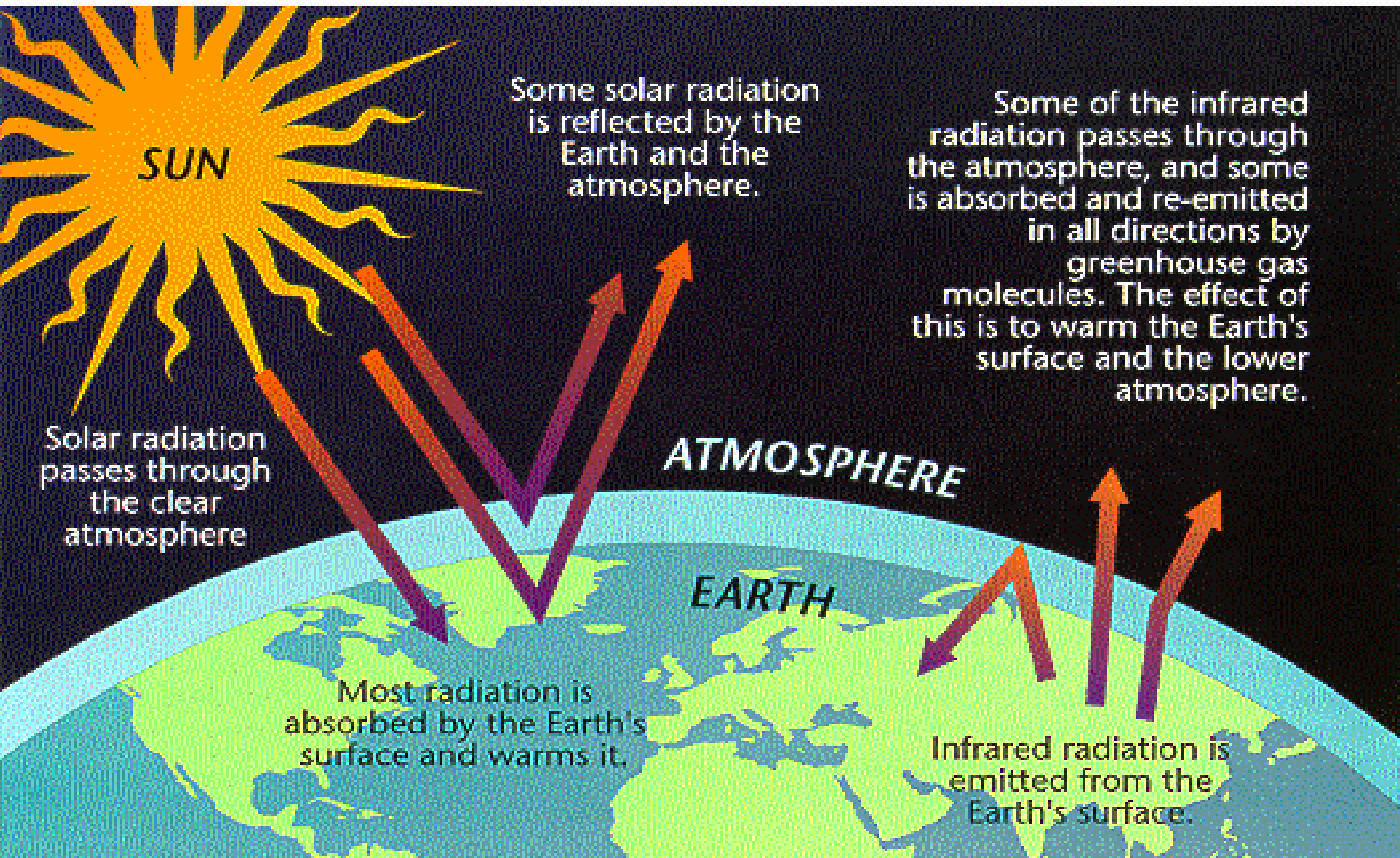


A High Level Introduction to the Technical Aspects of Climate Change

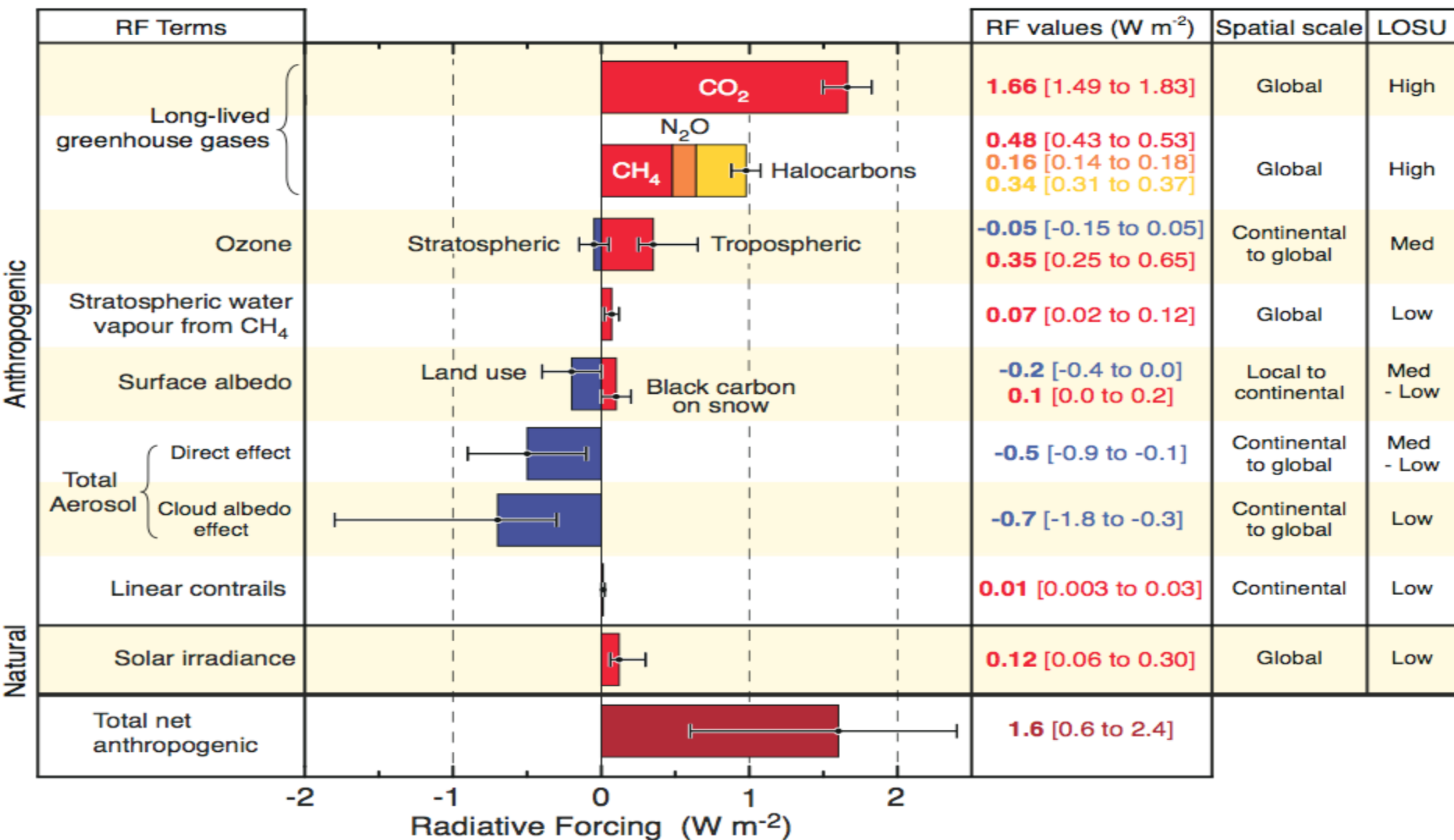
Presentation to the Select Committee, 7 June 2011,
Parliament

