

Discussion

- Explain the IPCC and how its numbers are derived
- Pure science issues
- Metric/policy related issues

IPCC taught me: Say what we do know before what we don't know.

What can we do now with what we know



Science Issues

Emissions

Atmospheric/Climate processes

Radiative effects

Climate response/Impact

→ Is a generic black carbon aerosol (e.g. Wm^{-2}/kg) a reasonable assumption

→ What numbers to use for best estimates (perfect model/IPCC)

→ Can observations help constrain aspects of the problem

→ Where are biggest timely gains to be made?



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Metric policy issues

1. Policy choice (e.g. just transport/ general mitigation)
2. Target/Goal
3. Time horizon
4. Base-line scenarios
5. Relationship to air quality
6. Are global metrics for short-lived effects appropriate
7. → Is CO₂ comparison a straitjacket?



Changes in Atmospheric Composition and Radiative Forcing

– Chapter 2 of AR4

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+ Many expert and government reviewers -about 8000 comments!

+ Authors of many original papers (750 cited in our chapter)



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What the IPCC AR4 says about BC

Fossil fuel BC forcing: 0.2 Wm^{-2} best estimate with a $\pm 0.15 \text{ Wm}^{-2}$ 90% confidence range [Table 2.12]

Range from 20 models: $0.04\text{--}0.49 \text{ Wm}^{-2}$ [Table 2.5]

Total BC: Best estimate 0.34 Wm^{-2} with a $\pm 0.25 \text{ Wm}^{-2}$ 90% confidence range [Table 2.13]

Range from 20 models: $0.08\text{--}0.61 \text{ Wm}^{-2}$ [Table 2.5]

Soot on snow 0.1 Wm^{-2} ± 0.1 90% confidence range [Table, 2,12]

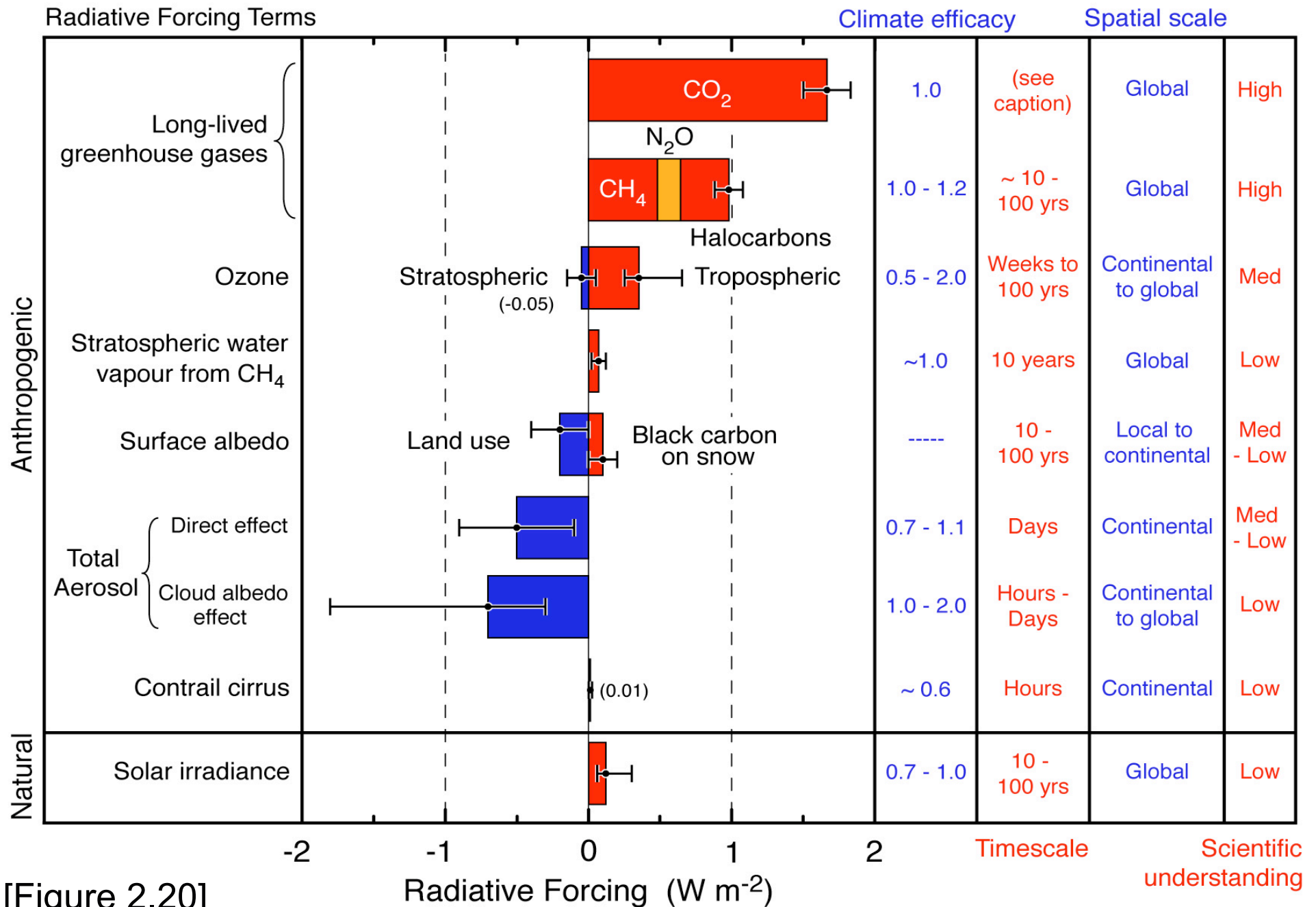
Confidence ranges include expert assessment – not just model ranges (different from TAR)

