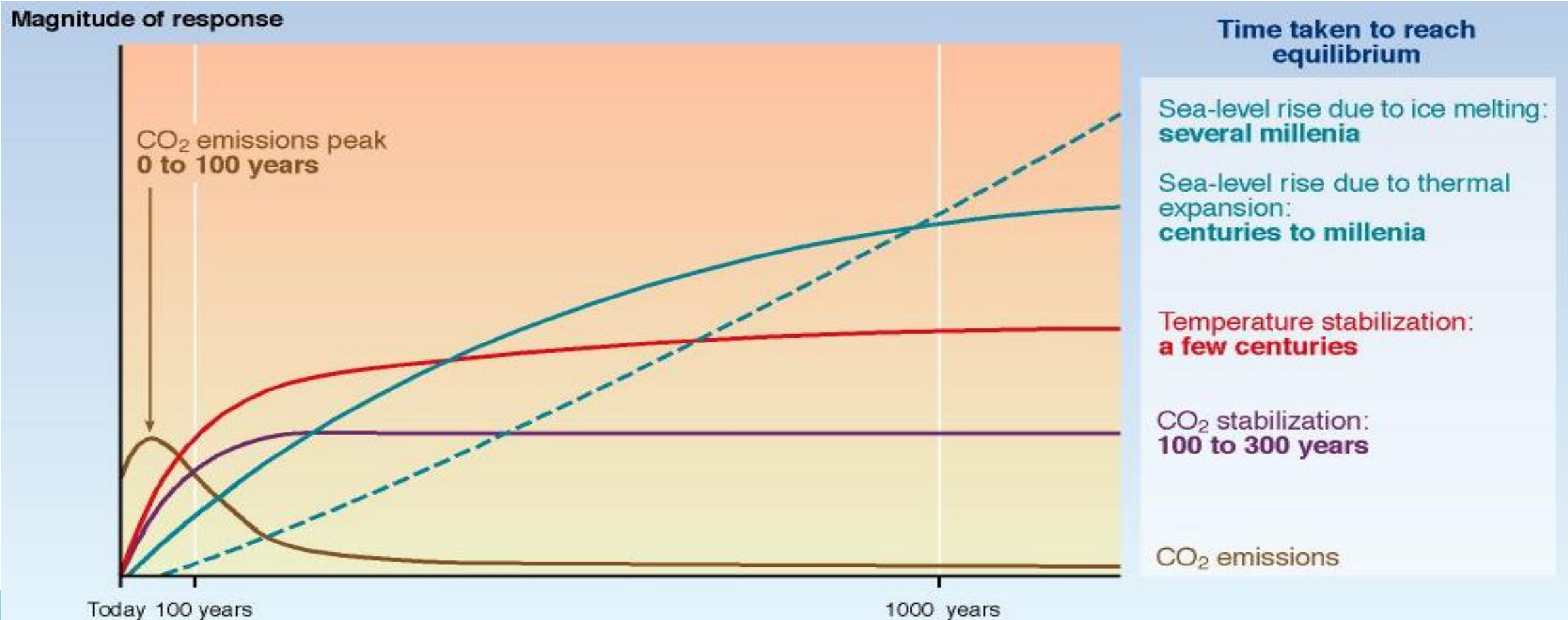


CO₂ emissions decline by about 45% (25%) from 2010 levels by 2030 reaching net zero around 2050 (2070) to limit warming to 1.5°C (2°C)

Non-CO₂ emissions show deep reductions



CO₂ concentrations, temperature and sea level continue to rise long after emissions are reduced



Concluding numbers:

- Observed global temperature rise since end of 19th century is **1°C**. Dominant cause is human activity.
- Committed warming: **>1.5°C?** (1.3-1.9°C)
- UNFCCC (Paris) aims at well below **2°C** (1.5°C)
- With present NDCs global temperature will rise **~3°C**
- Business as Usual results in **~4°C**