Klimatet – vart är det på väg?

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SMHI

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http://www.keepbanderabeautiful.org/climatechange.html

Östergötland, en del av klimatsystemet!

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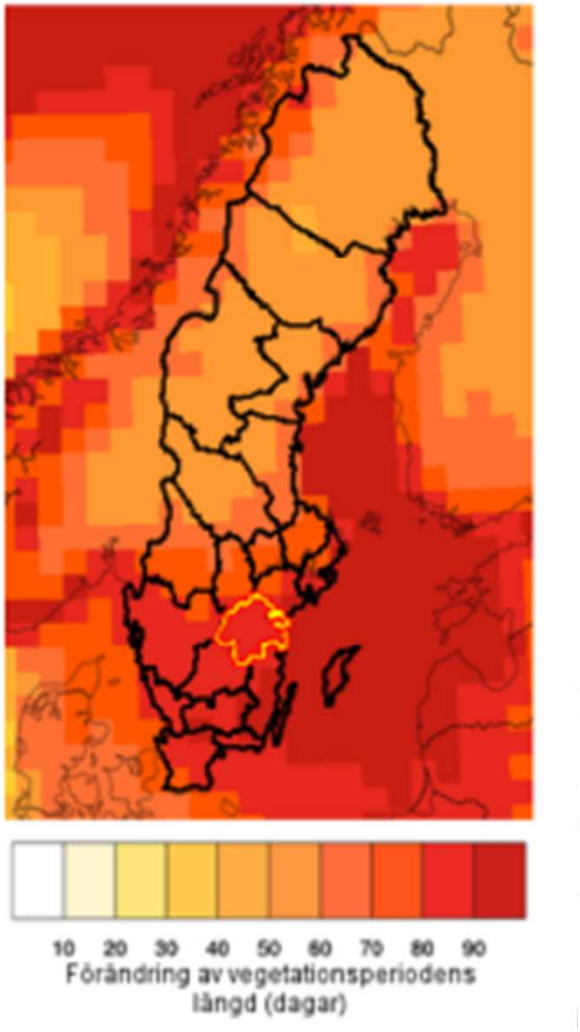
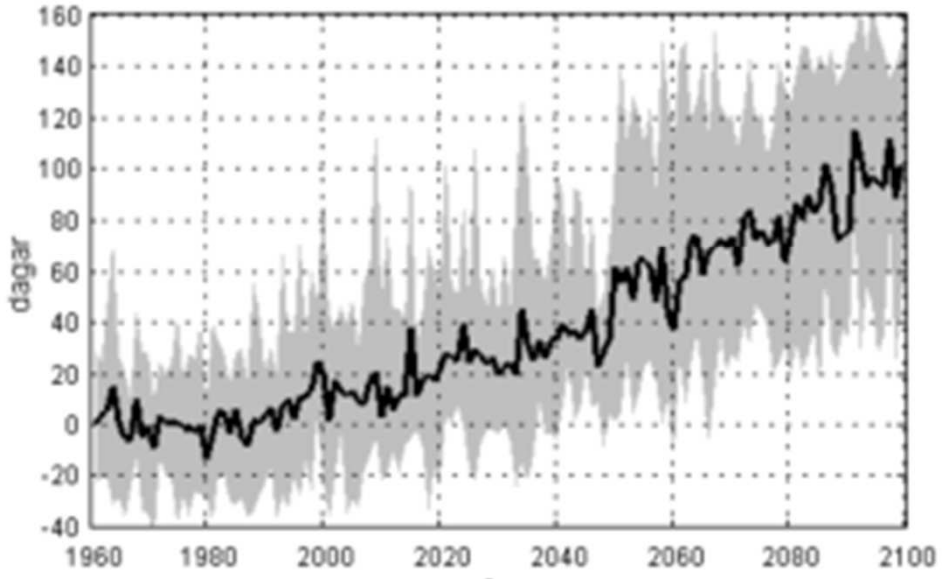
Förändring av vegetationsperiodens längd i Östergötlands län, scenario RCP8,5





http://www.smhi.se/klimat/framtidens-klimat/klimatscenarier?area=lan&var=veglen&sc=rcp85&seas=ar&dnr=5&sp=sv&sx=0&sy=0

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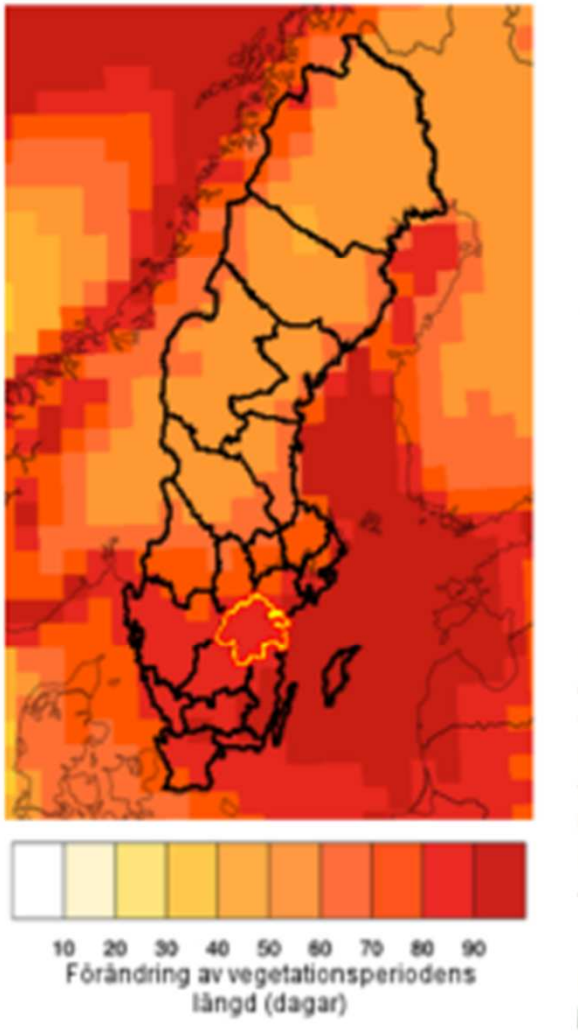

