Mudança do Clima: Impactos, Adaptação e Vulnerabilidade para Ecossistemas e Agricultura

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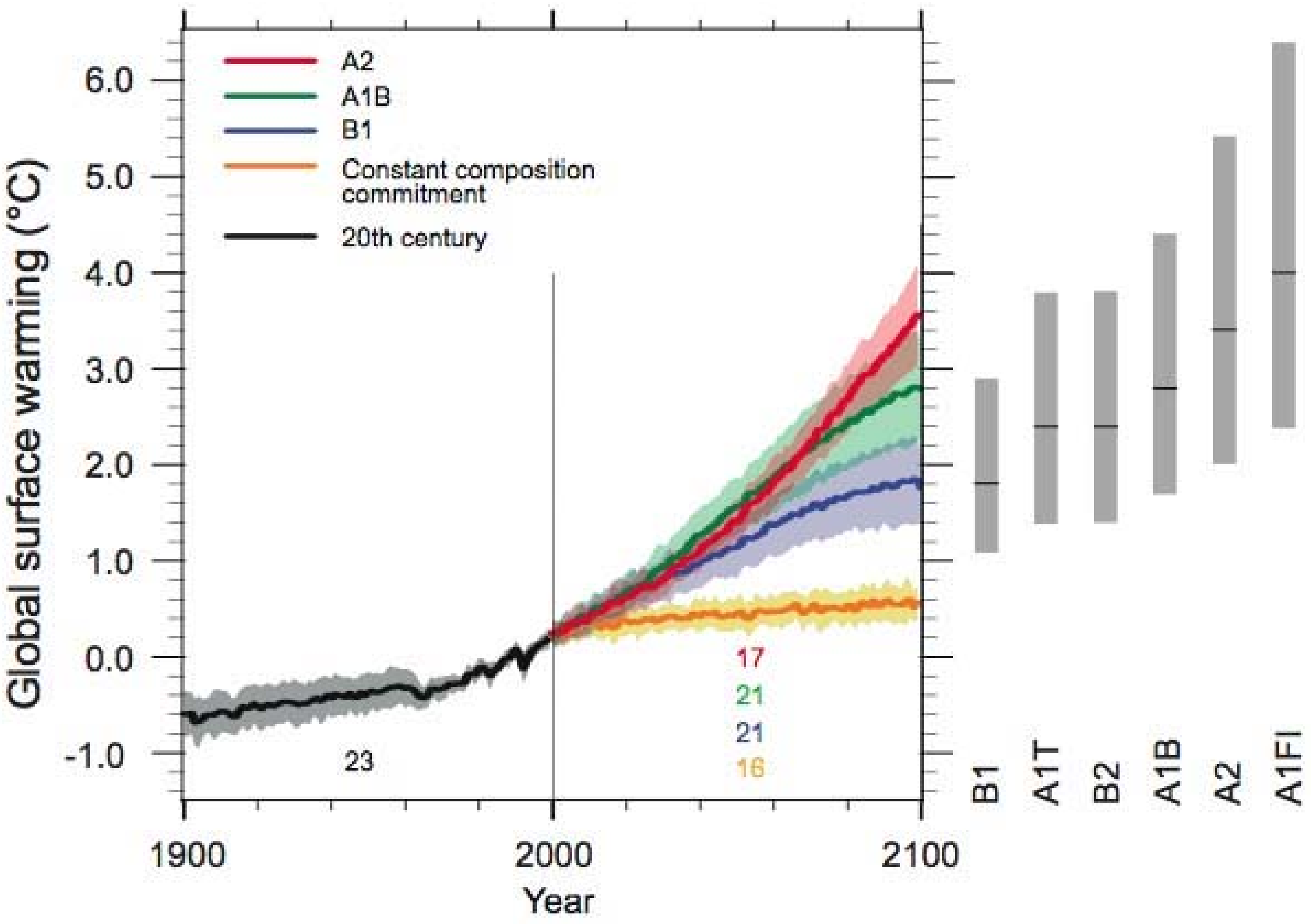
Seminário: *“Resumo para Tomadores de Decisão do IV Relatório de Avaliação do Painel Intergovernamental sobre Mudança do Clima das Nações Unidas (IPCC), Grupo de Trabalho II – Impactos, Adaptação e Vulnerabilidade “* 10 de abril de 2007, IEA/USP São Paulo.



IPCC, 2007 (AR-4 WG1 SPM)

ciência
FOLHA DE S.PAULO
SEXTA-FEIRA, 6 DE ABRIL DE 2007 ★ A14

Conclusão de texto envolve debate intenso

DO ENVIADO A BRUXELAS

Mesmo assim, assuntos espinhosos para alguns países muitas vezes ganham alguma reformulação. Ontem, por exemplo, segundo a Folha apurou, a delegação brasileira fazia objeções a uma referência à savanização da Amazônia, causada pelo aquecimento. **(MAC)**

Latin America

By mid-century, increases in temperature and associated decreases in soil water are projected to lead to gradual replacement of tropical forest by savanna in eastern Amazonia. Semi-arid vegetation will tend to be replaced by arid-land vegetation. There is a risk of significant biodiversity loss through species extinction in many areas of tropical Latin America. ** D [13.4]

IPCC AR4 WG2 2007. SPM

provide GCMs with feedbacks from changing vegetation – *e.g.* Cox *et al.* (2004) found that DGVM feedbacks raise HadCM3LC GCM temperature and decrease precipitation forecasts for Amazonia, leading to eventual loss of rainforests. There are still inconsistencies, however, between the models used by ecologists to estimate the effects of climate change on forest production and composition and the models used to predict forest yield. Future development of the models that integrate both the NPP and forestry yield approaches (Peng *et al.*, 2002; Nabuurs *et al.*, 2002) will significantly improve the predictions.

IPCC AR4 WG2 2007. Chapter 2

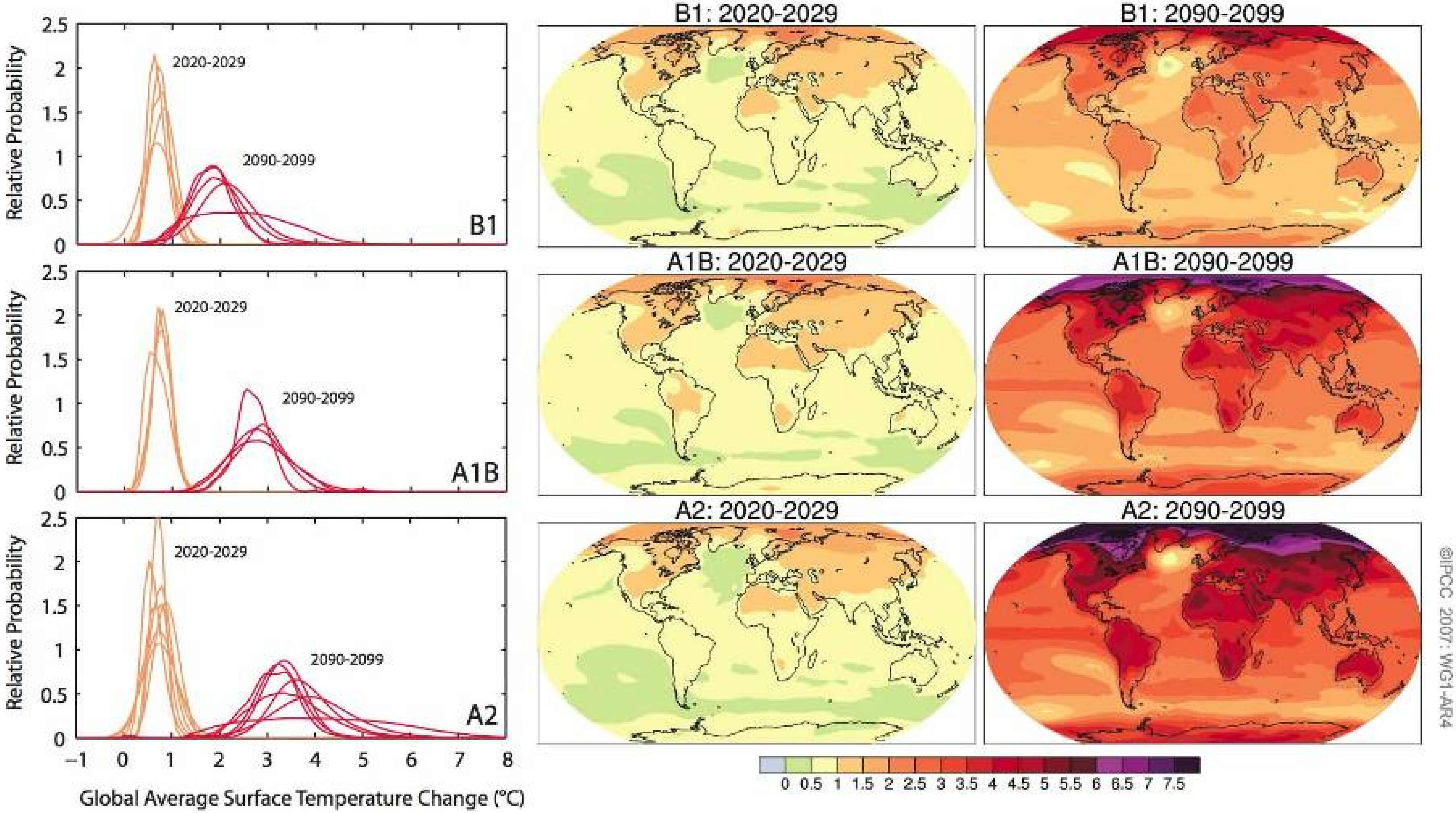
Potential increases in drought conditions have been quantitatively projected for several regions (*e.g.*, Amazon, Europe) during the critical growing phase, due to increasing summer temperatures and precipitation declines (*e.g.* Cox *et al.*, 2004; Schaphoff *et al.*, 2006; Scholze *et al.*, 2006; Figure 4.3, vegetation change 6). Since all these responses potentially influence net forest ecosystem productivity (NEP), substantive biotic feedbacks may result, either through carbon releases or influences on regional climate, contributing to further major uncertainties (*e.g.* Betts *et al.*, 2000; Peng and Apps, 2000; Semazzi and Song, 2001; Bergengren *et al.*, 2001; Leemans *et al.*, 2002; Körner, 2003b; Cox *et al.*, 2004; Canadell *et al.*, 2004; Gruber *et al.*, 2004; Heath *et al.*, 2005; 4.4.1).

IPCC AR4 WG2 2007. Chapter 4

Amazonia. Several AOGCM scenarios indicate a tendency of 'savannization' of eastern Amazonia (Nobre *et al.*, 2005) and the tropical forests of central and the south of Mexico (Arriaga and Gómez, 2004; Townsend *et al.*, 2002; Pounds *et al*, 2002). In the Northeast Brazil the semi -arid vegetation would be replaced by vegetation of arid regions (Nobre *et al* 2005) like in most of central and northern Mexico (Villers and Trejo, 2004).

