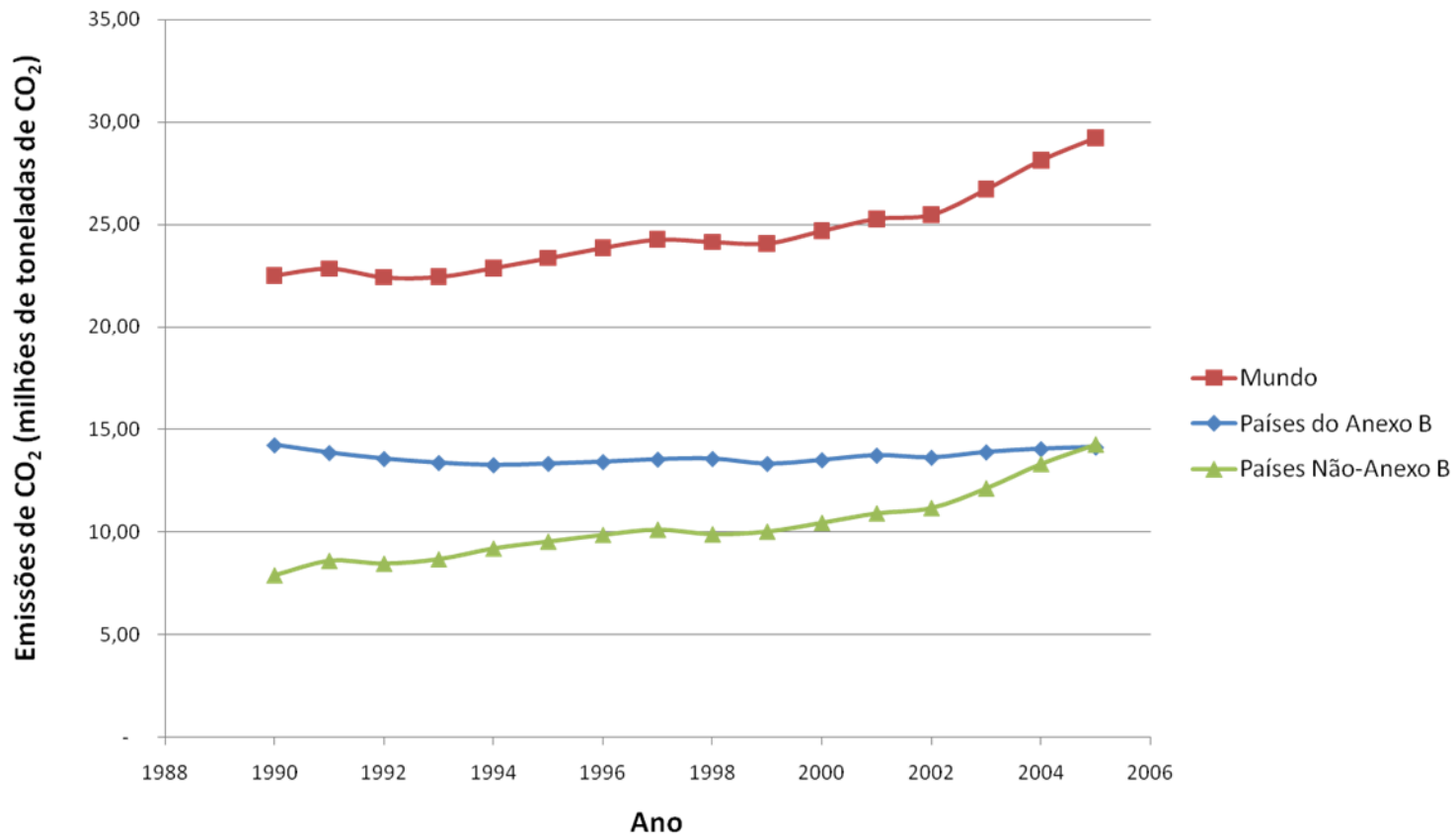


Desafios e Oportunidades para a Pesquisa em Mudanças do Clima no Brasil

Prof. José Goldemberg