The Greenhouse Effect



What is increasing the effect

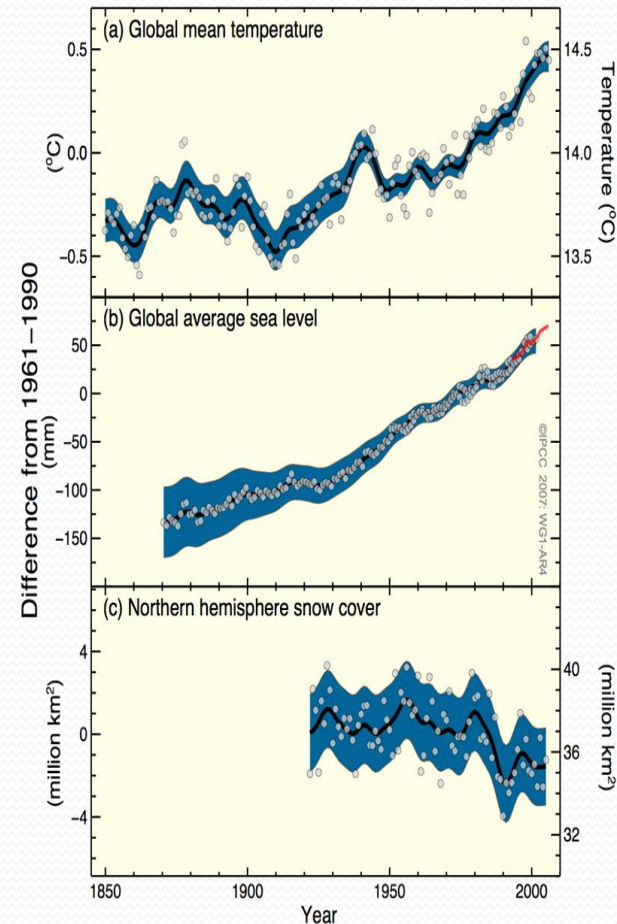
Radiative Forcing Components



Global Warming

- The Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Synthesis Report was signed-off in 2007
- **Warming** of the climate system is **unequivocal**, as is now evident from **observations** of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level.