No other indirect/semi-direct effects evaluated

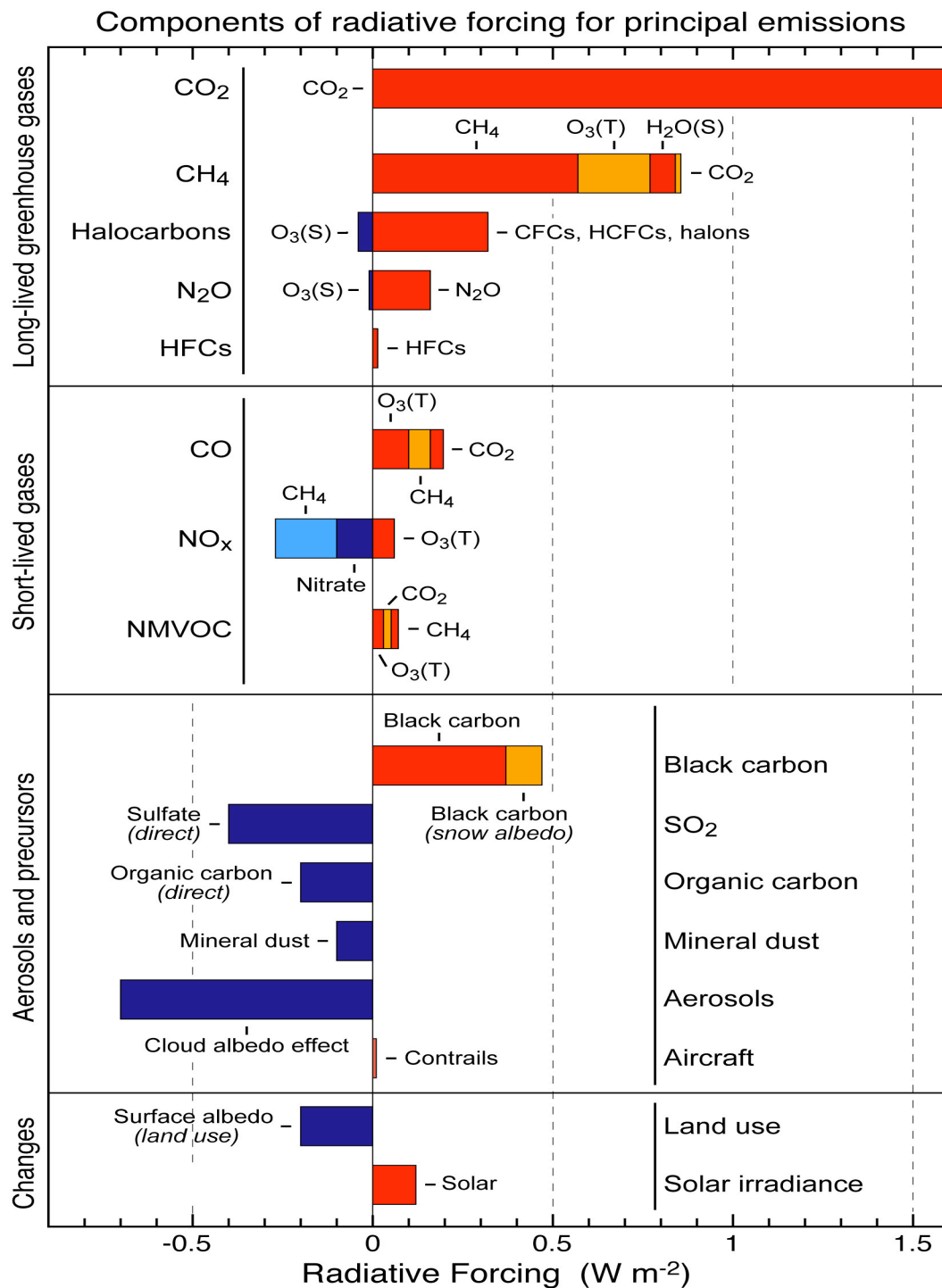


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Radiative forcing of climate between 1750 and 2005