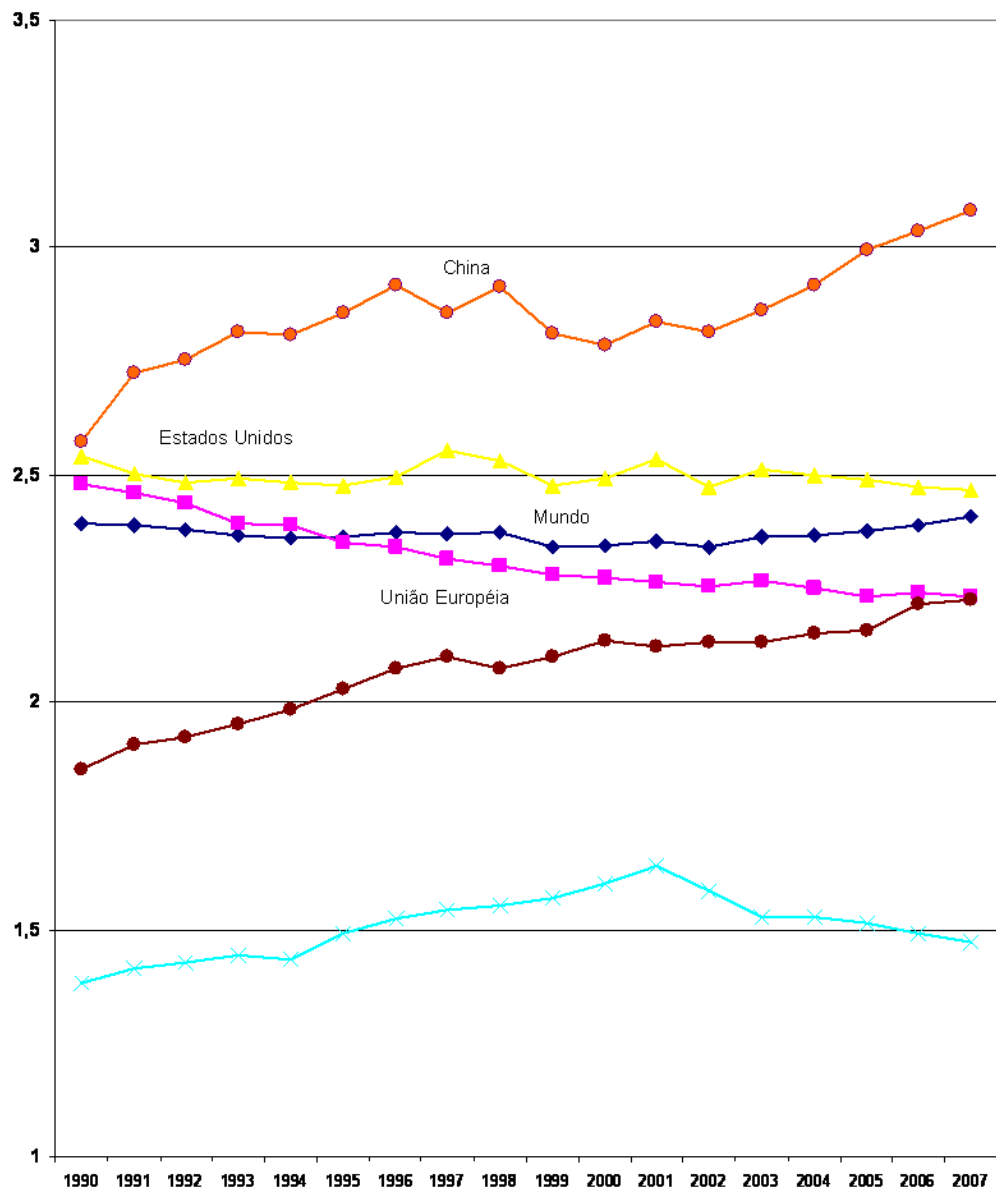
17/03/2001

Emissões Mundias de CO₂ a Partir da Queima de Combustíveis Fósseis (1990 - 2005)