IPCC AR4 WG2 2007. Chapter 13

AOGCM Projections of Surface Temperatures



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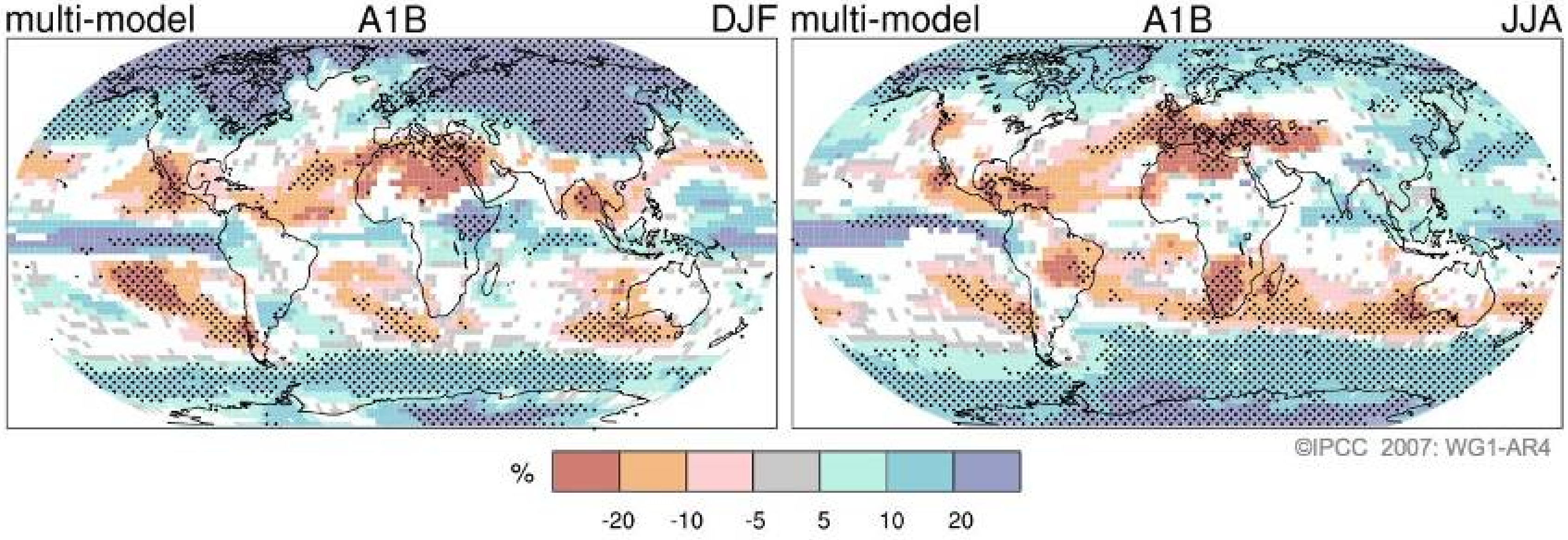
Projected Patterns of Precipitation Changes



IPCC, 2007 (AR-4 WG1 SPM)

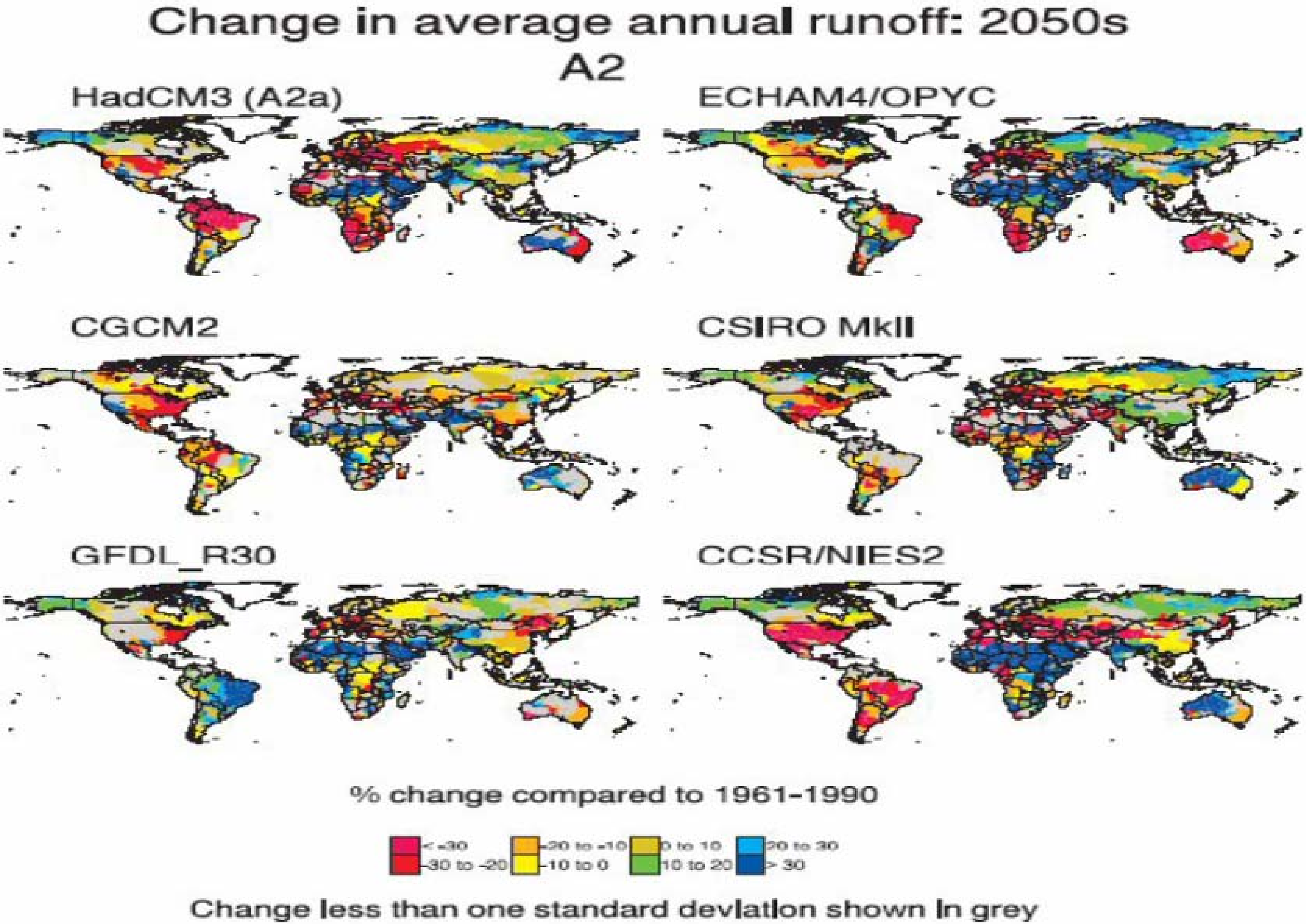


Figure 3.3: *Change in average annual runoff by the 2050s under the SRES A2 emissions scenario and different climate models (Arnell, 2003a).*

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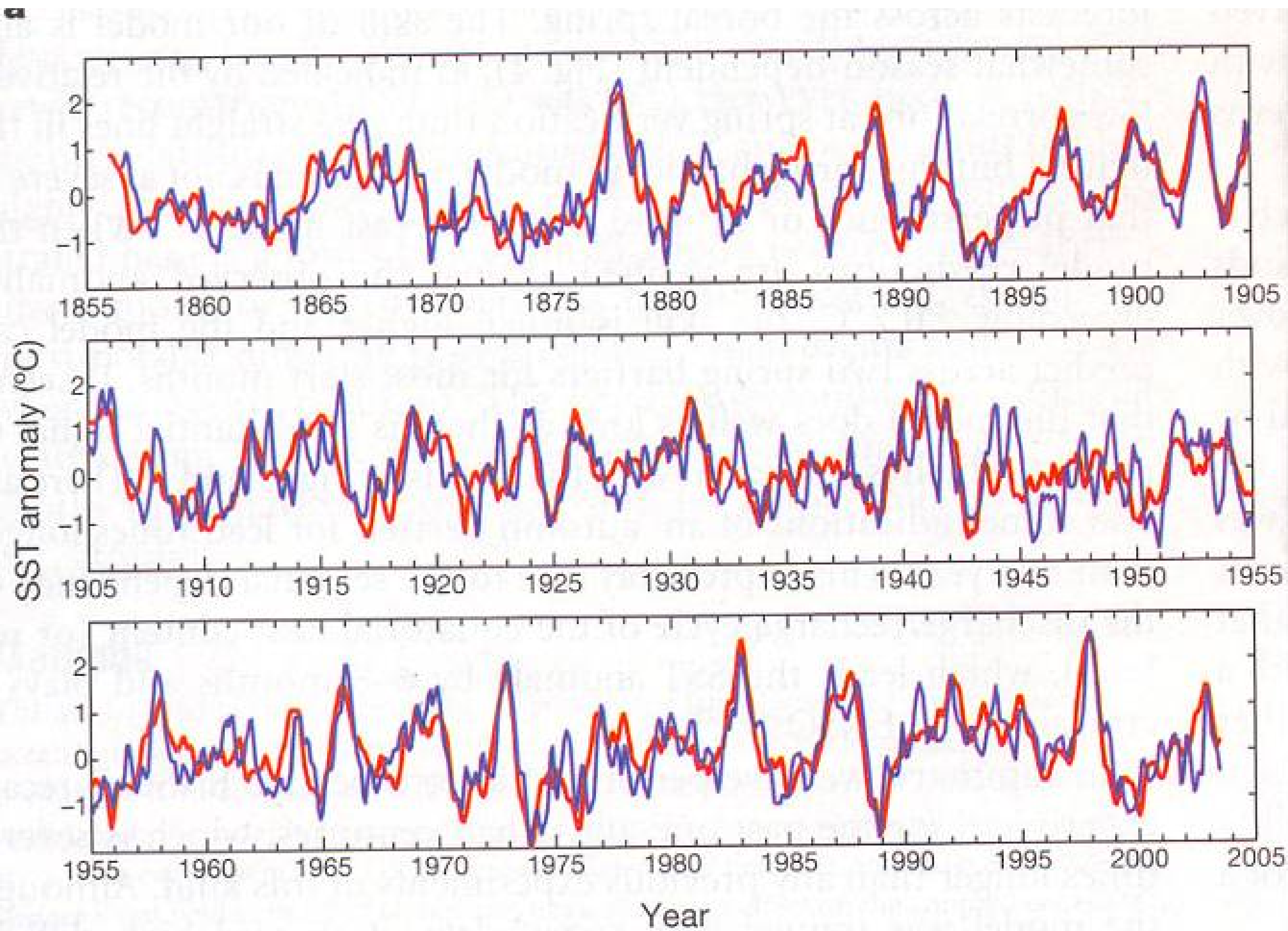

Figure 1 Retrospective predictions of El Niño and La Niña in the past 148 yr. **a,** Time series of SST anomalies averaged in the NINO3.4 region (5° S–5° N, 120–170° W). The red curve is monthly analysis of ref. 12 and the blue curve is the LDEO5 prediction at