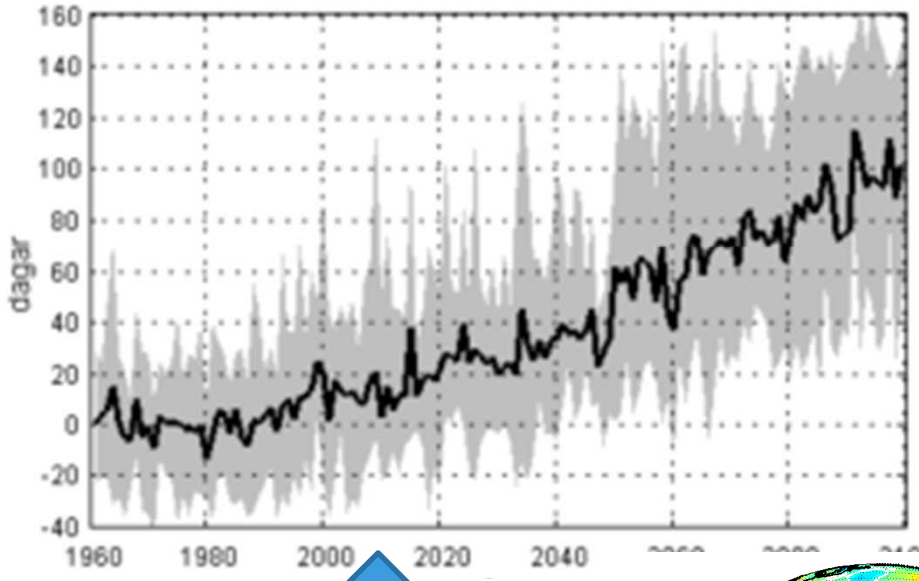

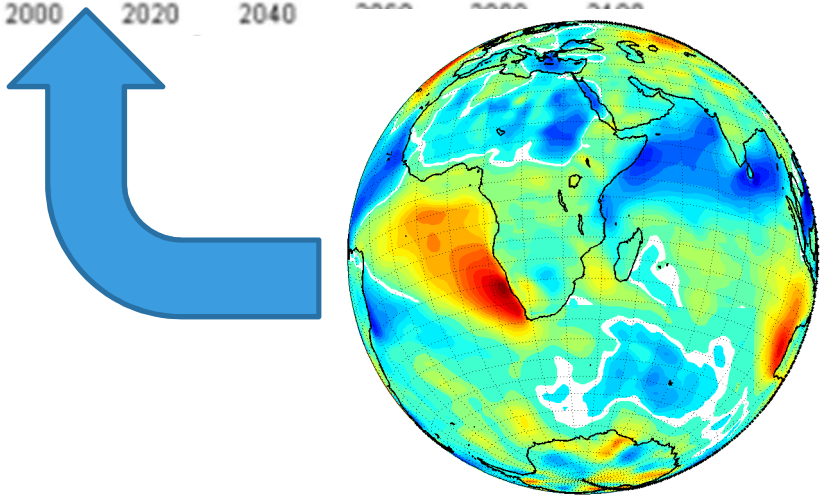

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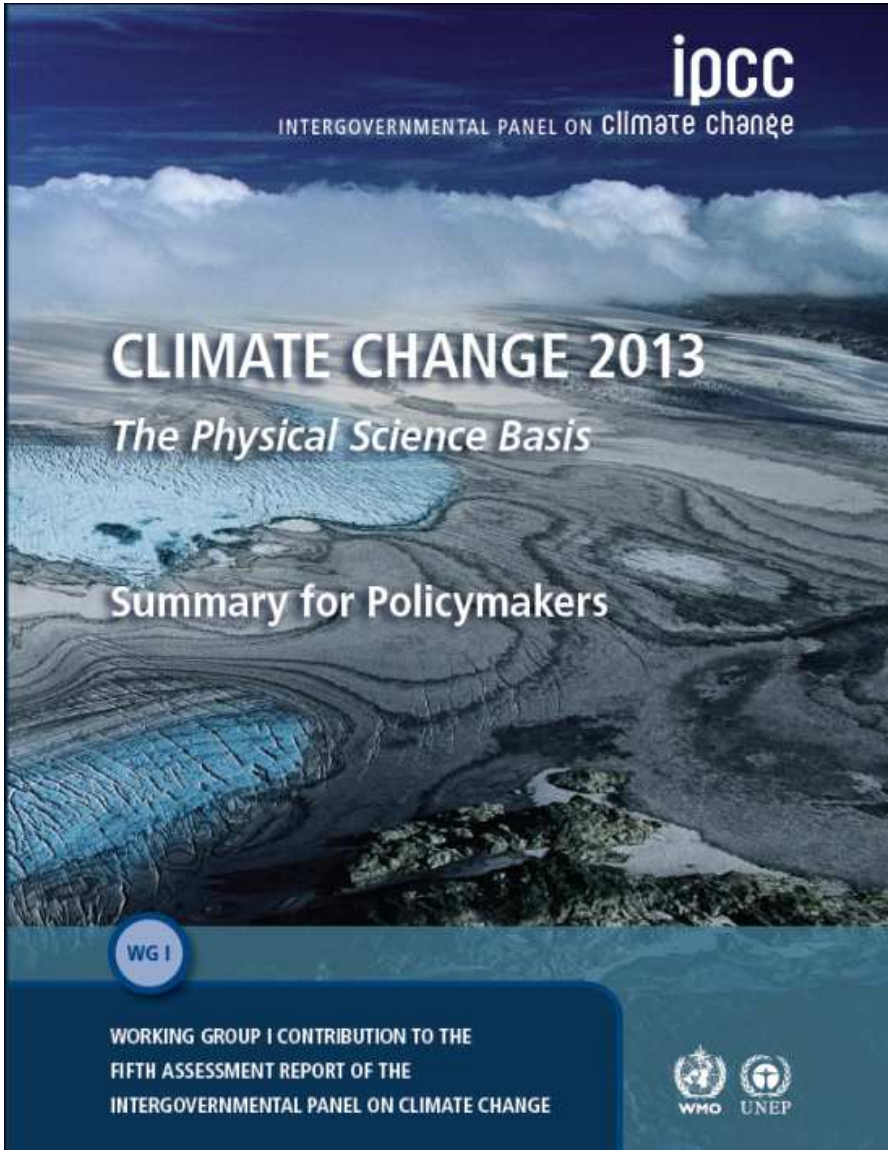
Vårt klimatsystemet enligt IPCC



IPCC AR5, september 2013
WG I
The Physical Science Basis

http://www.ipcc.ch/

Energin i klimatsystemet ökar!

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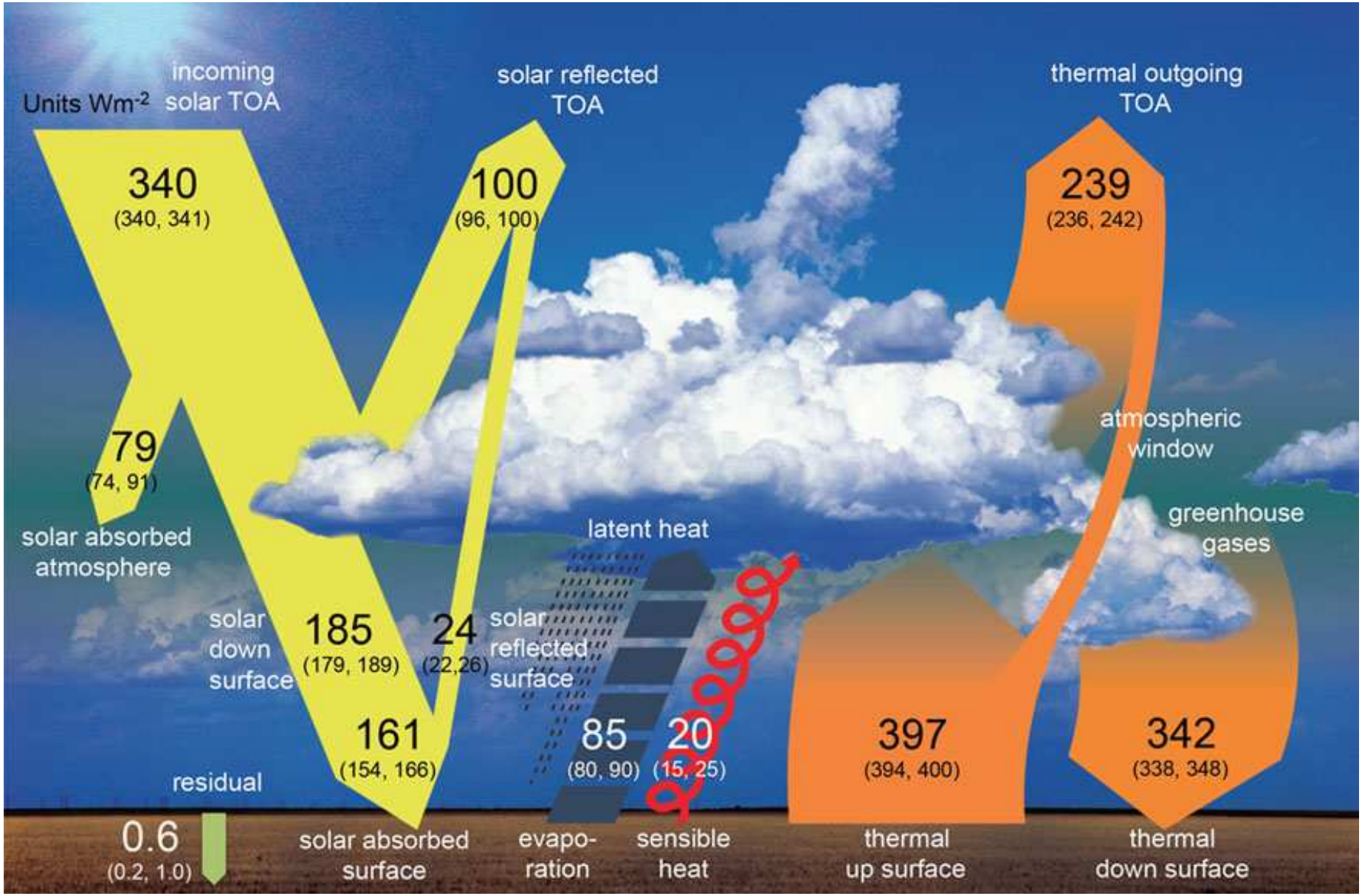

http://link.springer.com/article/10.1007%2Fs00382-012-1569-8

Energin i klimatsystemet ökar!