Changes in Temperature, Sea Level and Northern Hemisphere Snow Cover



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<http://www.ipcc.ch/>

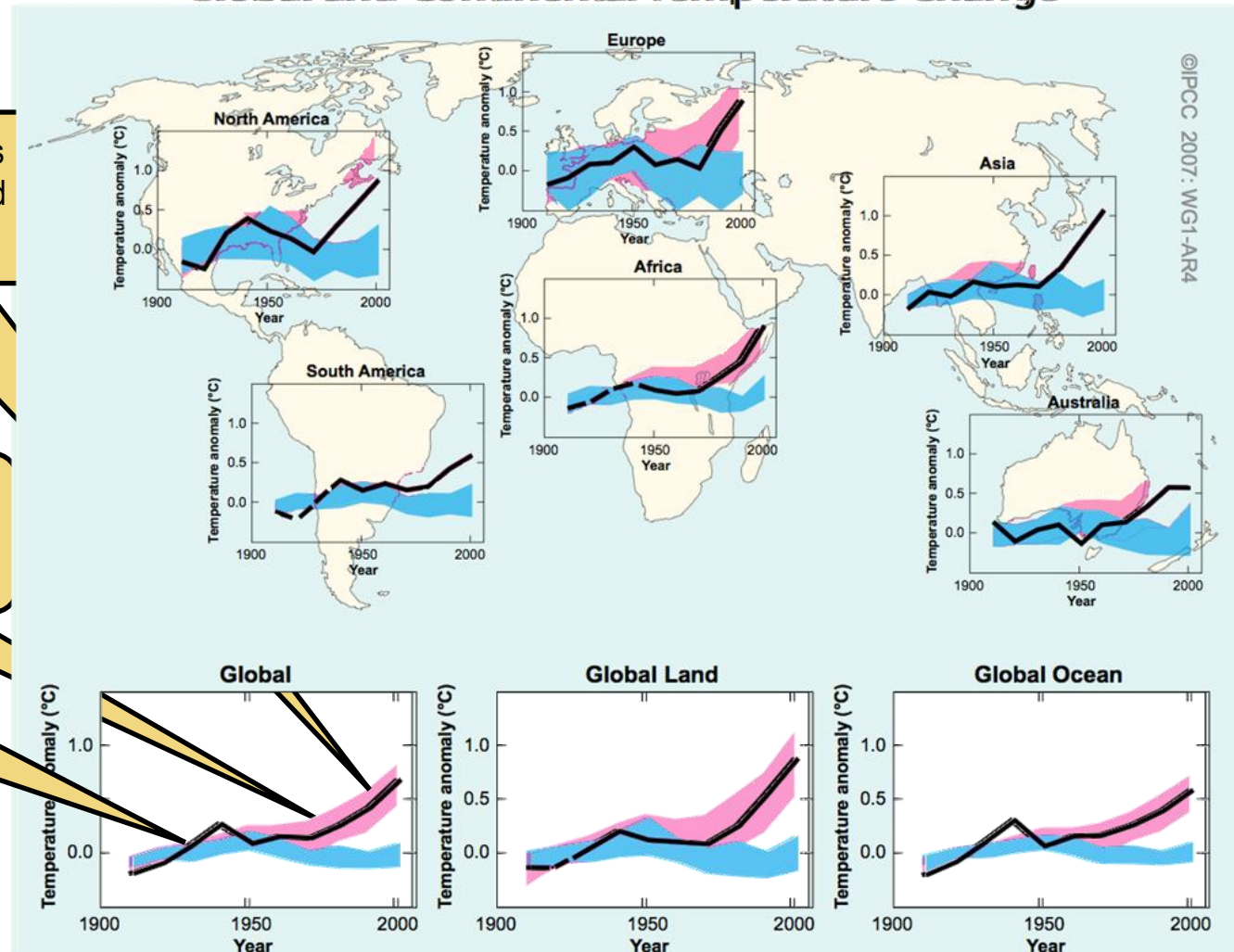
The Cause

Global and Continental Temperature Change

The pink band - Models using both "natural" and anthropogenic forcing