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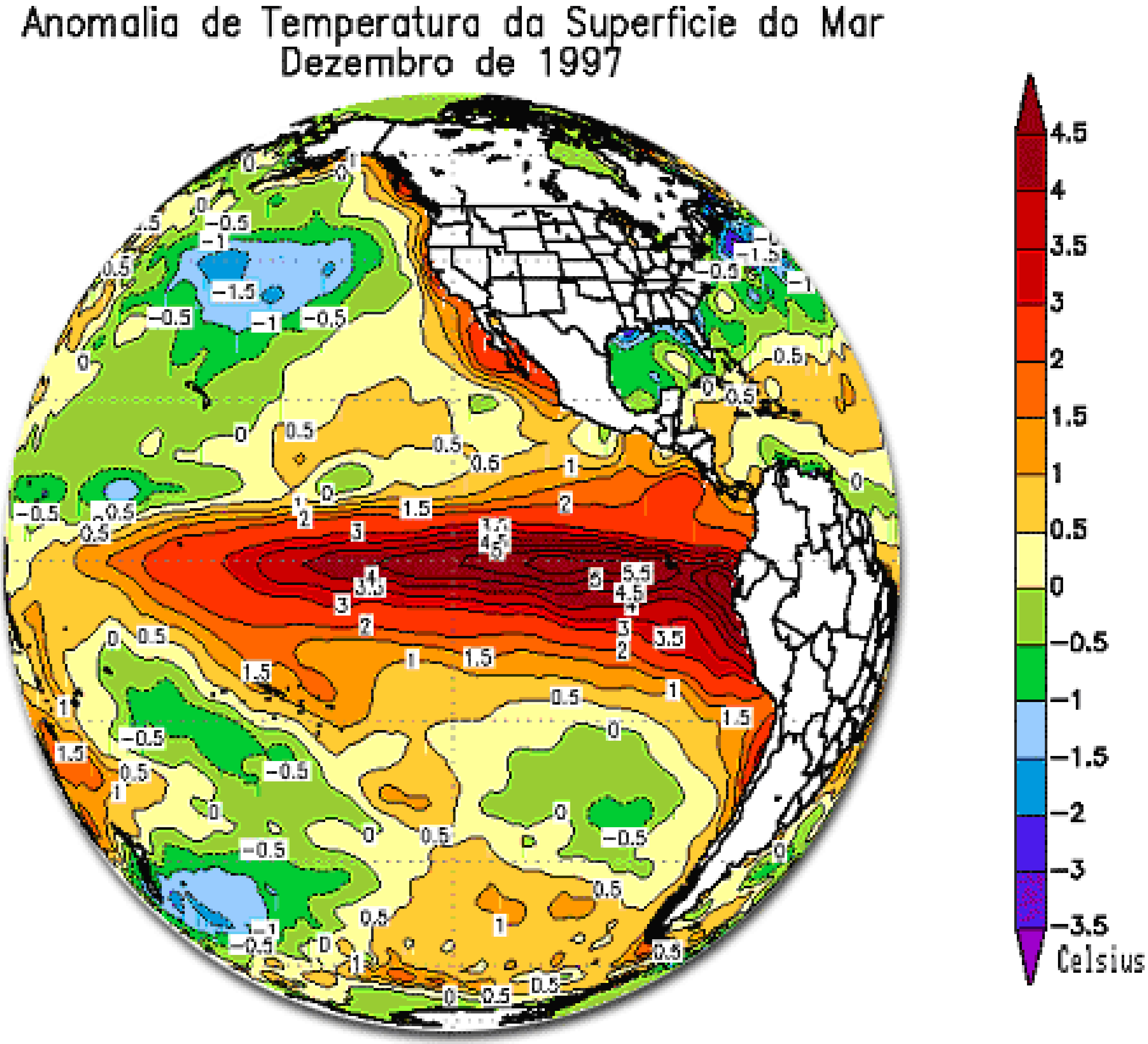
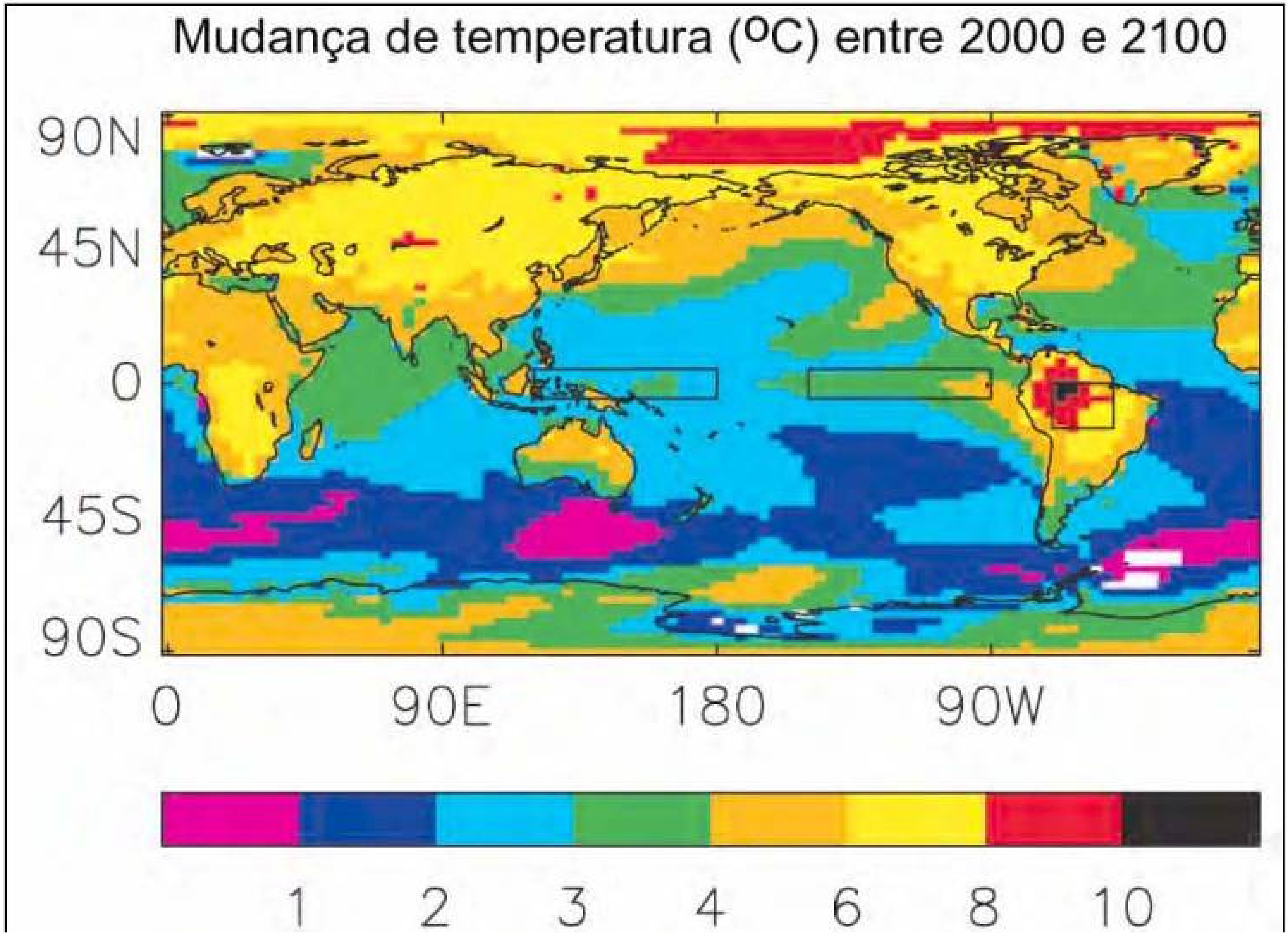
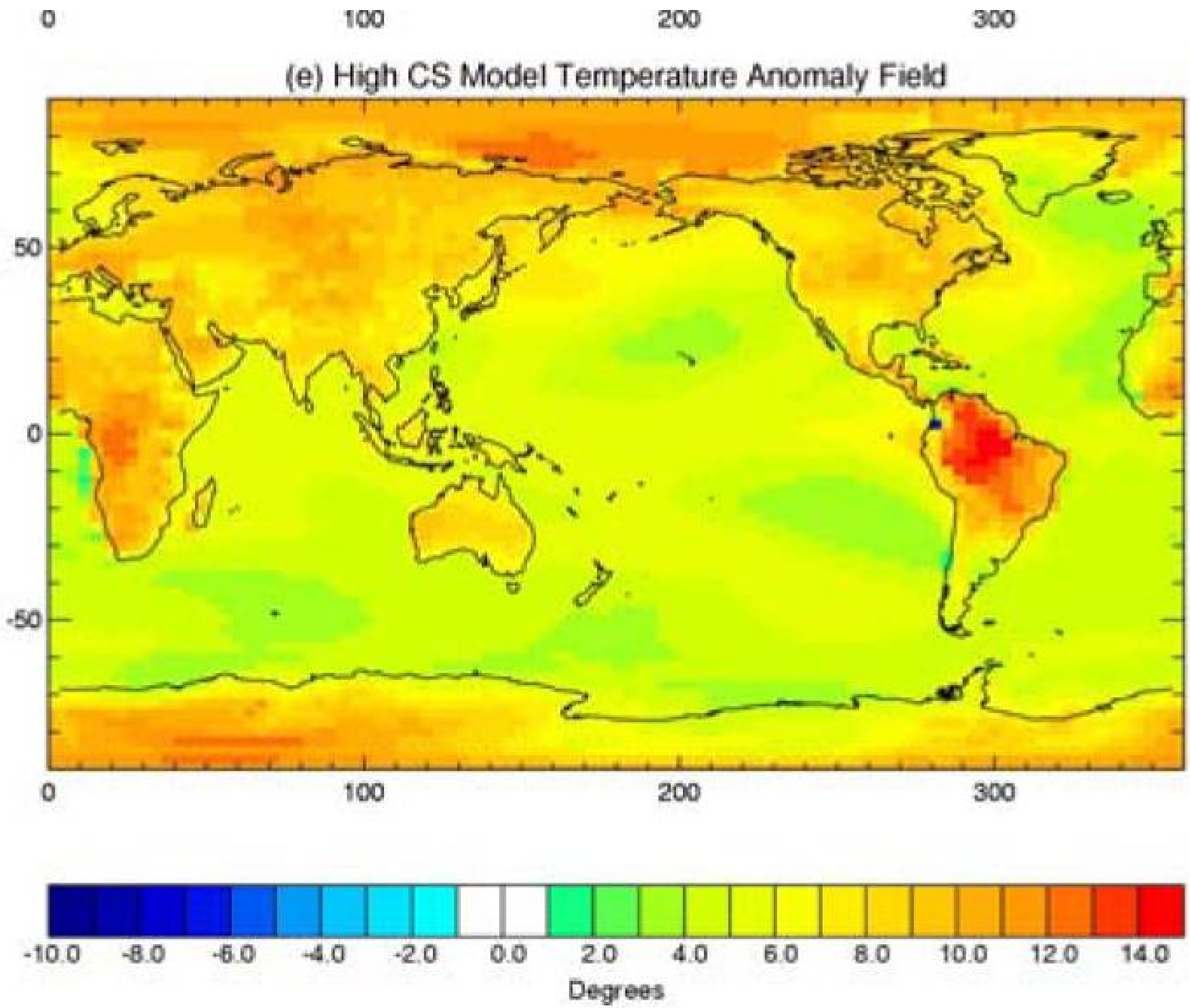

Anomalia de Temperatura da Superficie do Mar
Dezembro de 1997
4.5
4
3.5
3
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−3
−3.5
Celsius