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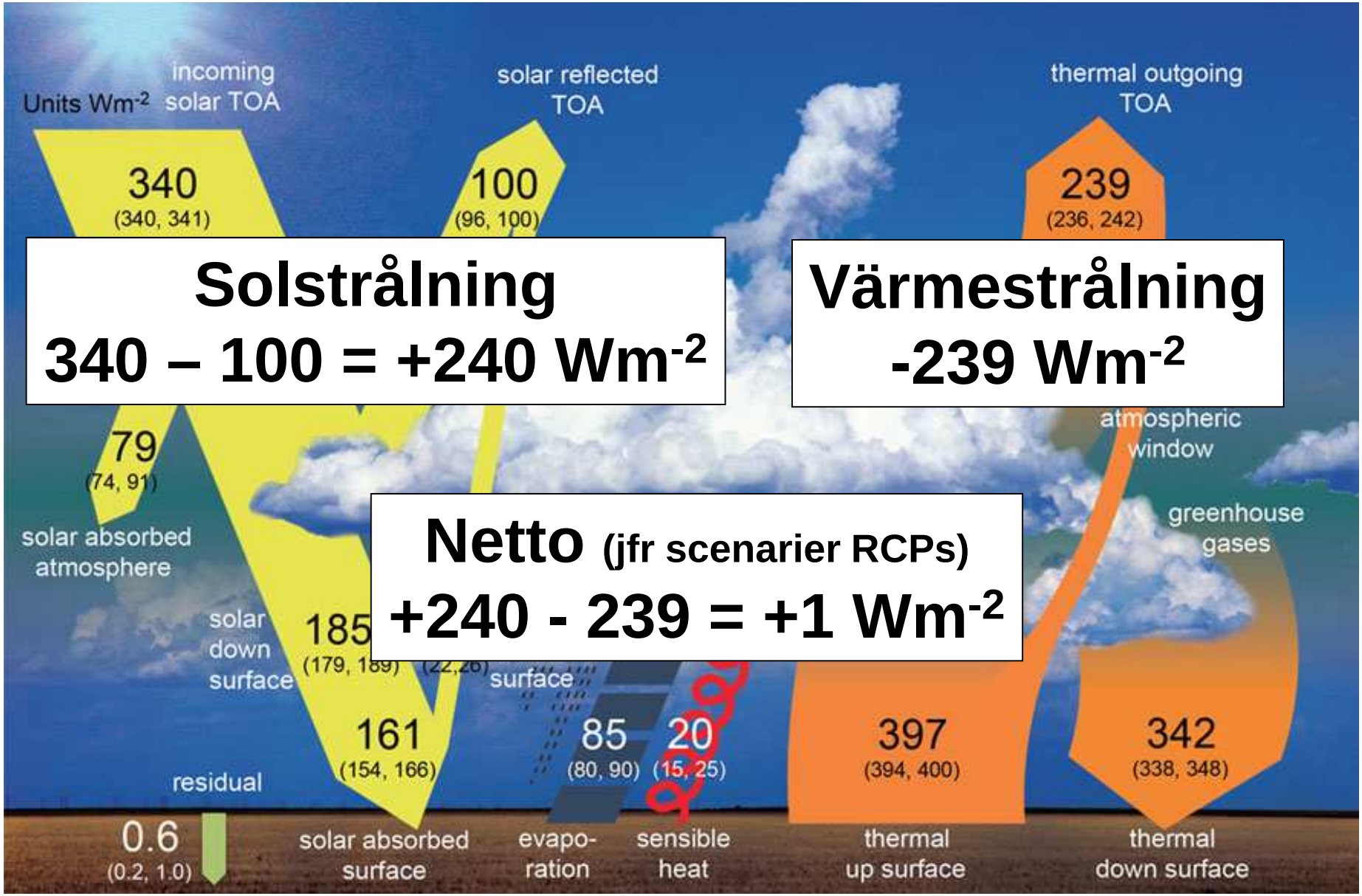

http://link.springer.com/article/10.1007%2Fs00382-012-1569-8

Hur fördelas energiökningen?

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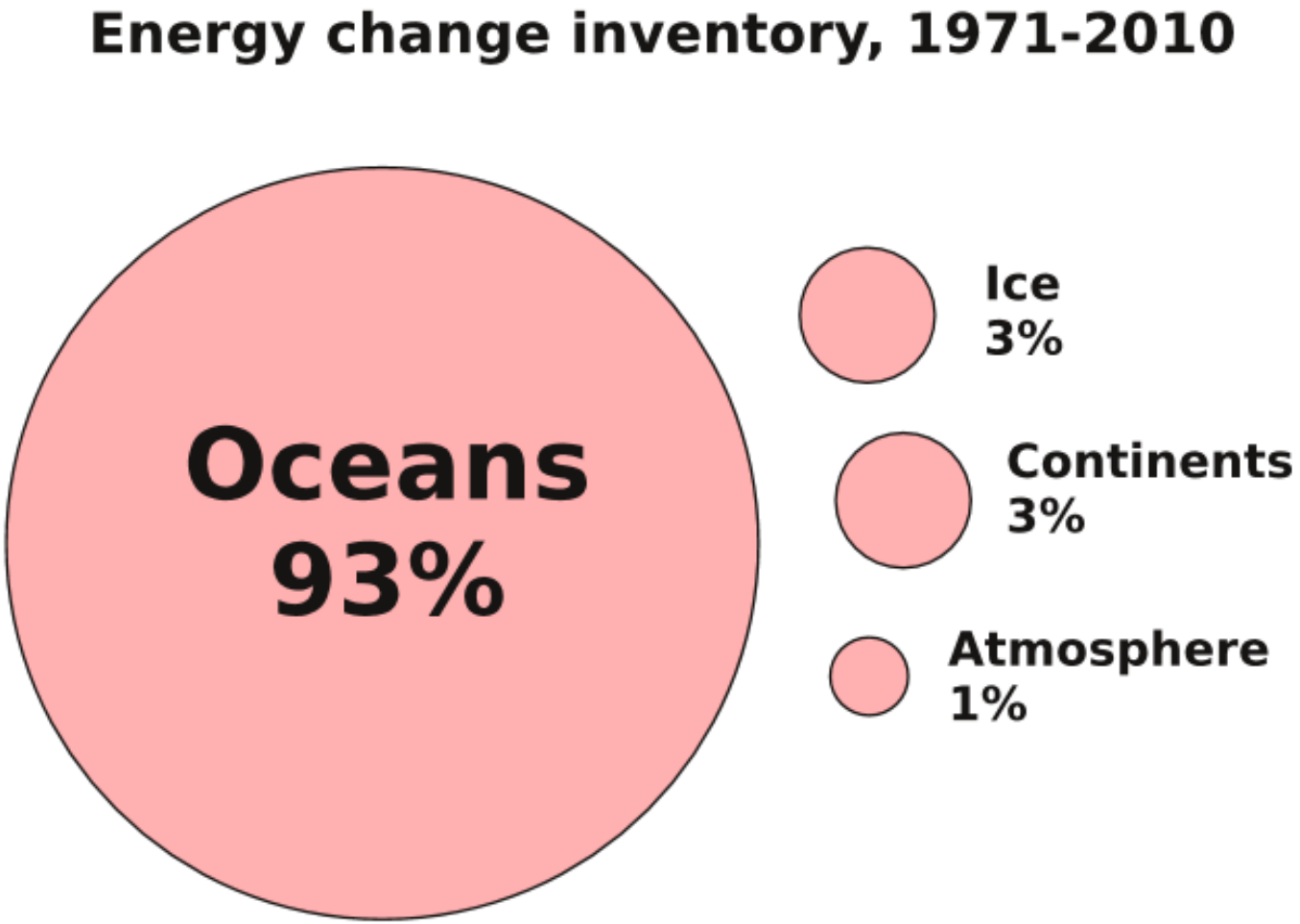

http://en.wikipedia.org/wiki/Global_warming#

Energitransporten i haven...