The solid line –
Observed
temperatures

The blue band -
Models using only
"natural" forcing



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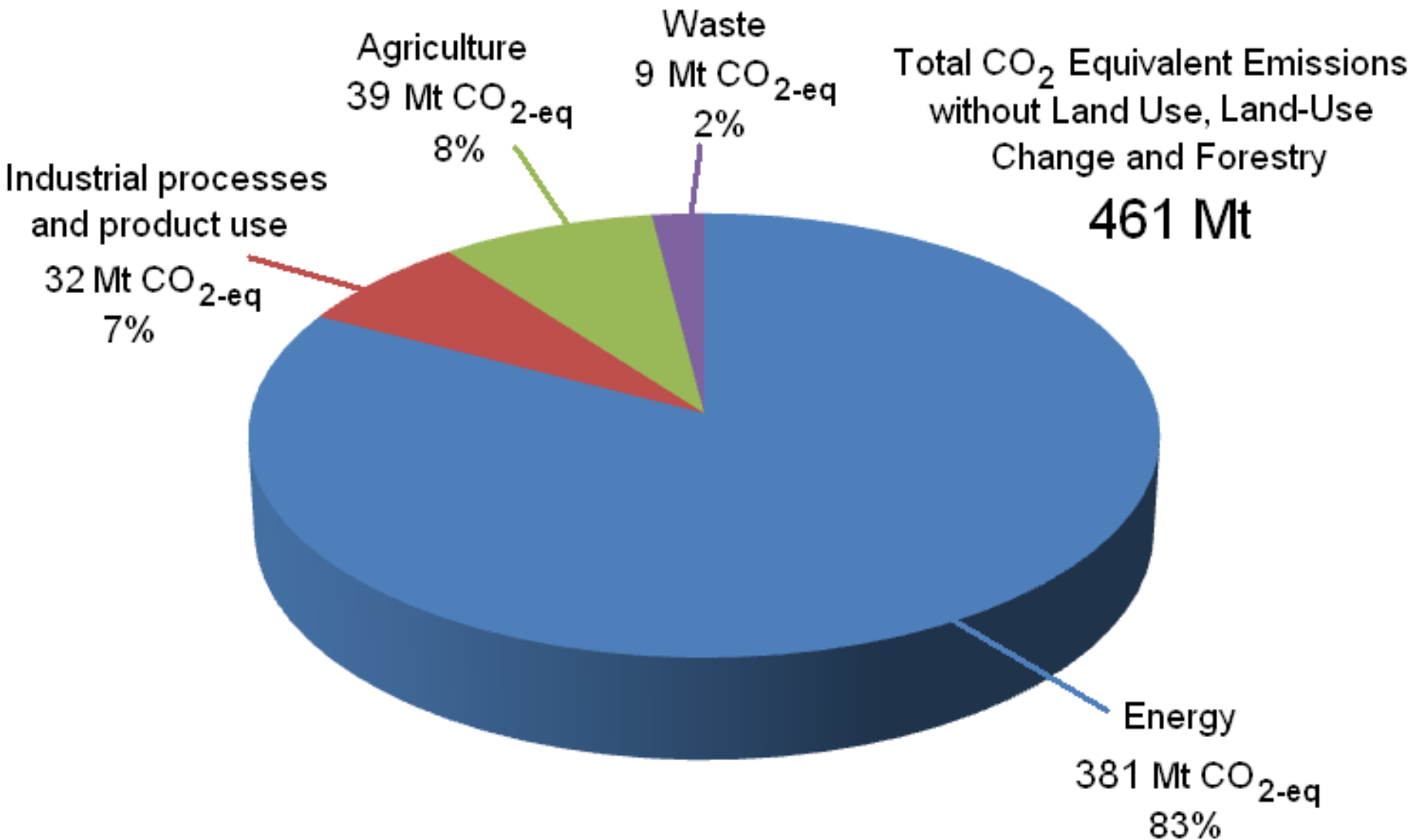
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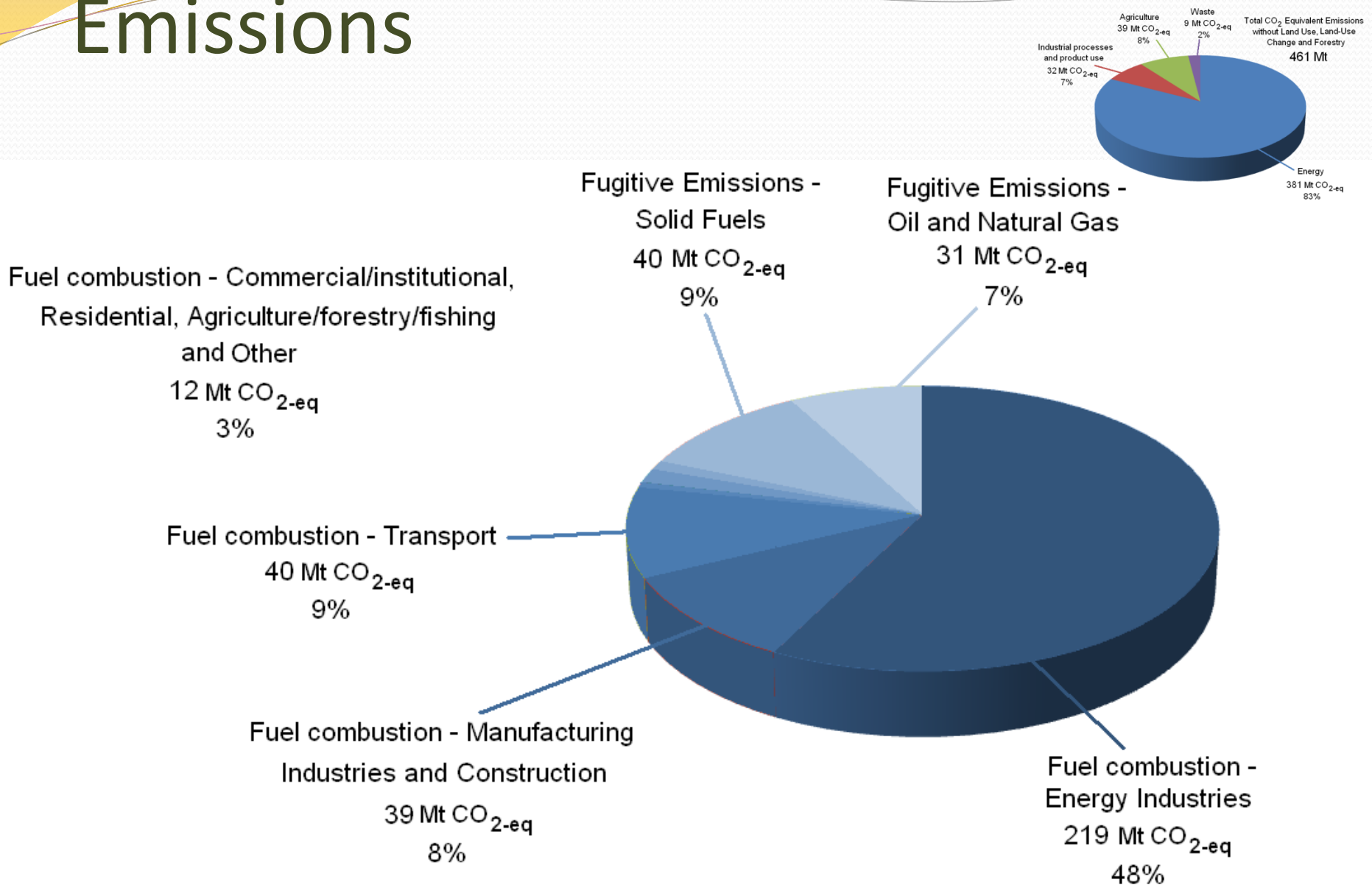
15km² of rain forest disappears every minute