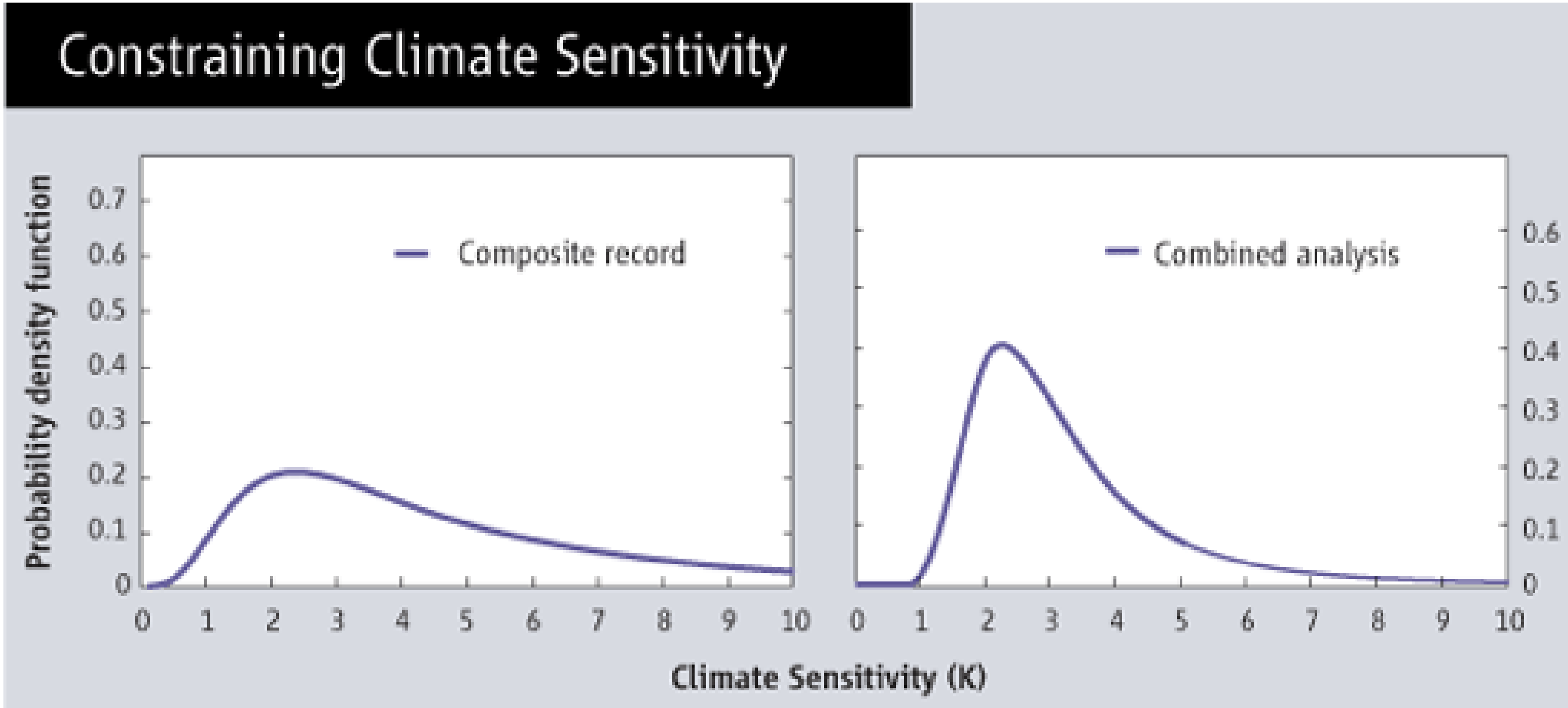
Photo by R.I. Barbosa



Cox et al. 2004



Stainforth,2005



ADAPTED FROM HEGERL *ET AL., NATURE* (2006)

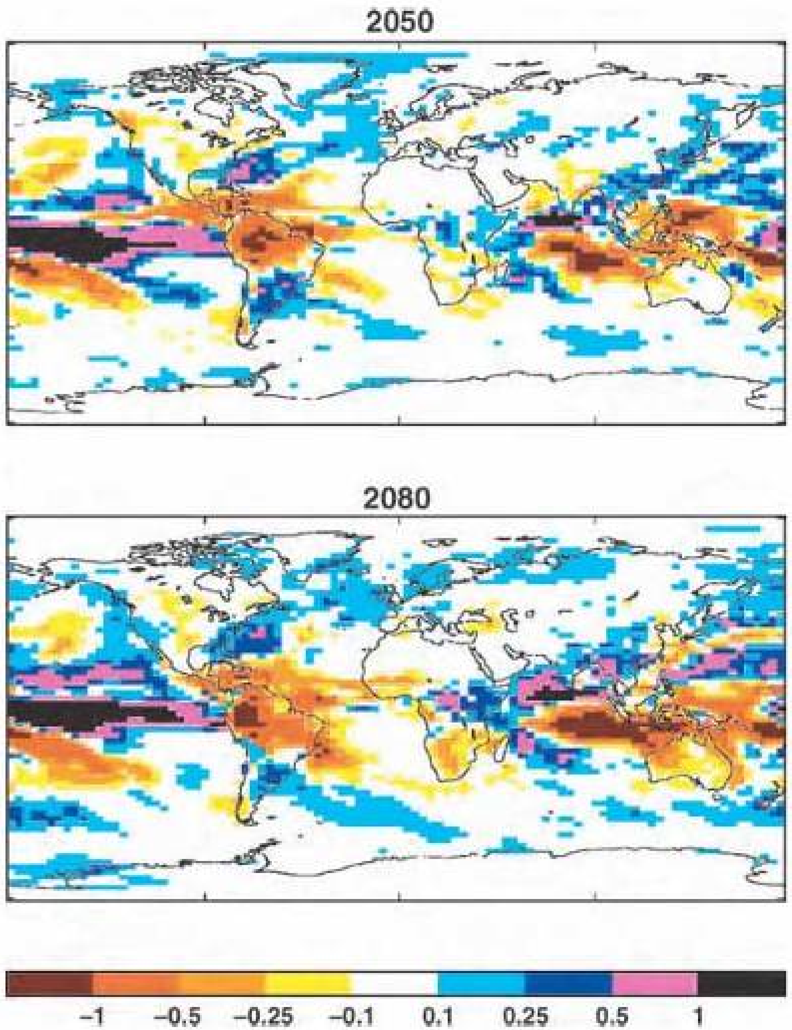
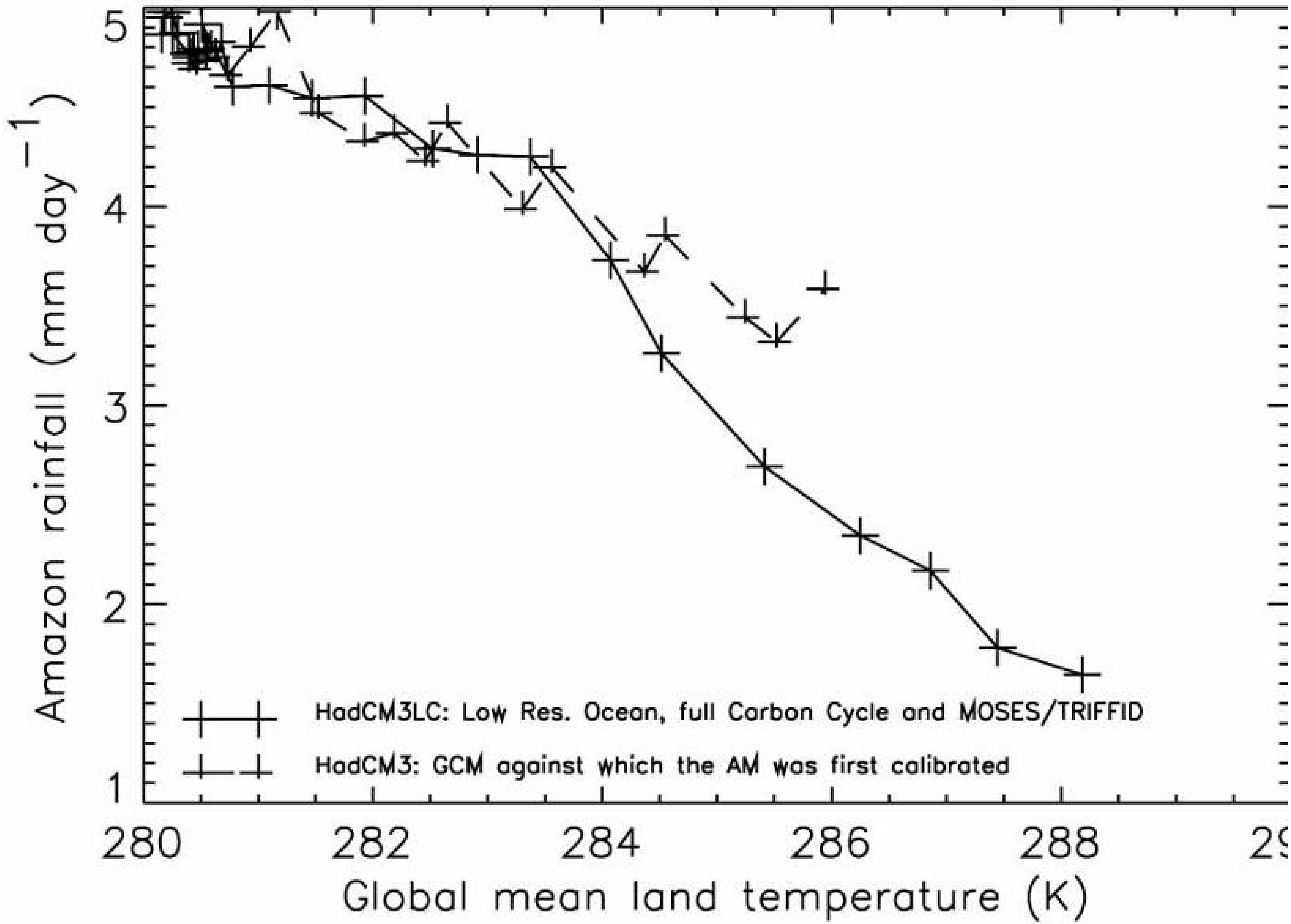


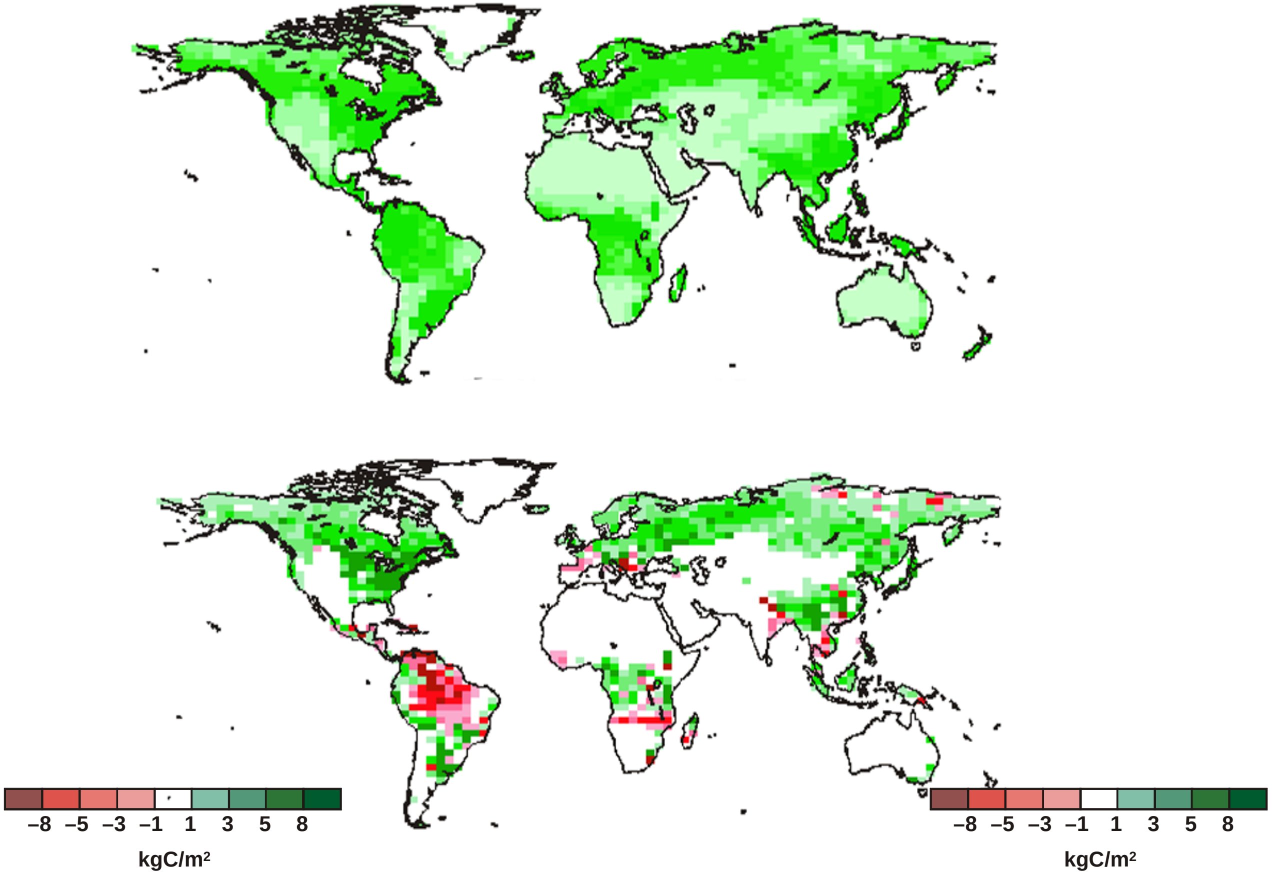
Fig. 8. Effect of including carbon cycle feedbacks on global precipitation patterns. Difference in precipitation (mm day^{-1}), CCYCLE – DYNVEG. 30-year mean centred around 2080