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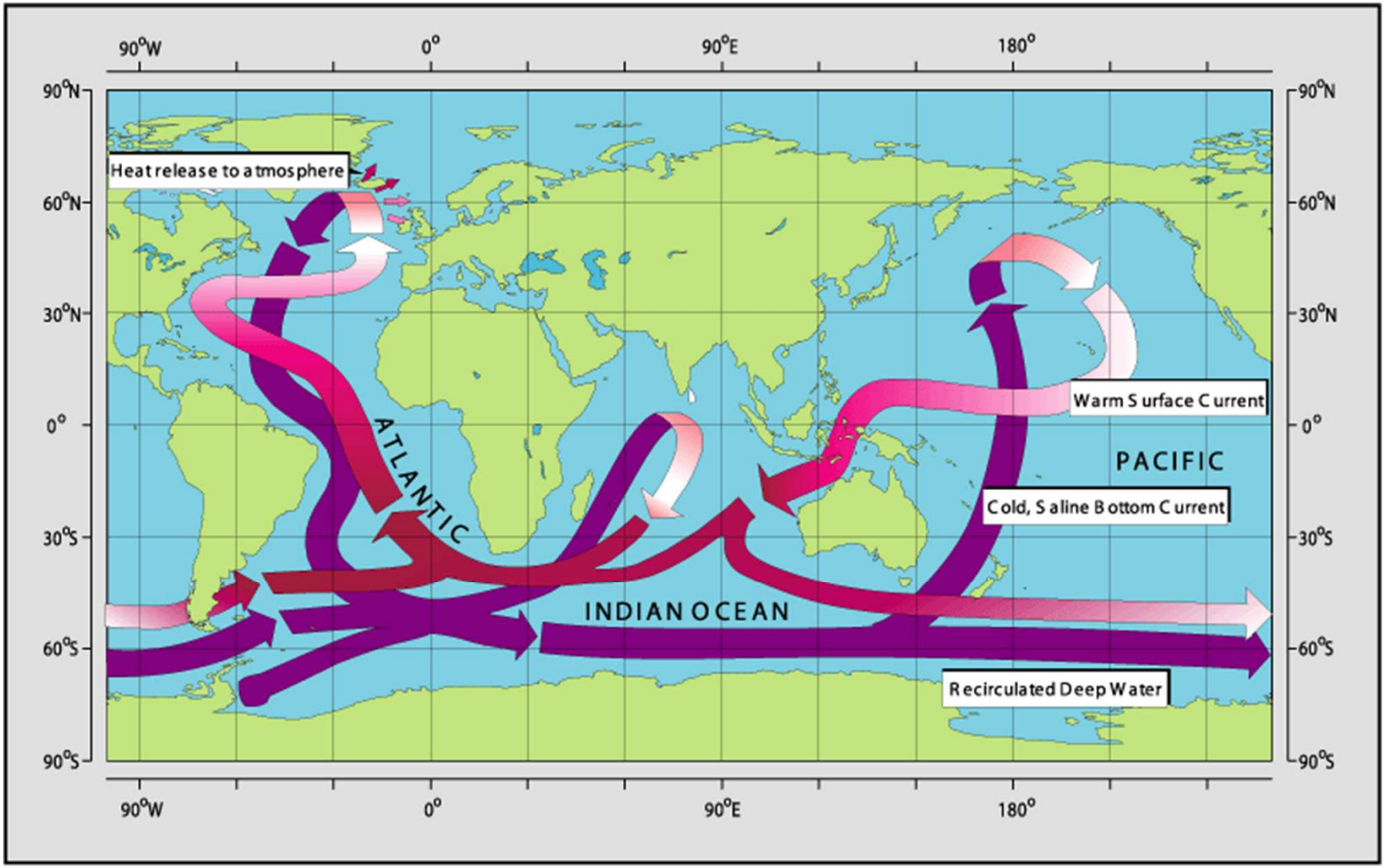
… ett cirkulationssystem med en tidsskala på hundratals år!



Den globala temperaturutvecklingen

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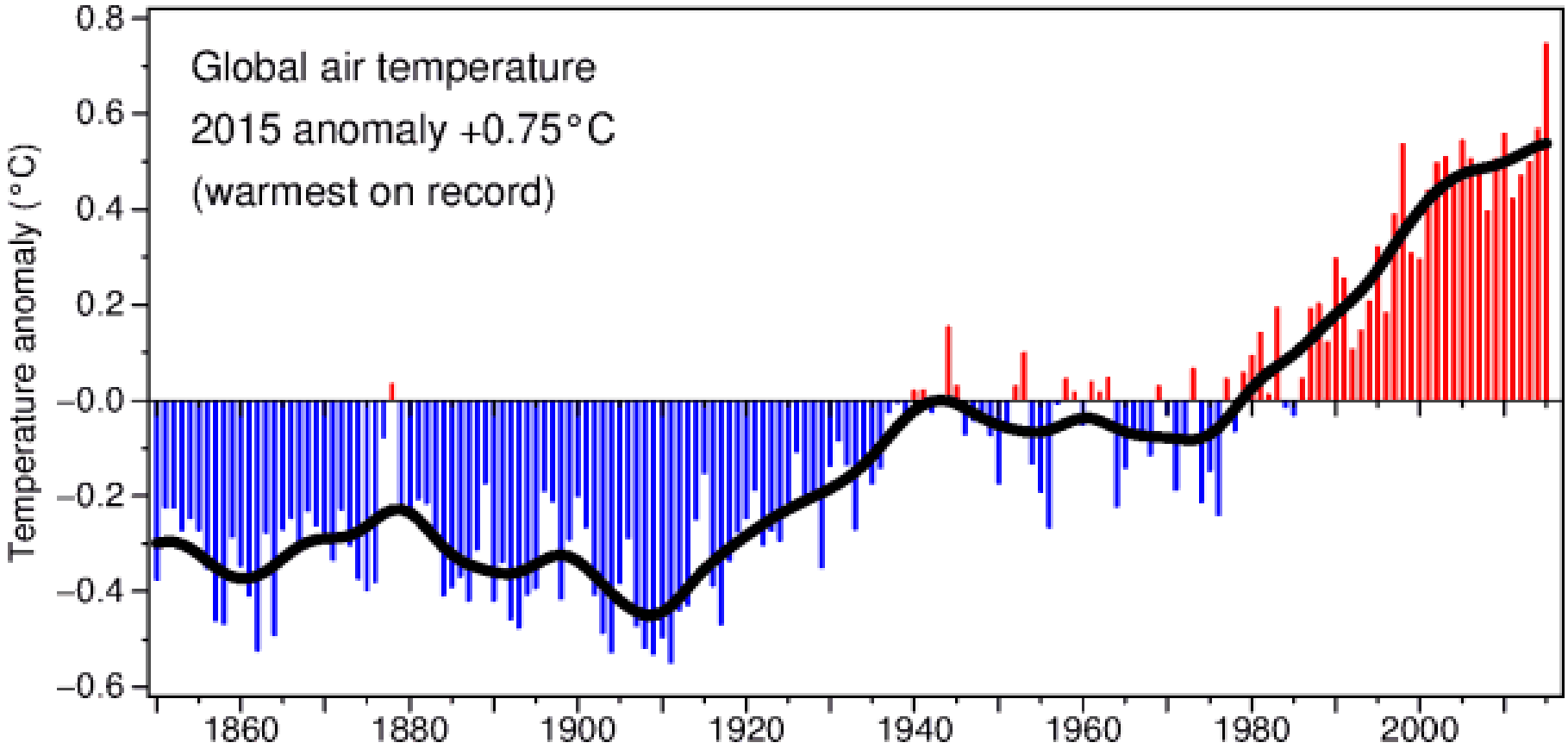

http://www.cru.uea.ac.uk/

Processer bakom utvecklingen

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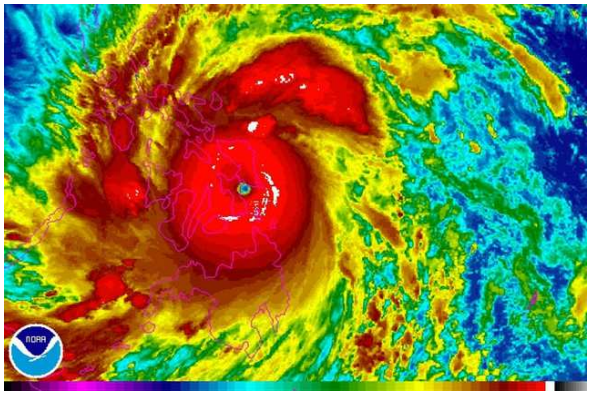