South Africa's GHG profile (2000)

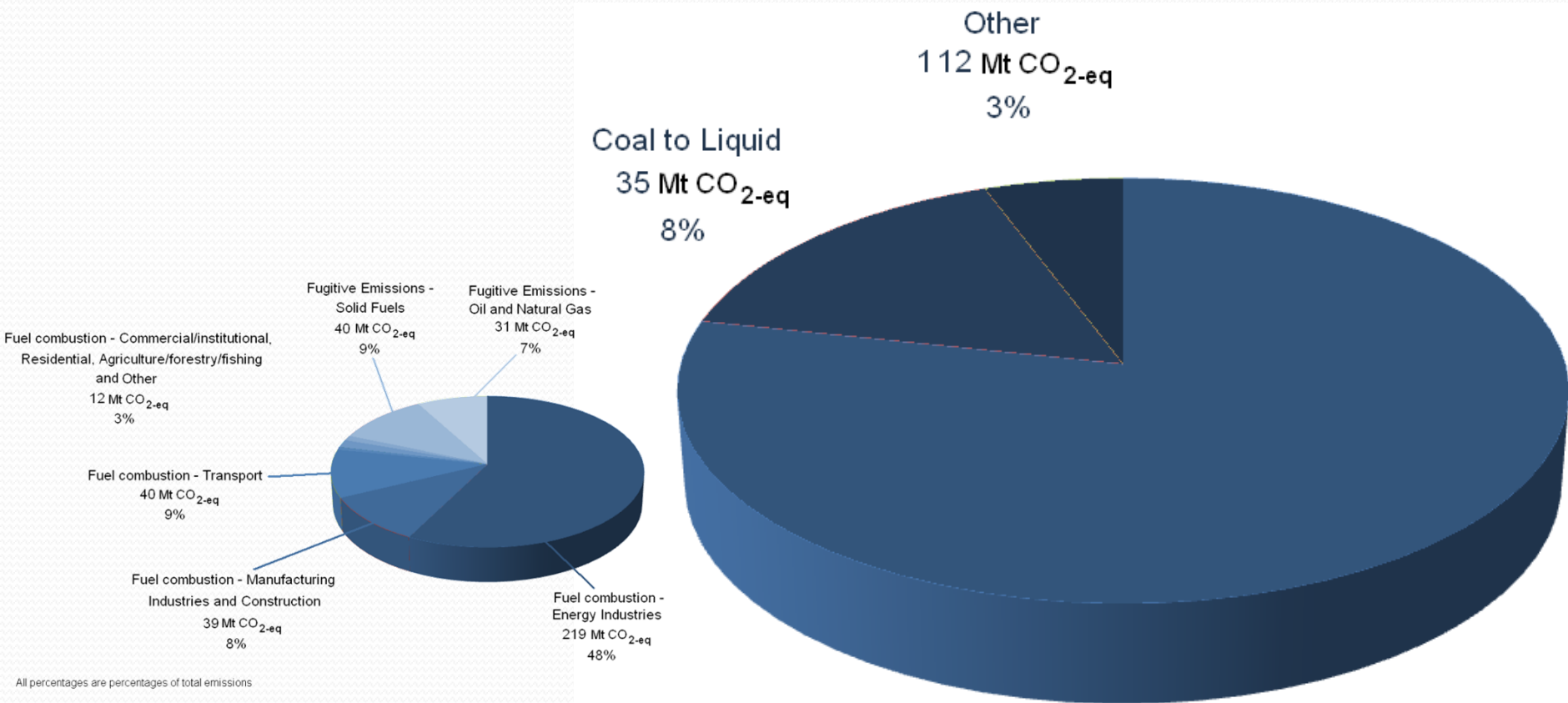


South Africa's GHG profile – Energy Emissions



All percentages are percentages of total emissions

South Africa's GHG profile – Fuel Combustion Energy Industries

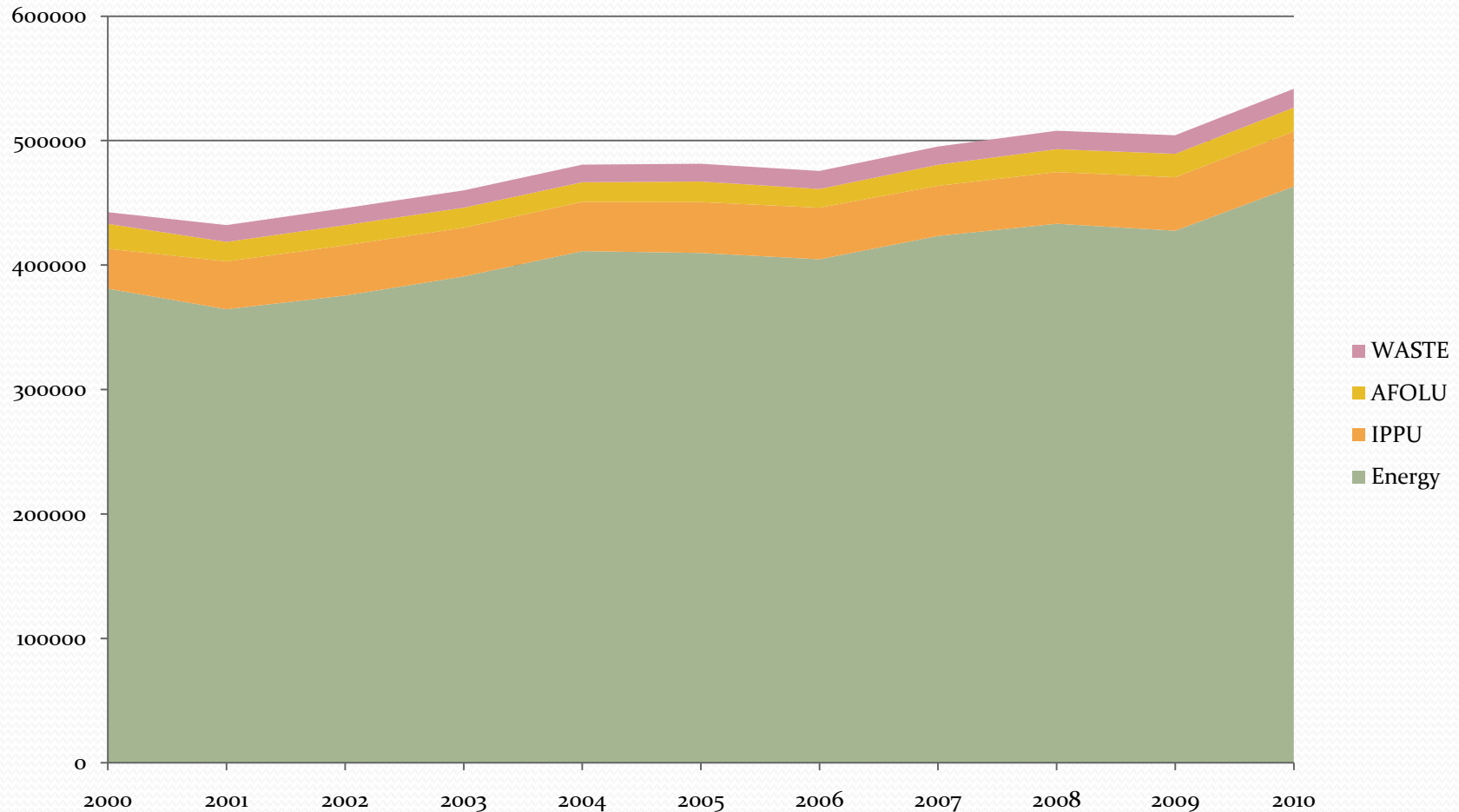


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All percentages are percentages of total emissions

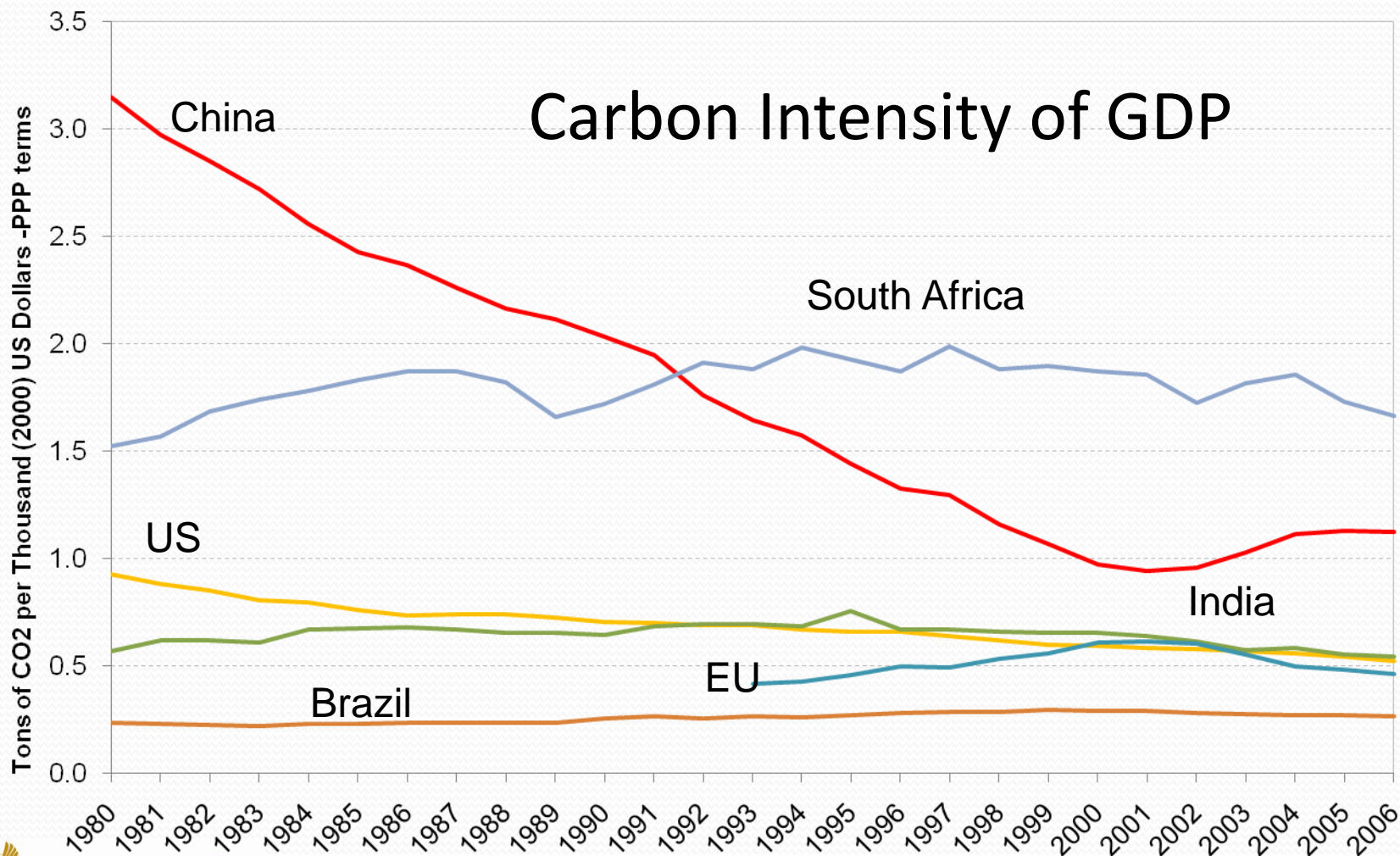
South Africa's GHG profile – Initial update figures



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How do we measure up globally