Betts et al. 2004 Theoretical and Applied Climatology



Huntingford et al. 2004 Theoretical and Applied Climatology

Changes in vegetation biomass
between the present day and the 2080s



[Hadley Centre, 2000]

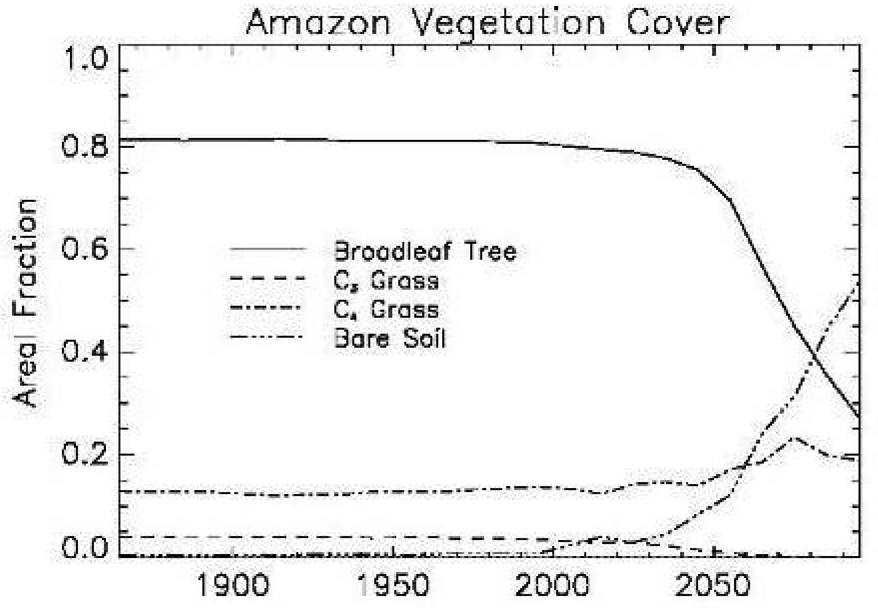
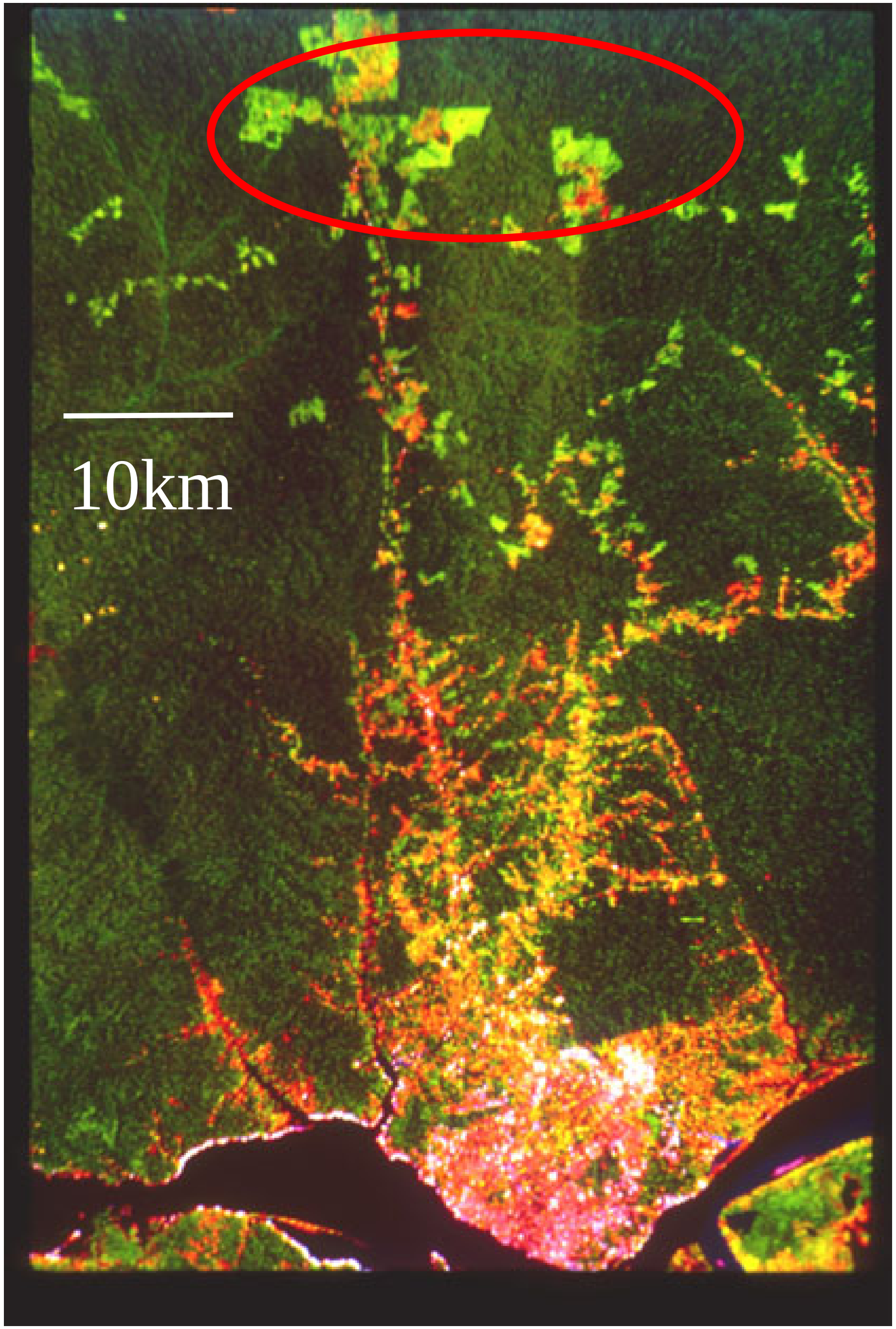


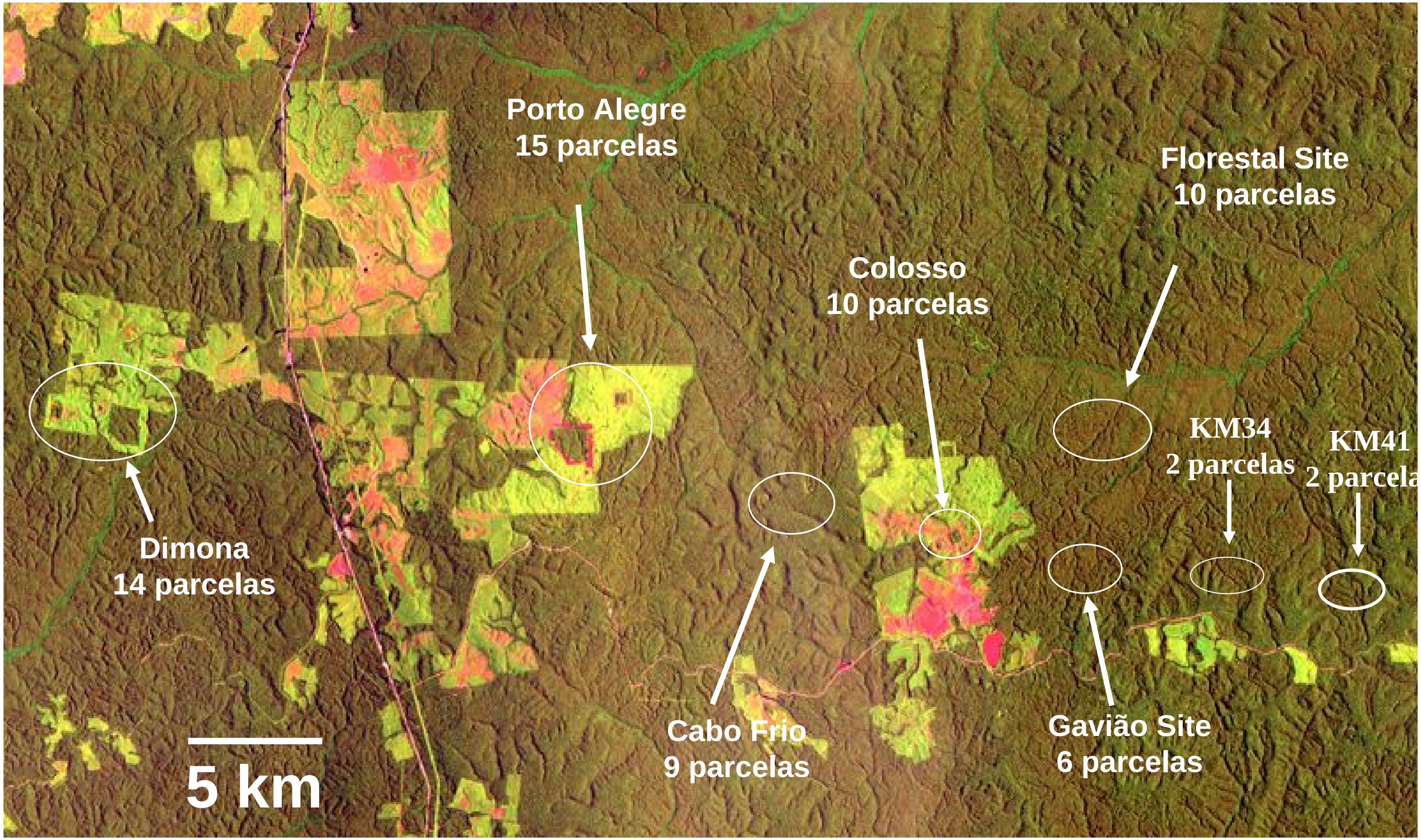
Figure 6: Evolution of the vegetation cover in the Amazon box from the coupled climate-carbon cycle simulation