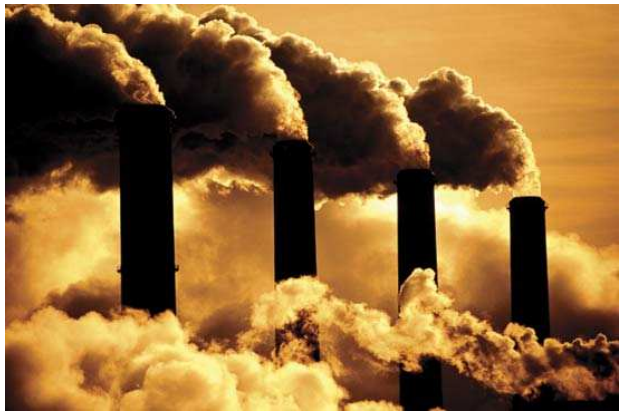

Tidsskalan hos processerna

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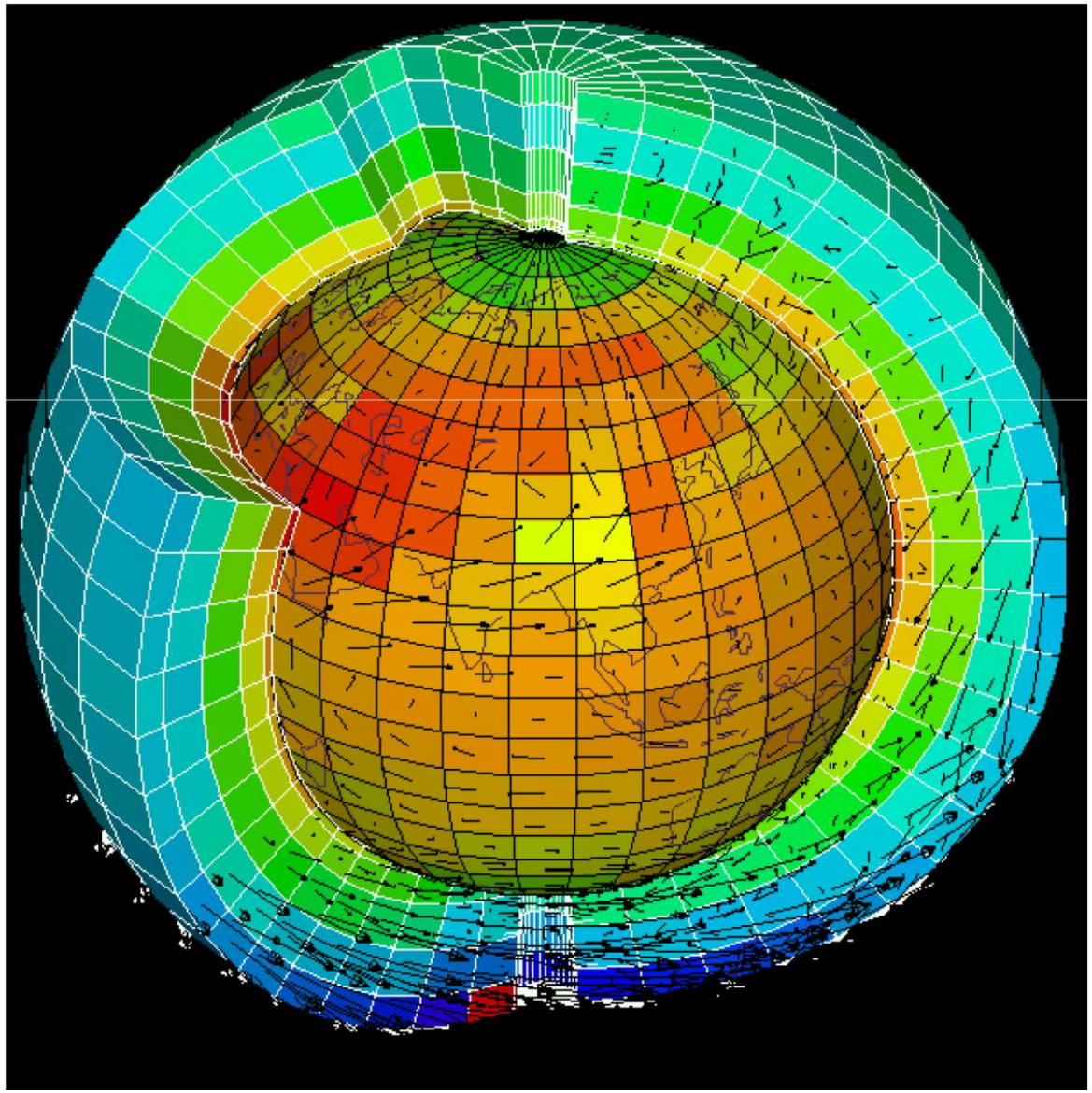