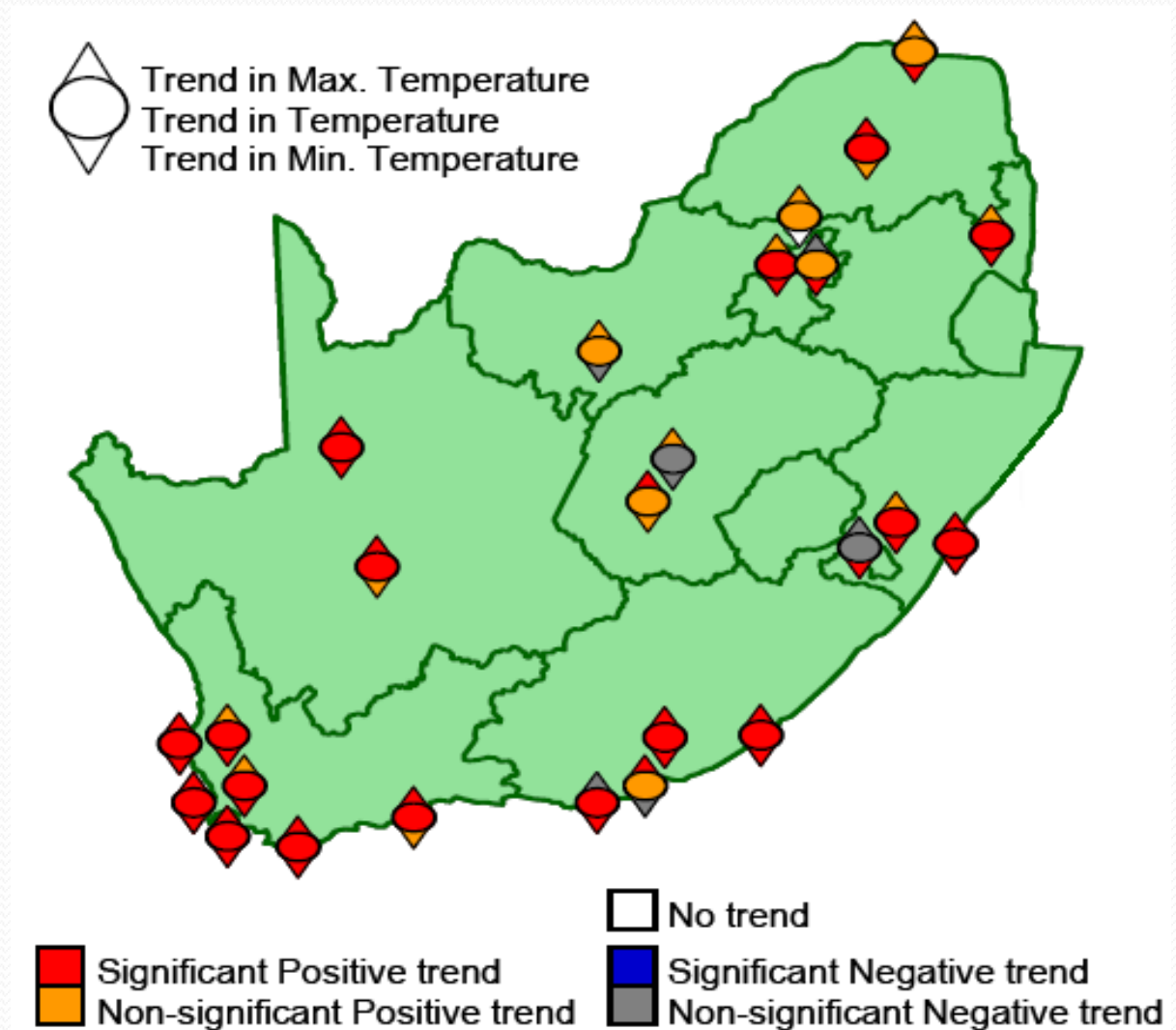
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Source: Prayas Energy Group, 2010

South African temperature observations

- Surface air temperature has warmed significantly over much of South Africa since the 1950s



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Temperature predictions for South Africa

- Under relatively unmitigated global emissions scenario -
 - Coastal regions warm
 - 1-2°C ~ 2050
 - 3-4°C ~ 2100
 - Interior regions warm
 - 3-4°C ~ 2050
 - 6-7°C ~ 2100