Cox et al. 2004 Theoretical and Applied Climatology

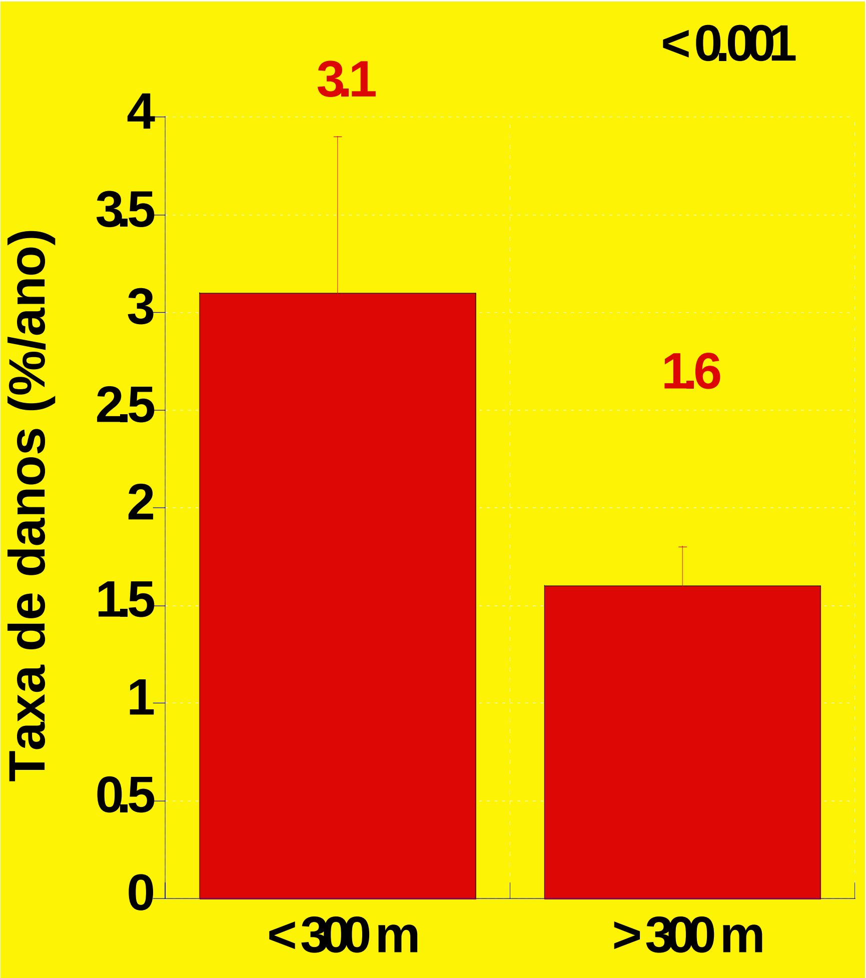

10km

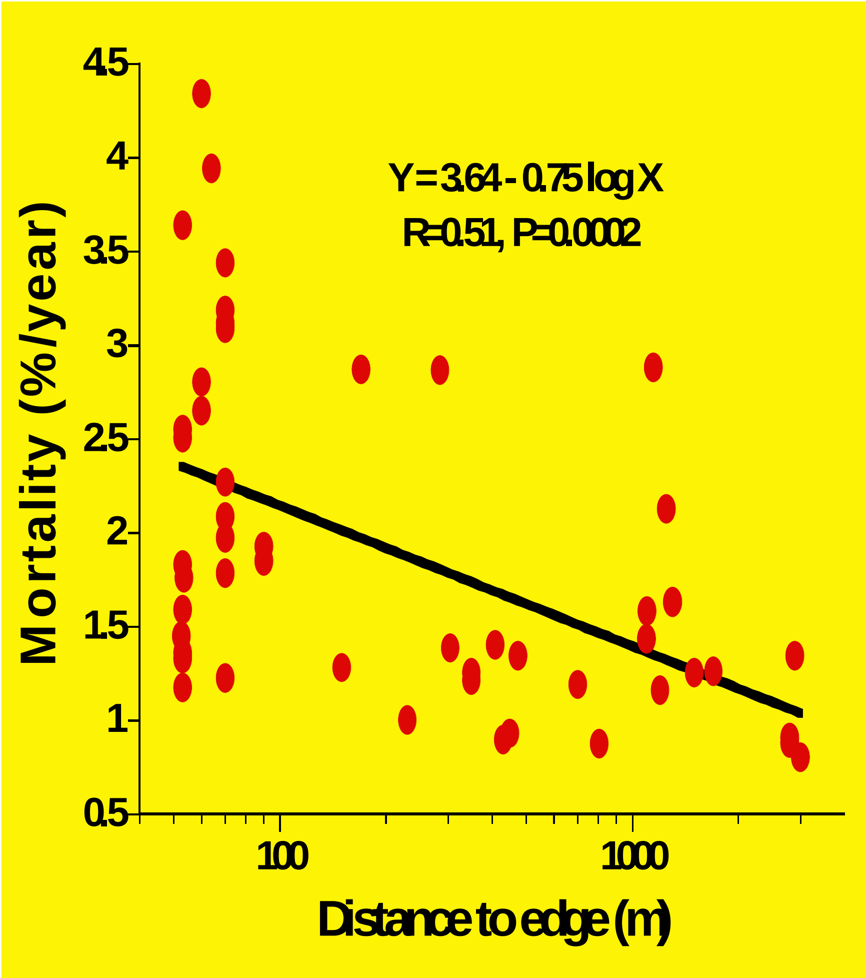

Fotos: Richard Bierregaard

Localização das Parcelas na área do PDBFF

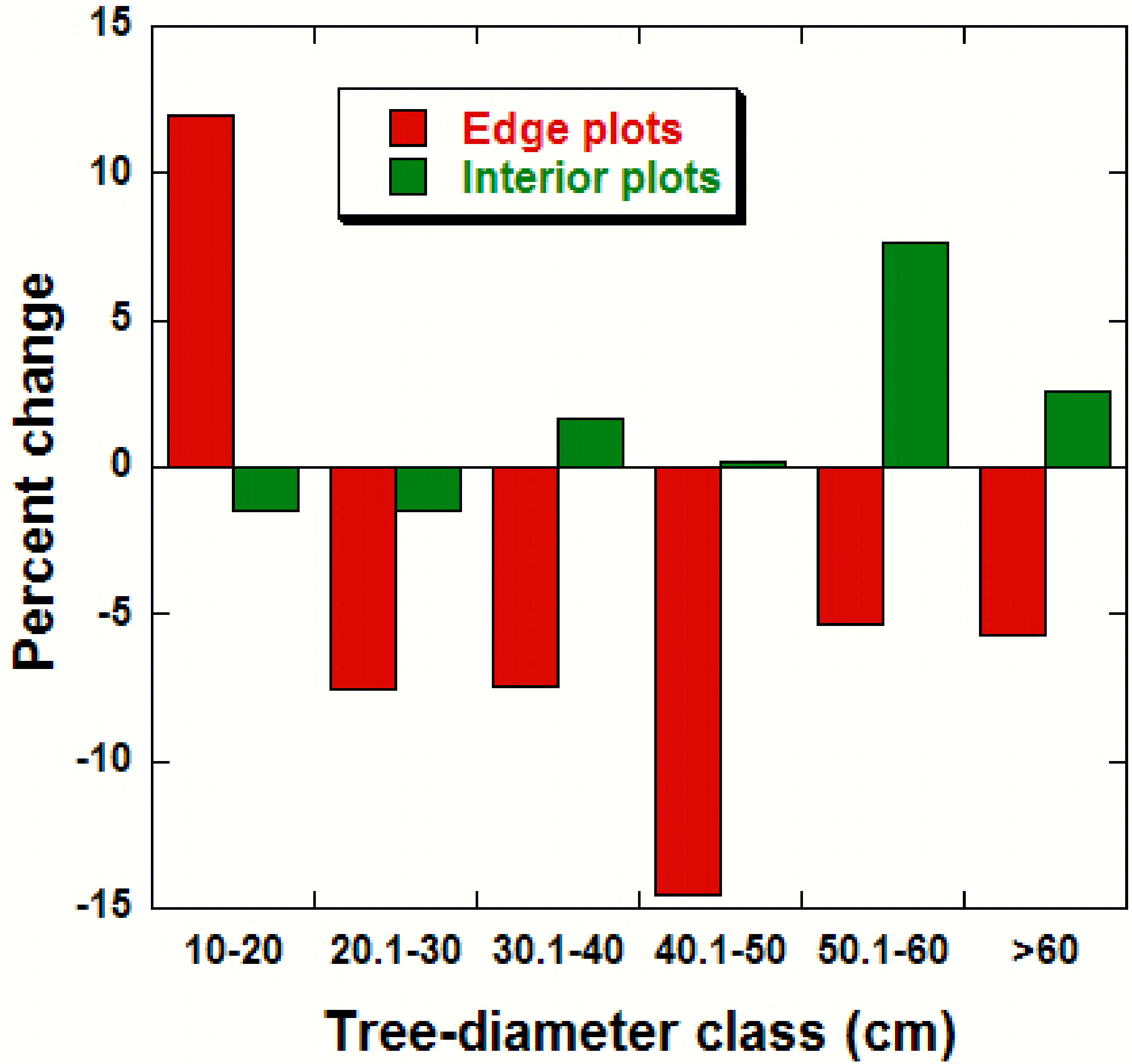


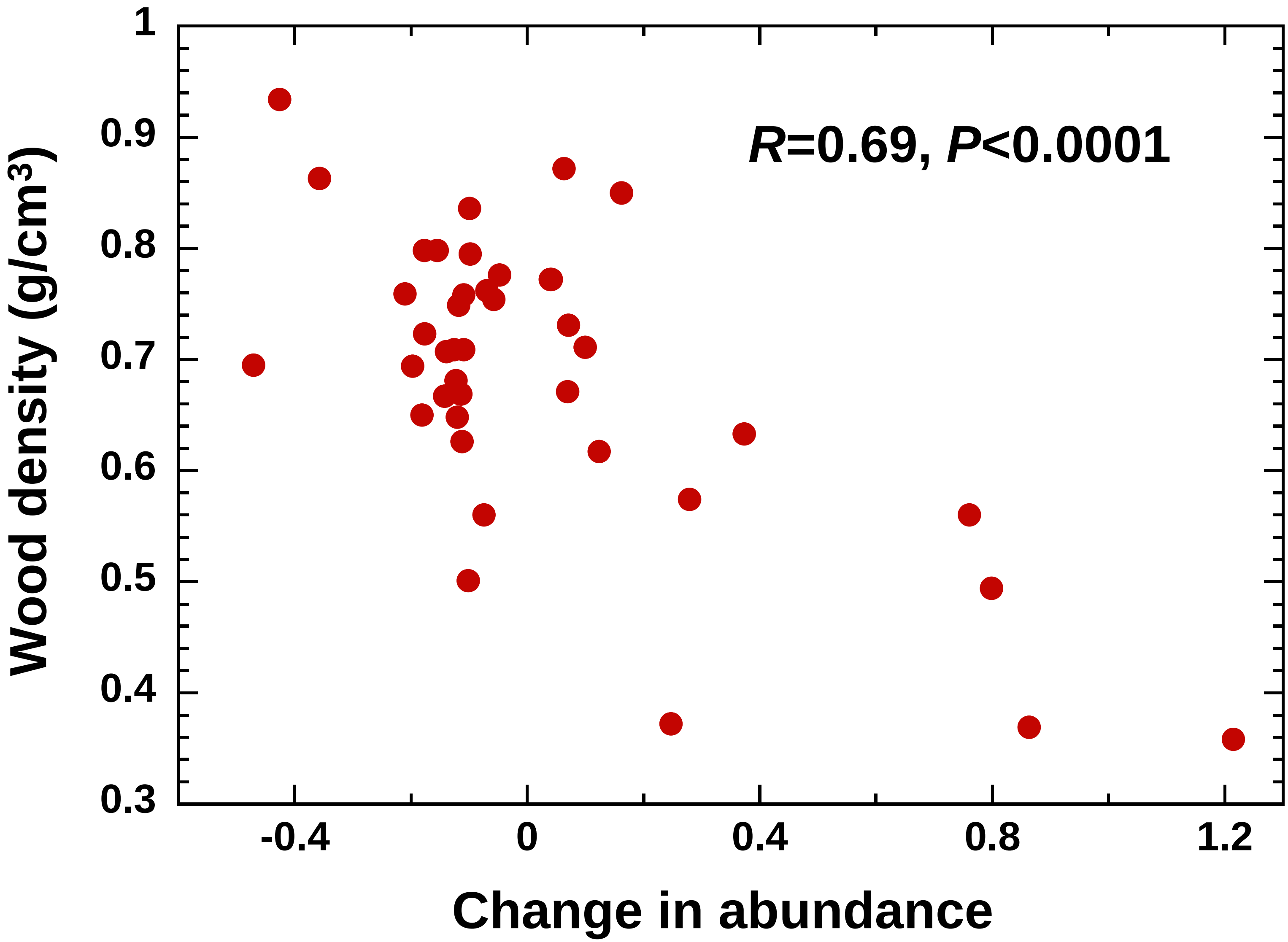
Damage and mortality of trees (%/yr)





Nascimento and Laurance, 2004 Ecol. Appl.;


Edge plots
Interior plots
Percent change
15
10
5
0
-5
-10
-15
10-20
20.1-30
30.1-40
40.1-50
50.1-60
>60
Tree-diameter class (cm)