Atmosphere
Temperature
Humidity
Cloud water
Wind speed / direction

A couple of weeks

Land
Snow
Soil moisture

A few months

Vegetation

Sea
Temperature
Salinity
Flow speed / direction

Some hundreds years

Glaciers

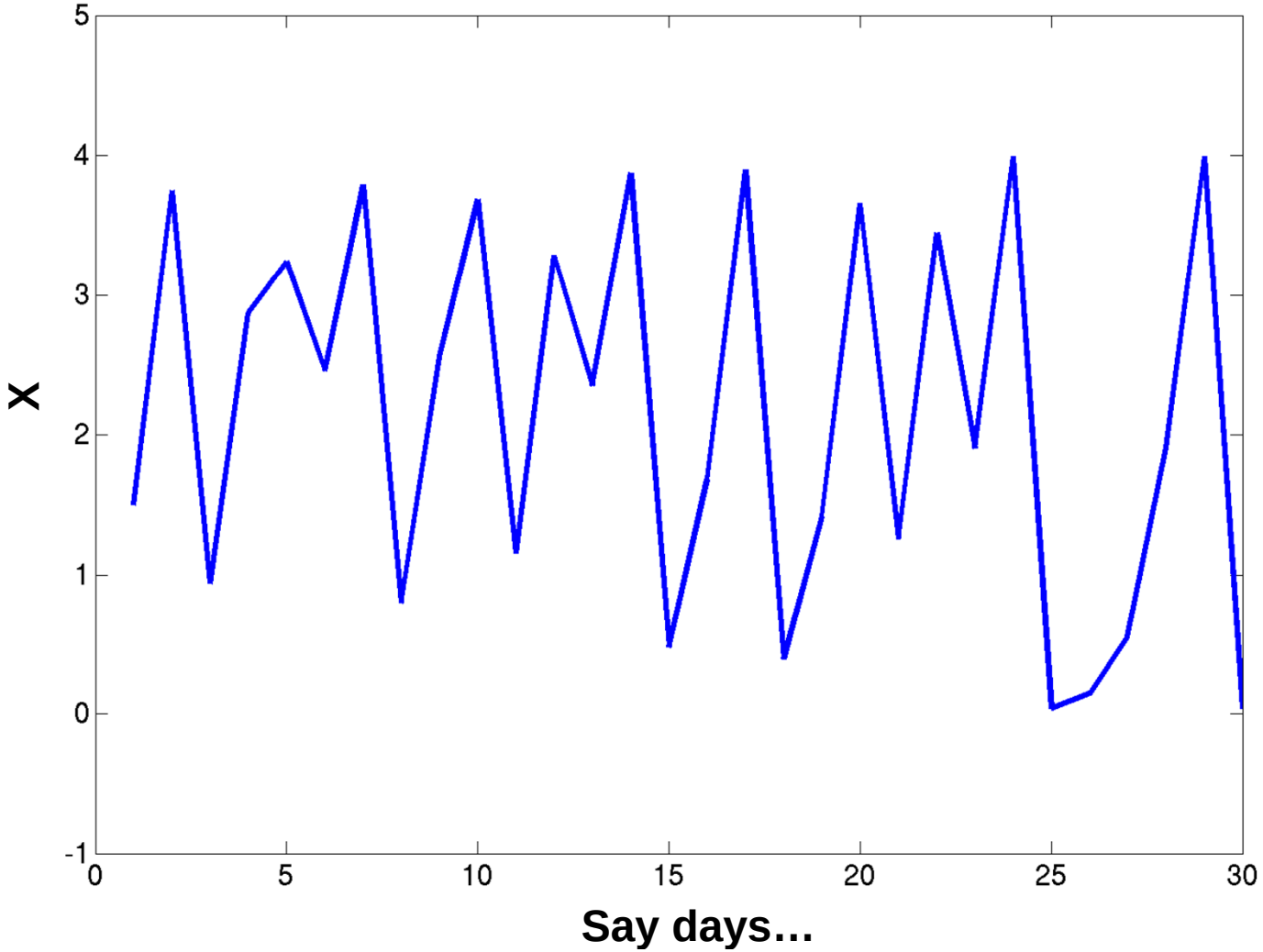
Thousand years

Starttillståndet är betydelsefullt

A simplified non-linear equation: $X(n+1) = A\,X(n) - X(n)^2$

Assume constant A=4

X(1)=1.5



Starttillståndet är betydelsefullt

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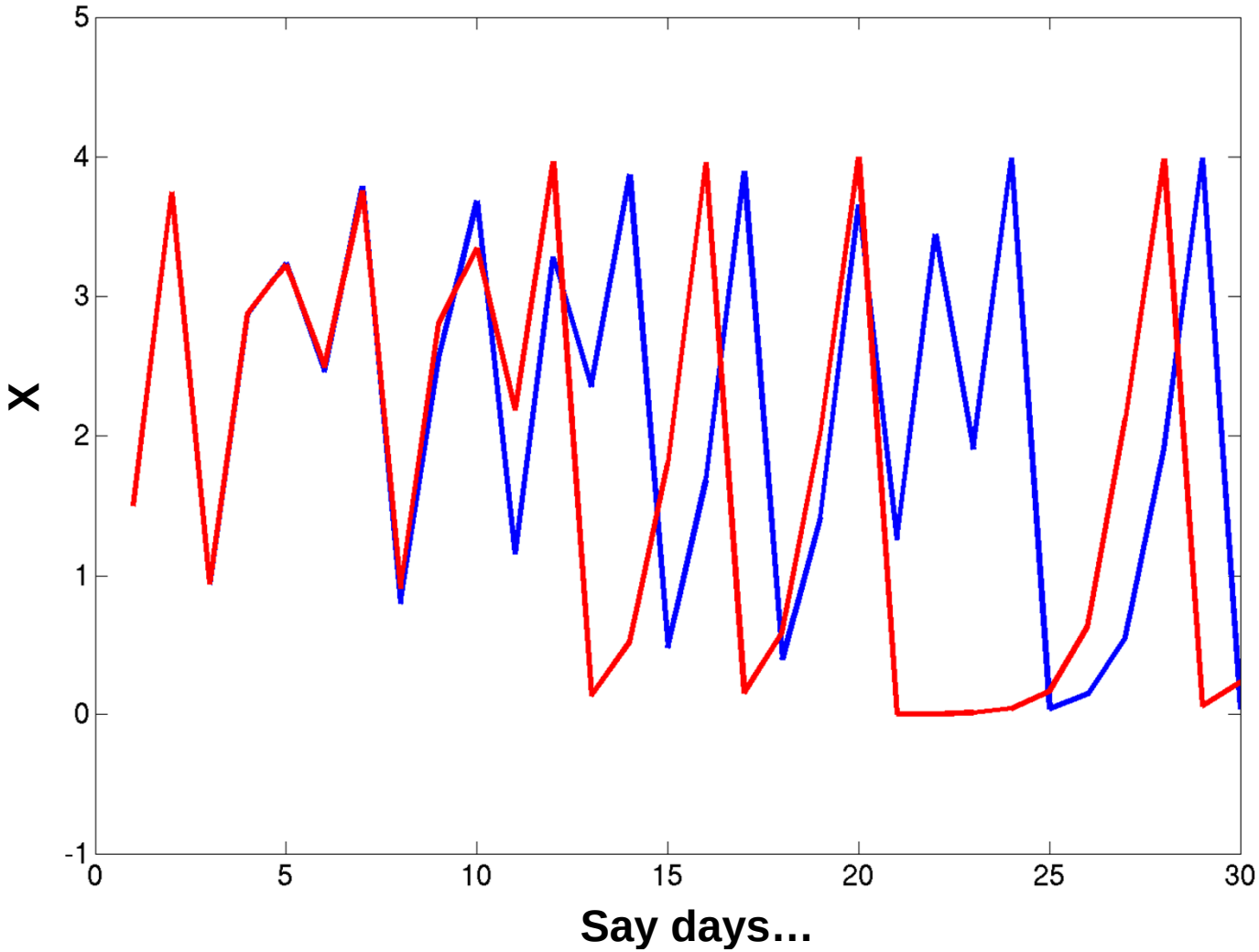
Assume constant A=4

X(1)=1.5 **X(1)=1.499**



Energitransporten i haven...

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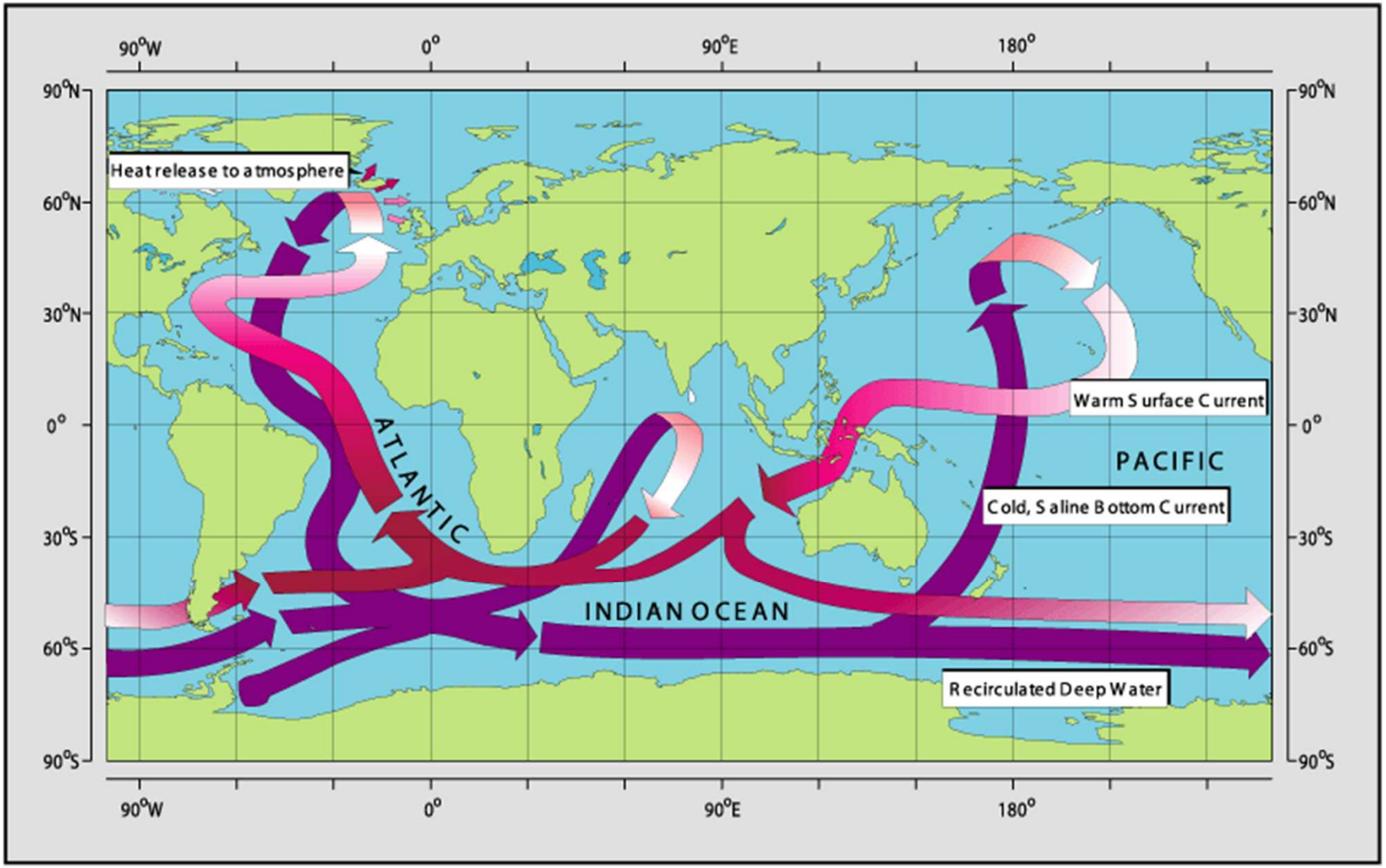