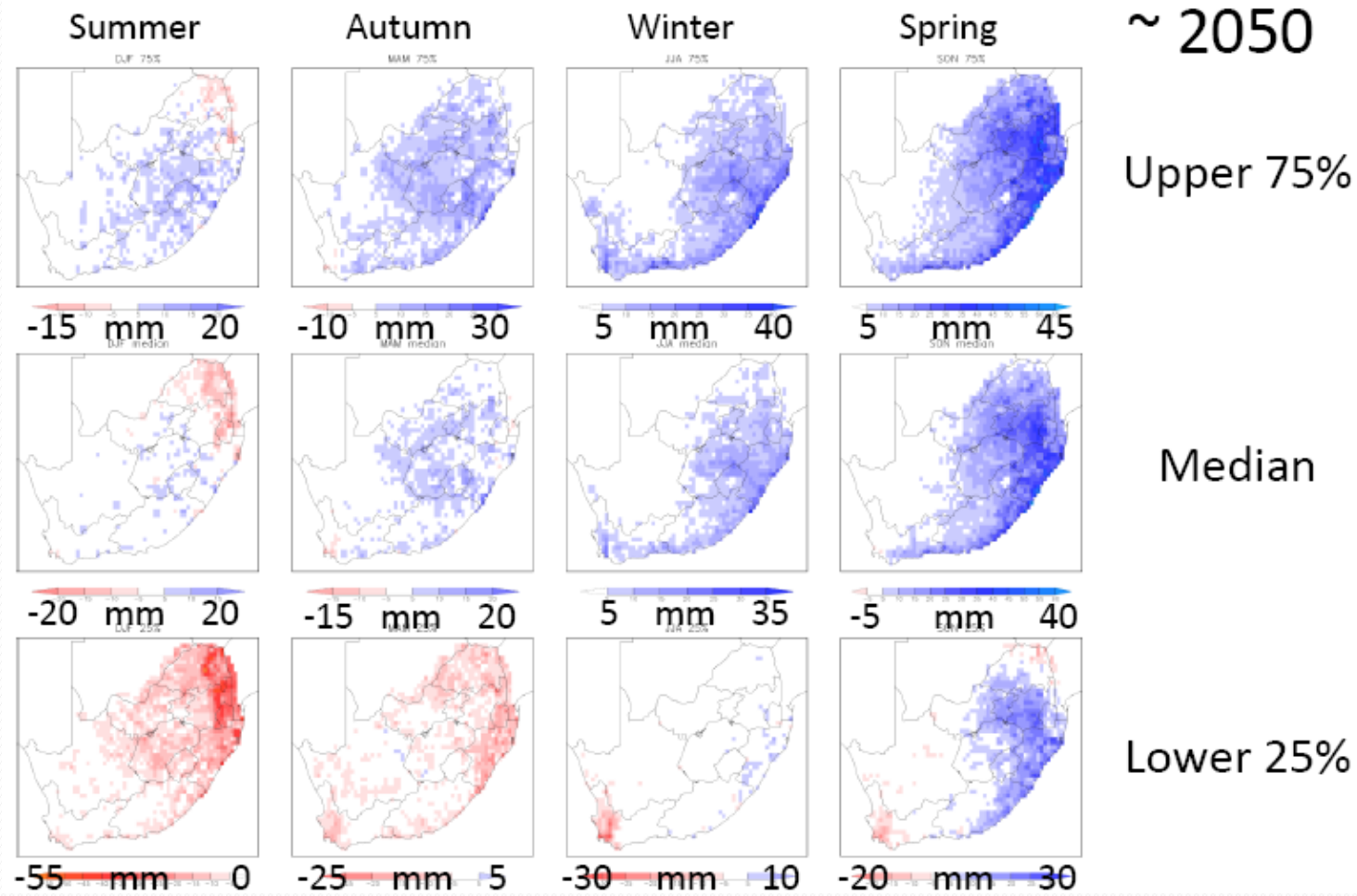
Courtesy Dennis Laidler, DEADP



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Changes in rainfall



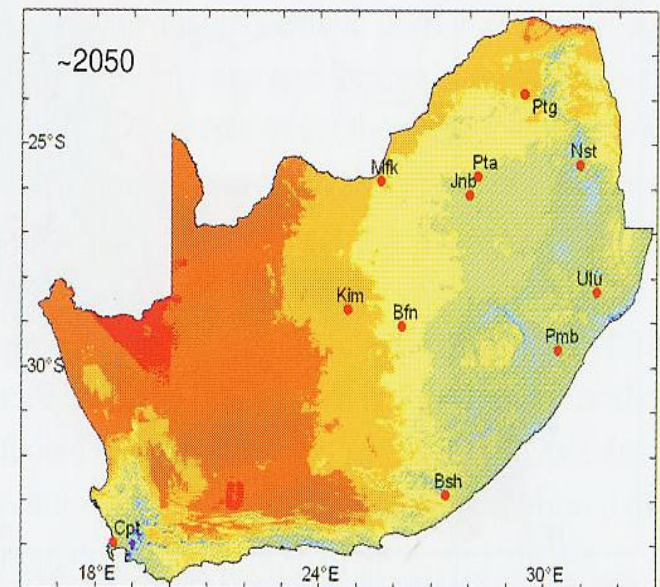
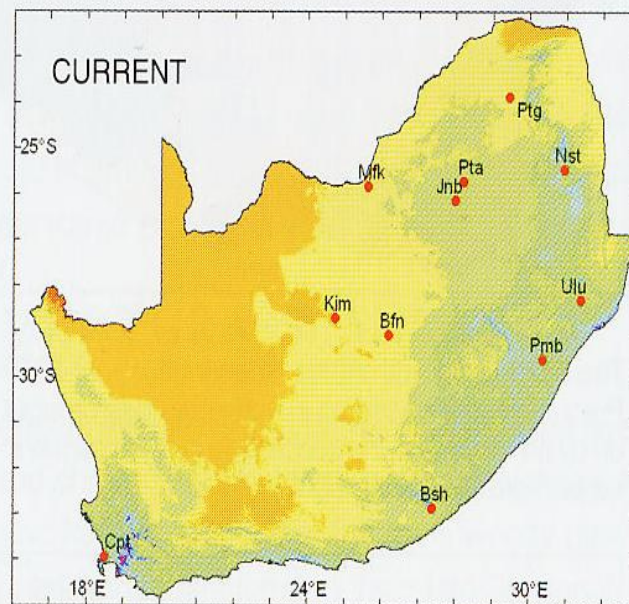
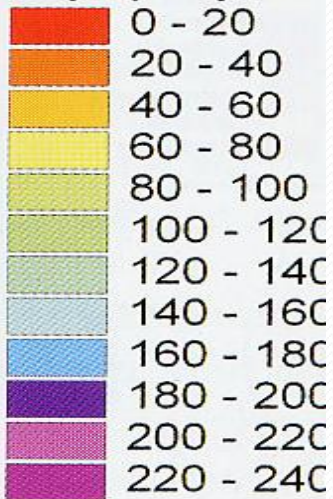
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South African Impacts – Agriculture and Biodiversity

*The effect of global climate change on '**soil moisture days**' in South Africa
(number of days when both soil moisture and temperature are suitable for plant growth)*

Favourable
soil moisture
Days per year



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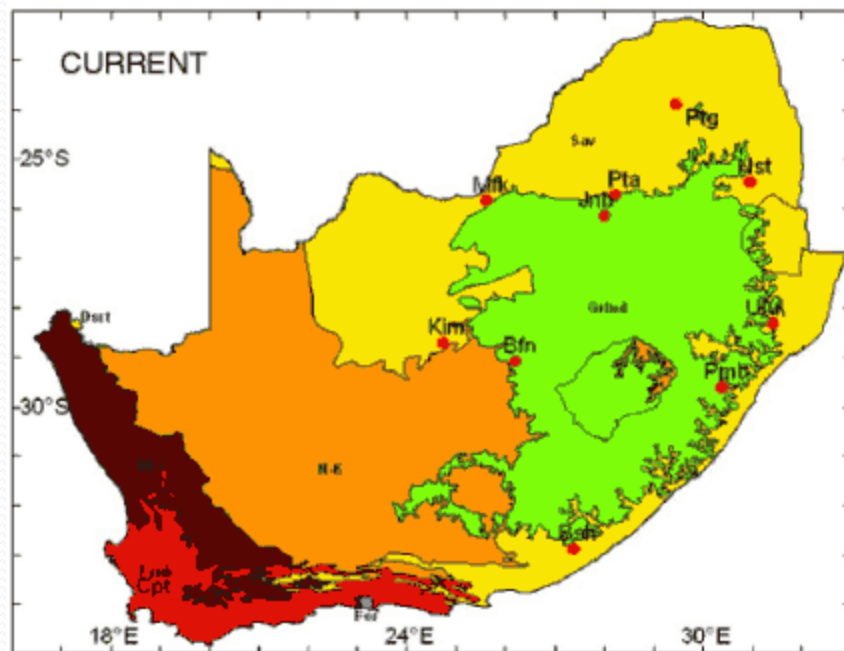
<http://www.sanbi.org/>

South African Impacts – Agriculture and Biodiversity (Cont.)