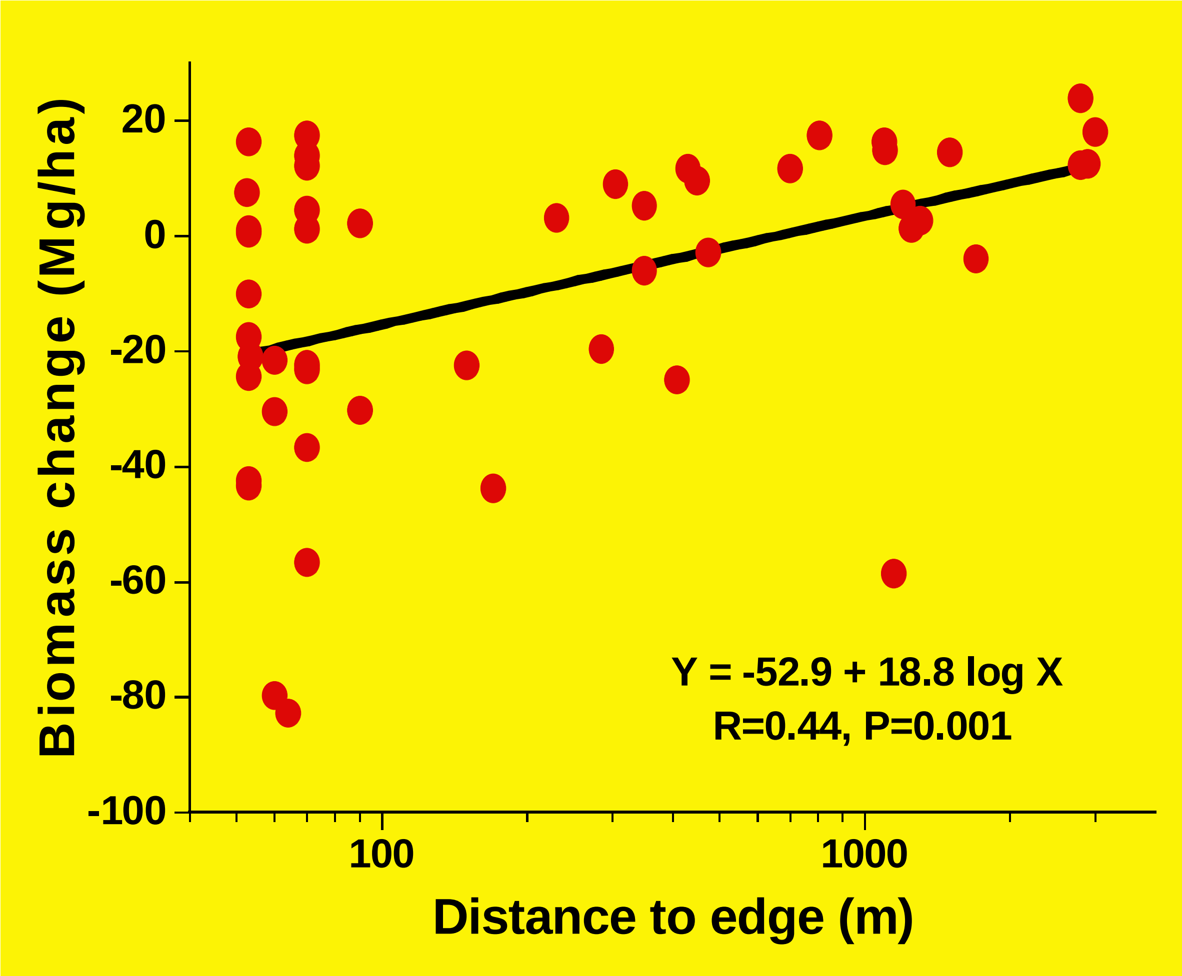


Laurance et al. 2006
PNAS

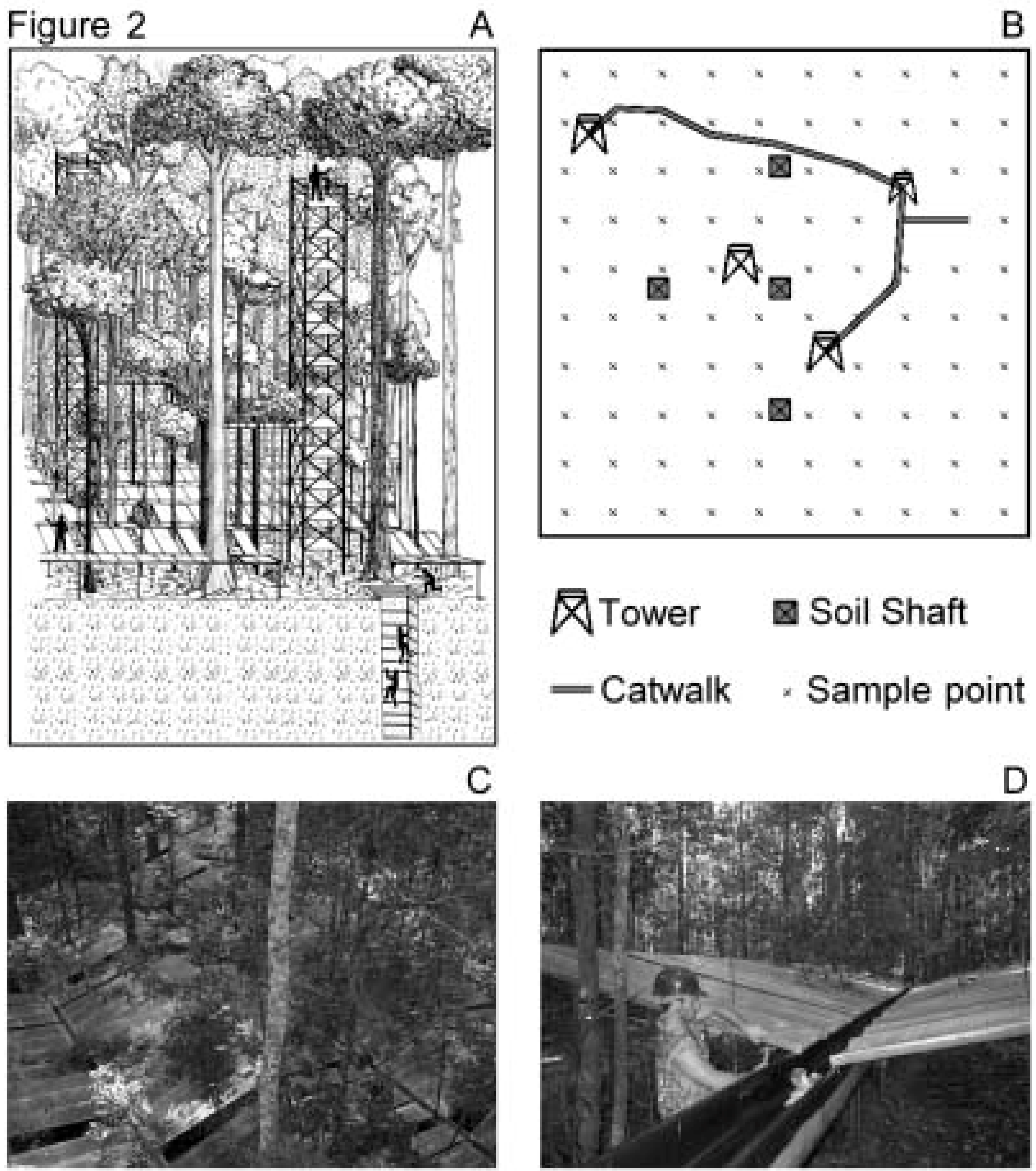
Net loss of biomass after 17 years of fragmentation

Mean biomass loss < 300 m = 22.7 Mg/ha

1.3 Mg ha^{-1} yr^{-1}

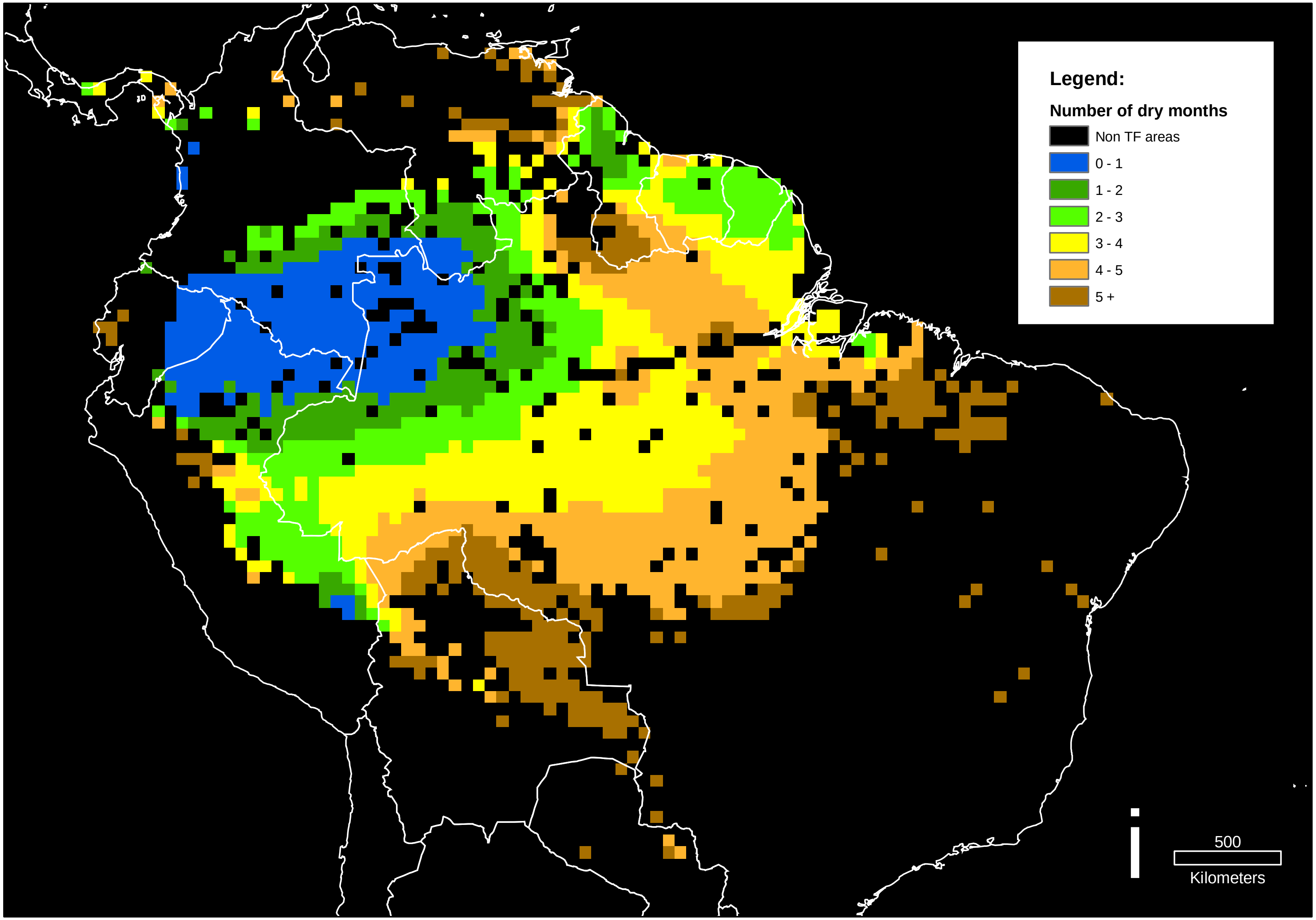


Nascimento and Laurance, 2004 Ecol.Appl.;