Framtiden

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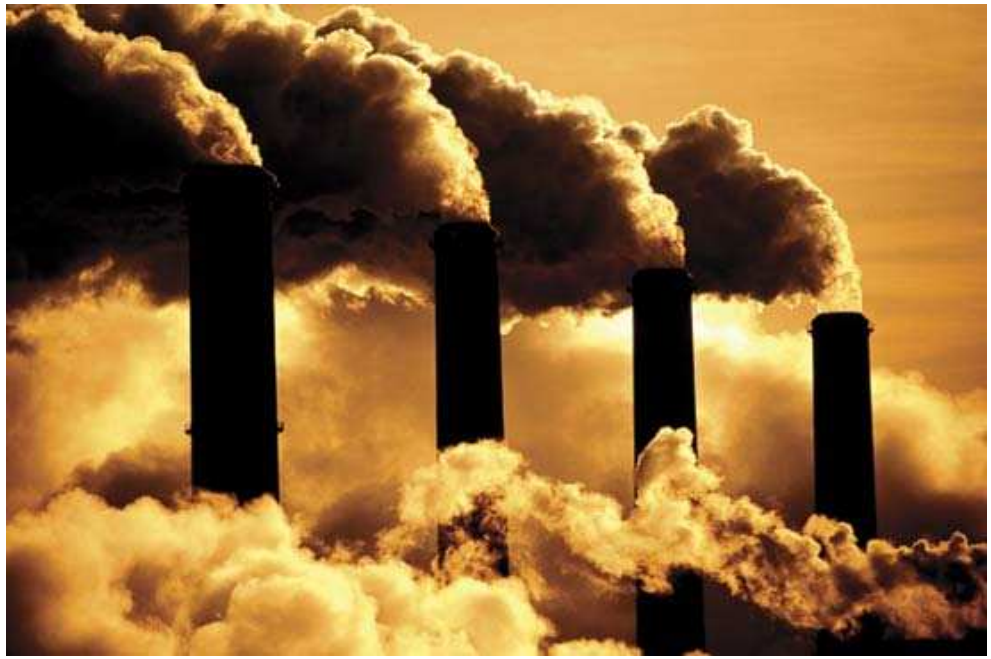
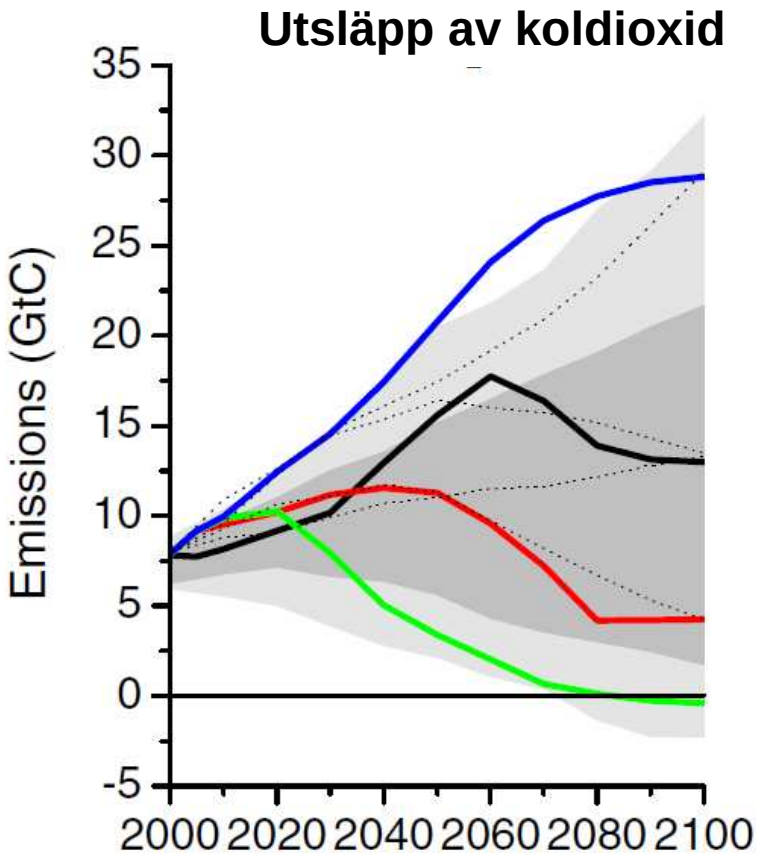
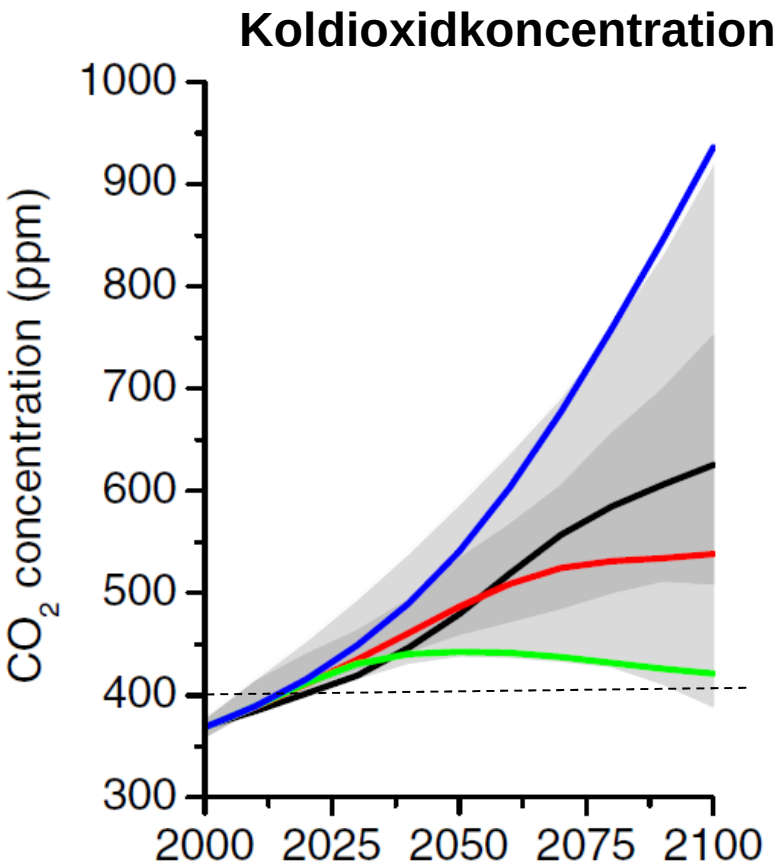


?

RCP – representative concentration pathway





Nu: 401

RCP 8.5 **Stora fortsatta utsläpp!**

RCP 6.0

RCP 4.5

RCP 2.6 (3-PD) **Upptag om 100 år!**

Van Vuuren et al., Climatic Change, 2011

Beräknad respons i global temperatur

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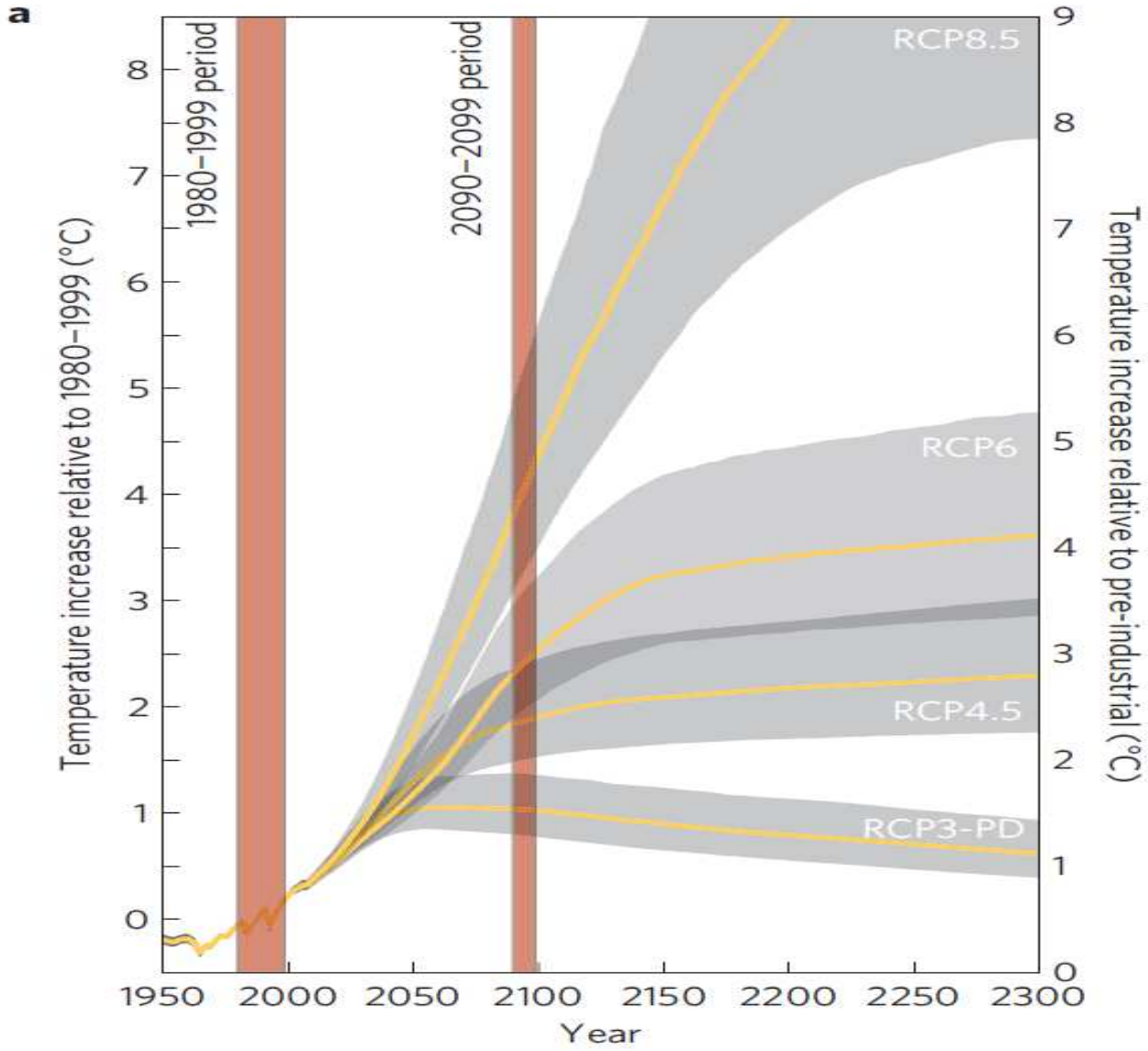