[Figure 2.20]



Forcing from emission sources

[Figure 2.21]

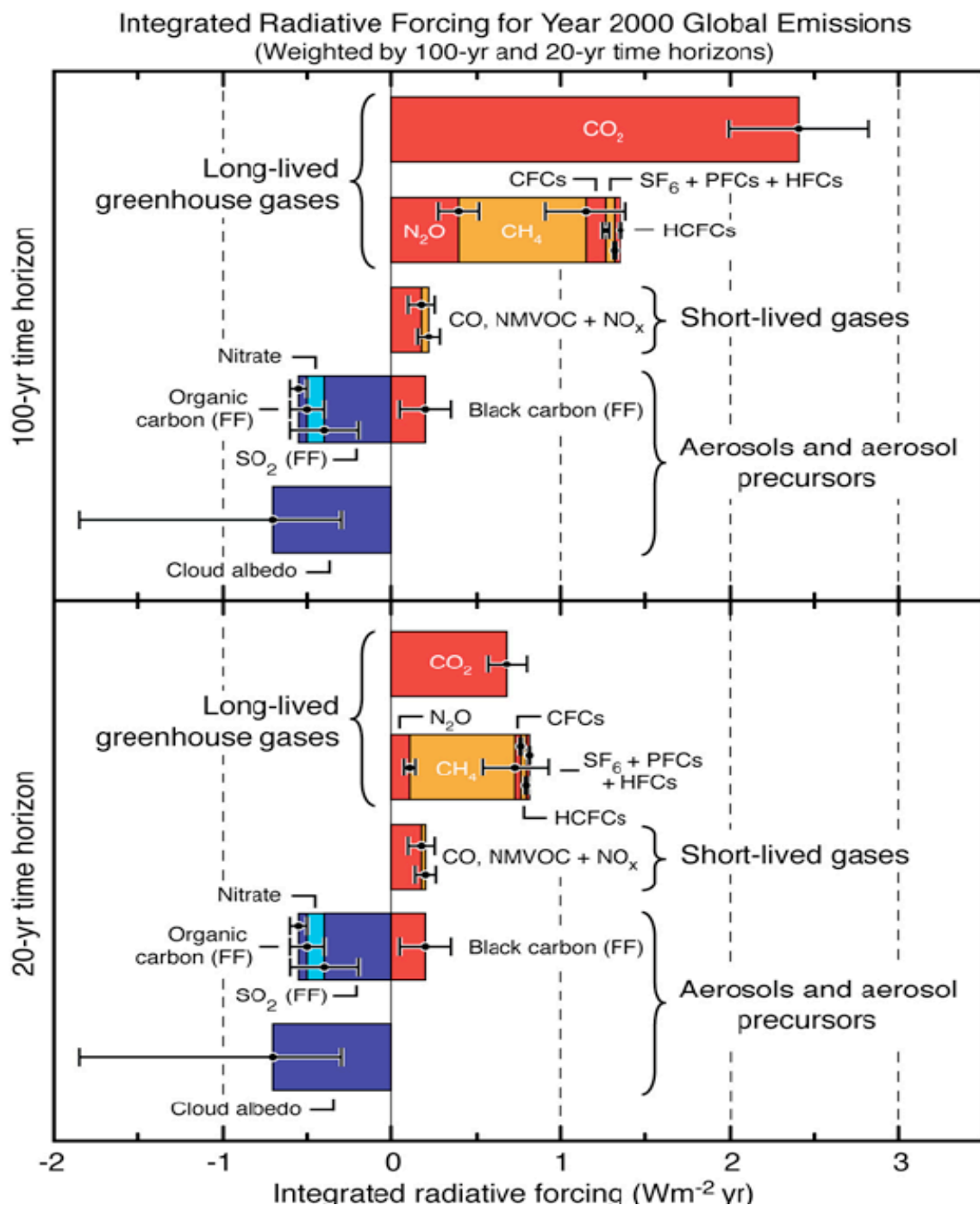


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100 Years

Short lived
BC metrics
are in IPCC,
but
disguised!

20 Years



[Figure 2.22]

Relationship between forcing and response

Efficacy of BC effects for the lower troposphere could be much higher. Height/regional differences in forcing response

Response could be very different than CO₂ (related to surface forcing differences) (related to semi-direct and indirect effects)