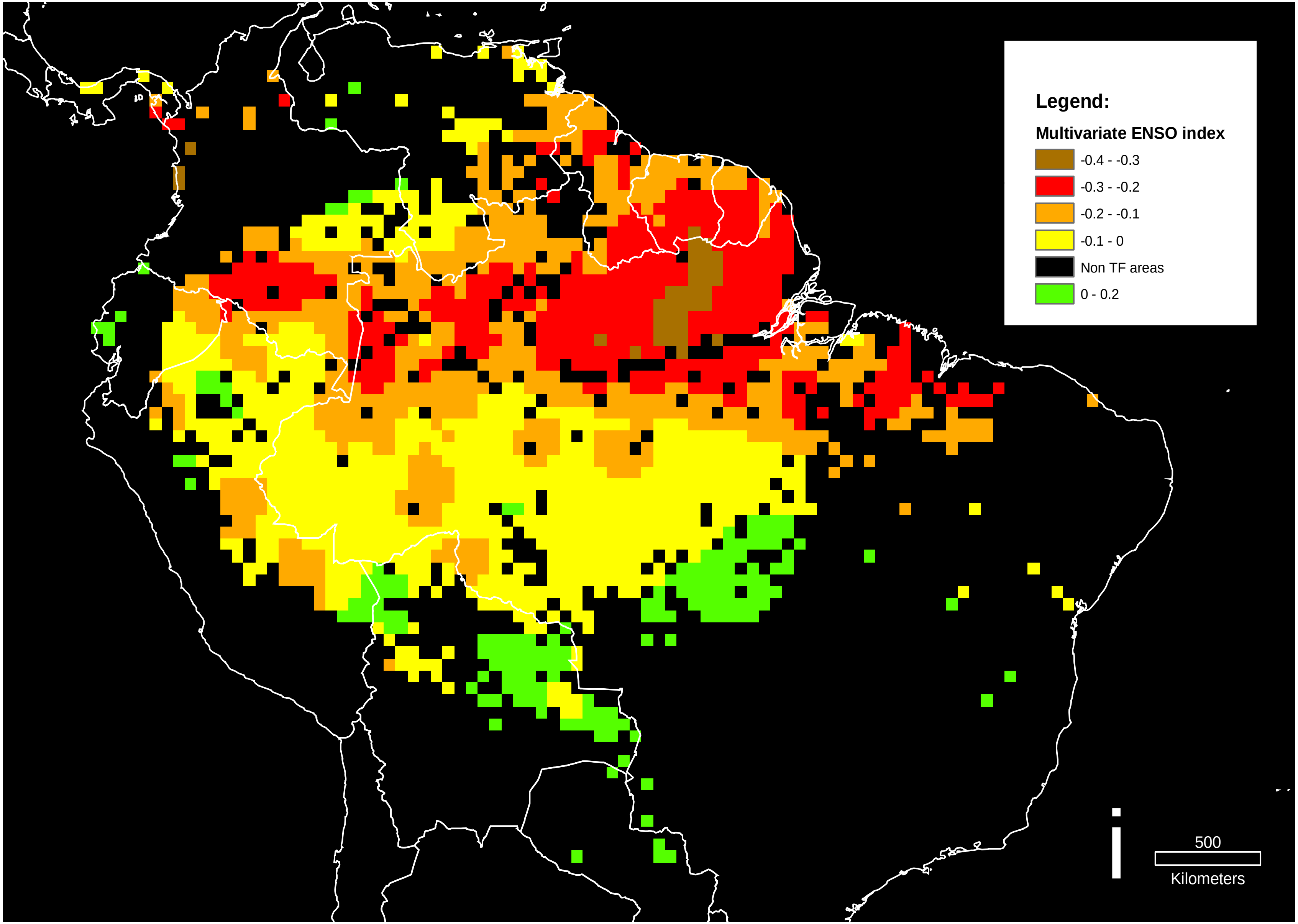
Nepstad et al. 2002

Length of dry season



Derived from the New et al 2001 dataset

Impact of El Nino



Malhi and Wright 2004 *Spatial patterns and recent trends in the climate of tropical forest regions.* Philosophical Transactions of the Royal Society

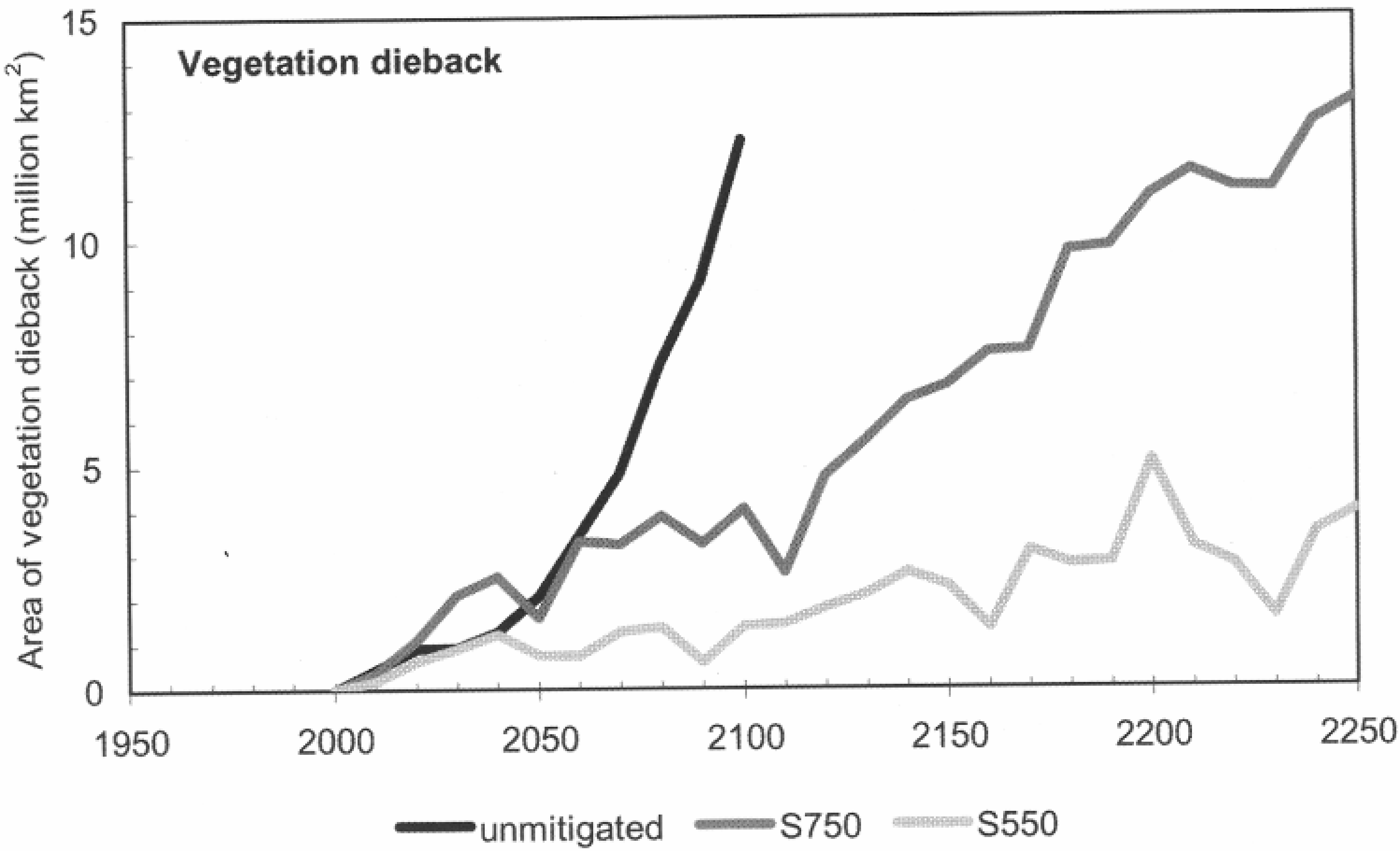


Figure 6. Area of vegetation dieback in response to climate change, under unmitigated emissions (top line), S750 (middle line) and S550 (bottom line).

Arnell et al. 2002 Climatic Change

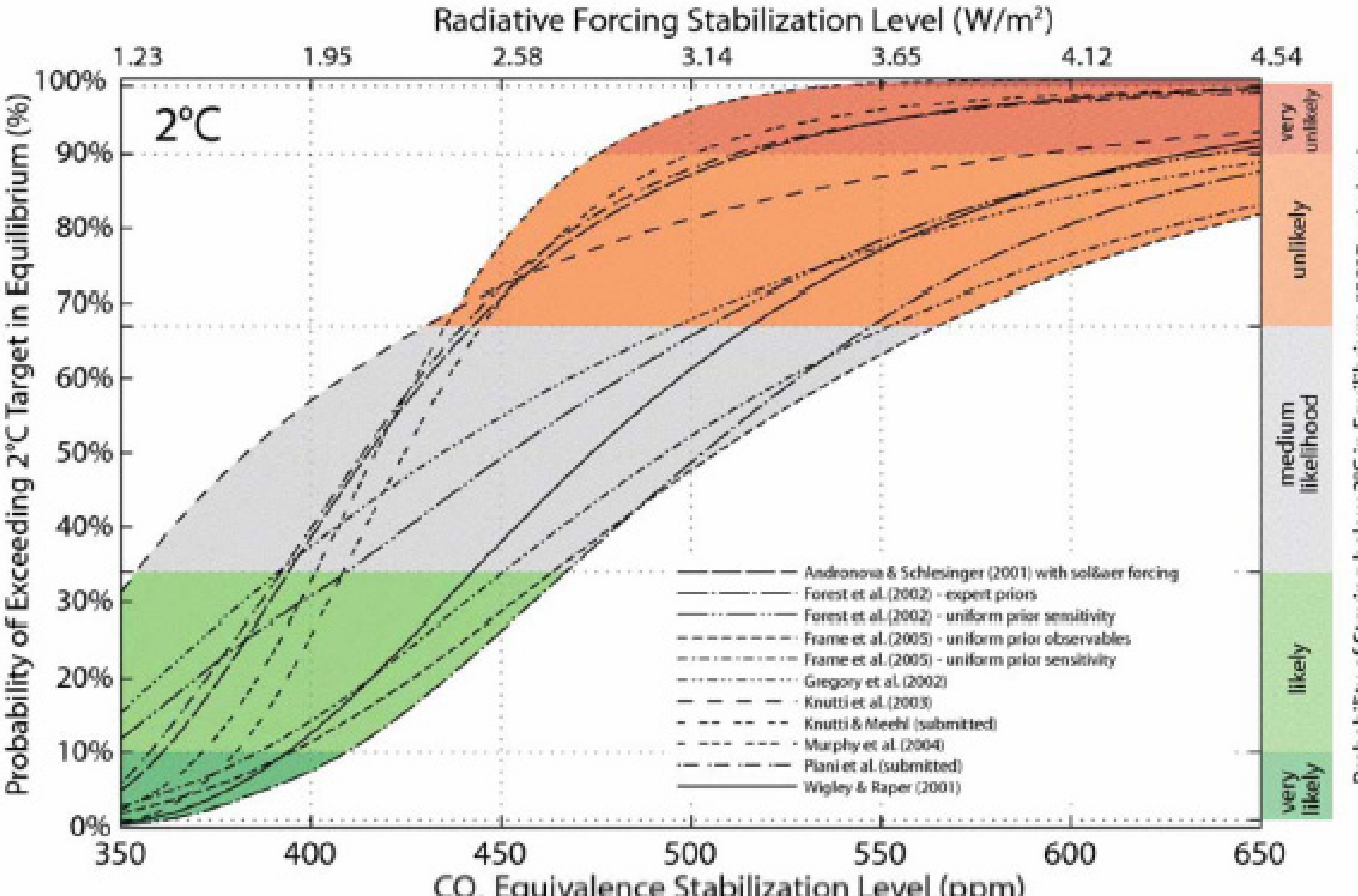


***Figure 19.1:** Probability (see Key Caveat above on low confidence for specific quantitatitive results) of exceeding an equilibrium global warming of 2°C above preindustrial (1.4°C above 1990 levels), for*

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