RCP 8.5

RCP 6.0

RCP 4.5

RCP 2.6 (3-PD)

Rogelj et al., Nature Climate Change, 2012

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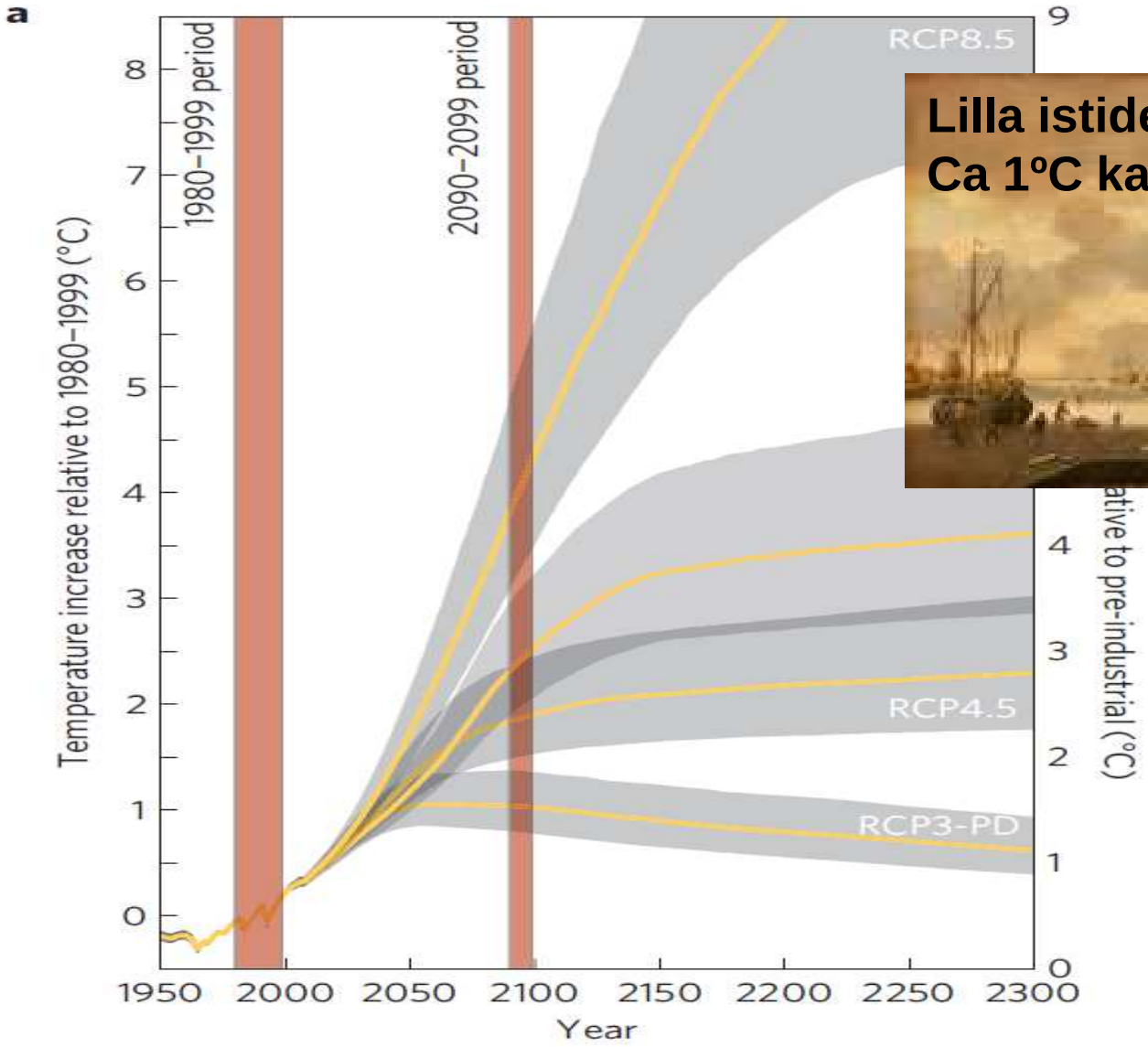

RCP 8.5

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Rogelj et al., Nature Climate Change, 2012

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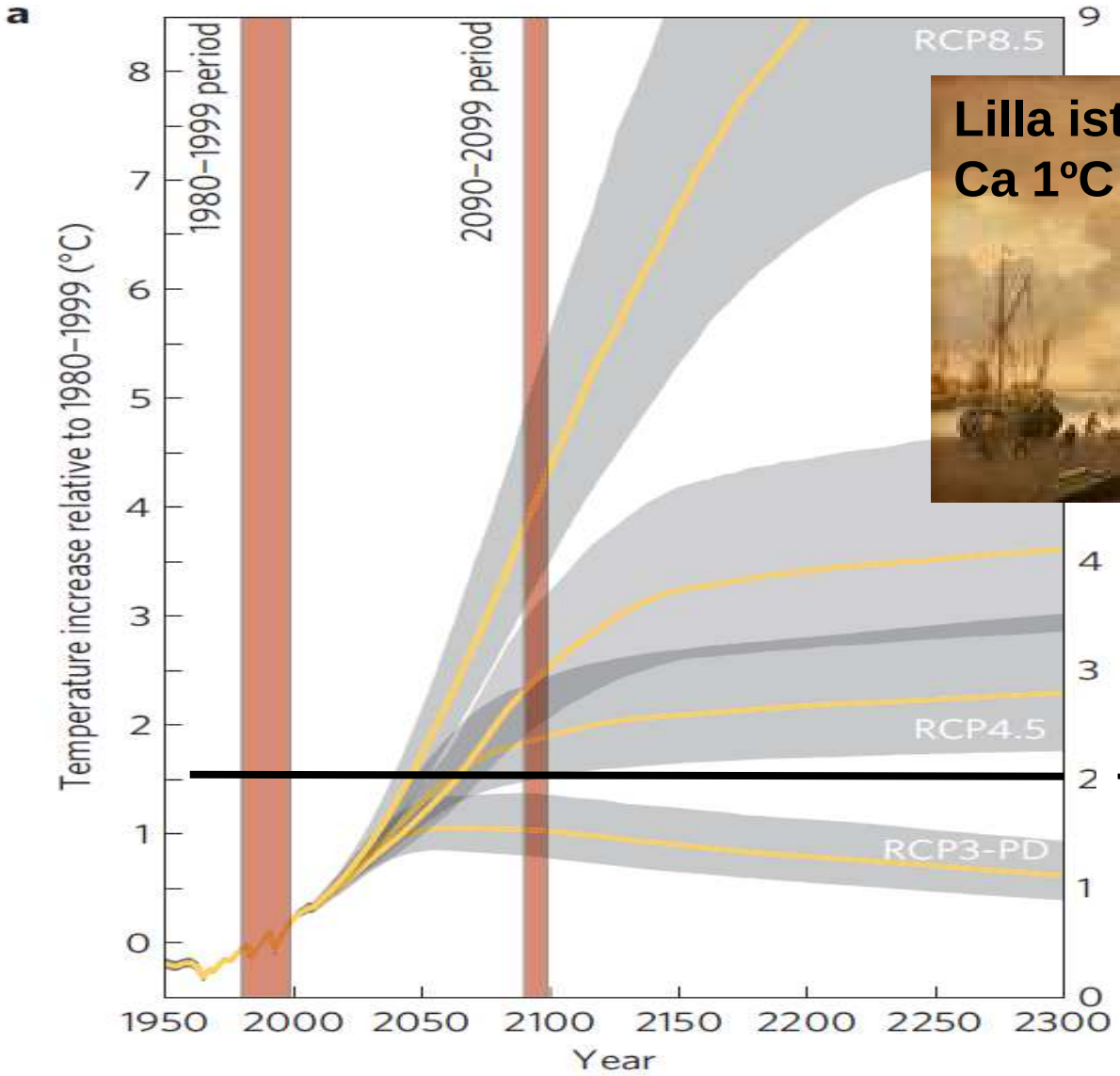

RCP 8.5

Lilla istiden:
Ca 1ºC kallare än idag!

RCP 6.0

RCP 4.5

Tvågradersmålet

RCP 2.6 (3-PD)

Rogelj et al., Nature Climate Change, 2012