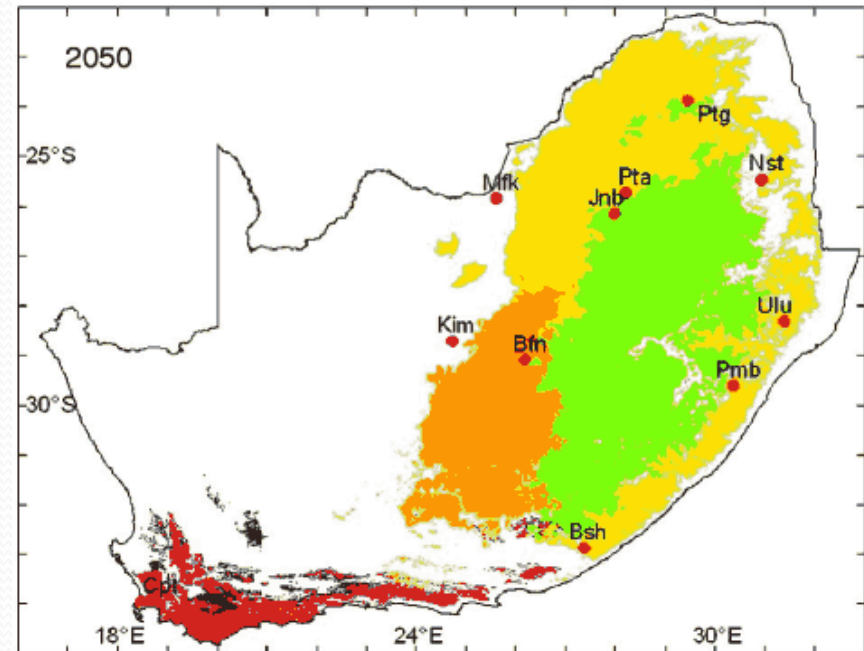
SA Biomes

- Desert
- Forest
- Fynbos
- Grassland
- Nama-Karoo
- Savanna
- Succulent Karoo

The biomes of South Africa as mapped in the year 2000



The biomes of South Africa in the year 2050
Predictions are based on climate changes brought on by an increase in the concentration of atmospheric carbon dioxide to 550 ppm



White areas represent climatic conditions not encountered in South Africa today



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<http://www.sanbi.org/>

Other key impacts

- Agricultural sub-sectors are sensitive to projected climate change; “winners” and “losers” may emerge
- Small scale and homestead dryland farmers are most vulnerable; intensive irrigated agriculture better buffered, but vulnerable to water resource constraints
- Under some scenarios maize production in summer rainfall areas and fruit and cereal production in winter rainfall is likely to be significantly adversely affected



Other key impacts (Cont.)

- Commercial forestry vulnerable to increased frequency of wildfires and restriction due to their water demand in south-western regions
- Rangelands vulnerable to bush encroachment, possibly related to enhanced growth by rising atmospheric CO₂
- Indigenous biodiversity vulnerable in key biodiversity hotspots–grasslands, fynbos and succulent karoo
- Alien invasive plant species likely to increase in importance because of greater spread and impact on water resources
- Strong trends have been detected in the physical marine environment (rising sea level; warming Agulhas current and parts of the Benguela), but projections of climate change impacts remains speculative



Other key impacts (Cont.)

- Health impacts are exacerbated by disease burden complex
- Some effects due to climate change may already be occurring, such as due to rainfall (drought and flood) and temperature extremes
- Cholera outbreaks have been associated with extreme weather events, especially in poor, high density settlements



Other key impacts (Cont.)

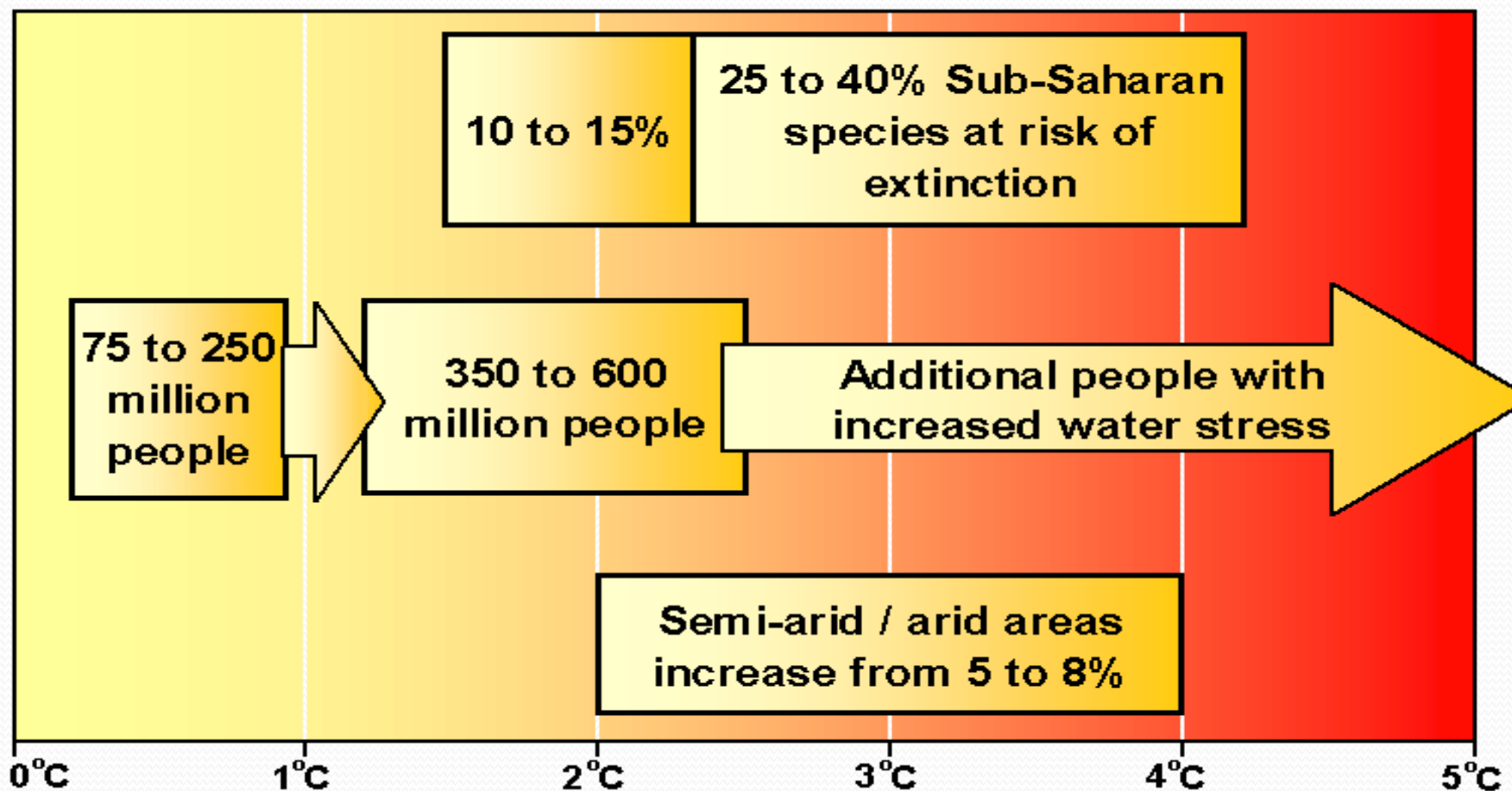
- Damage costs due to extreme weather-related events (flooding, fire, storms and drought) have conservatively been roughly 1 billion rand per year between 2000 and 2009



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Key African Impacts



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THANK YOU

**THANK YOU
FOR YOUR
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