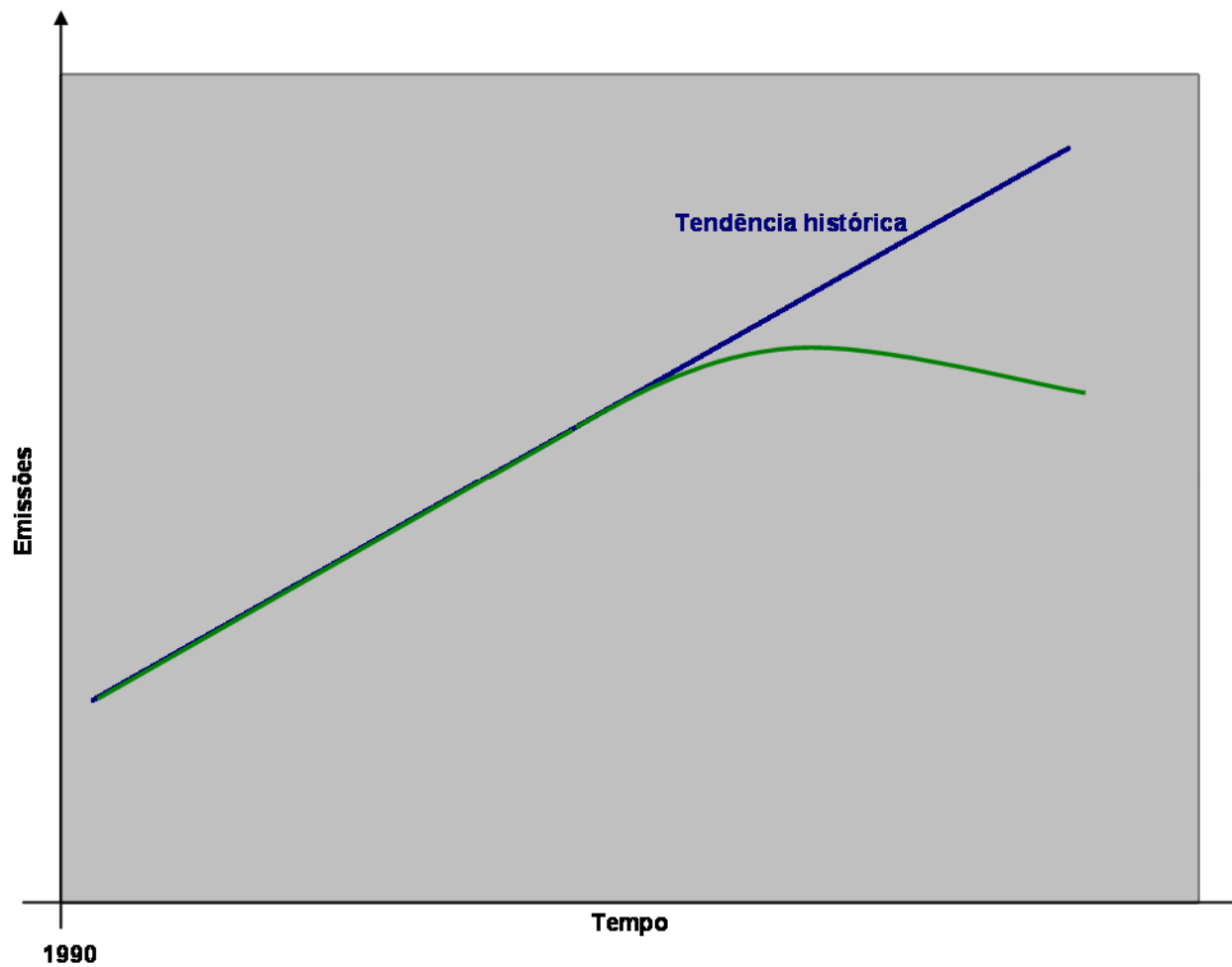


Evolução da Relação CO₂/TPES

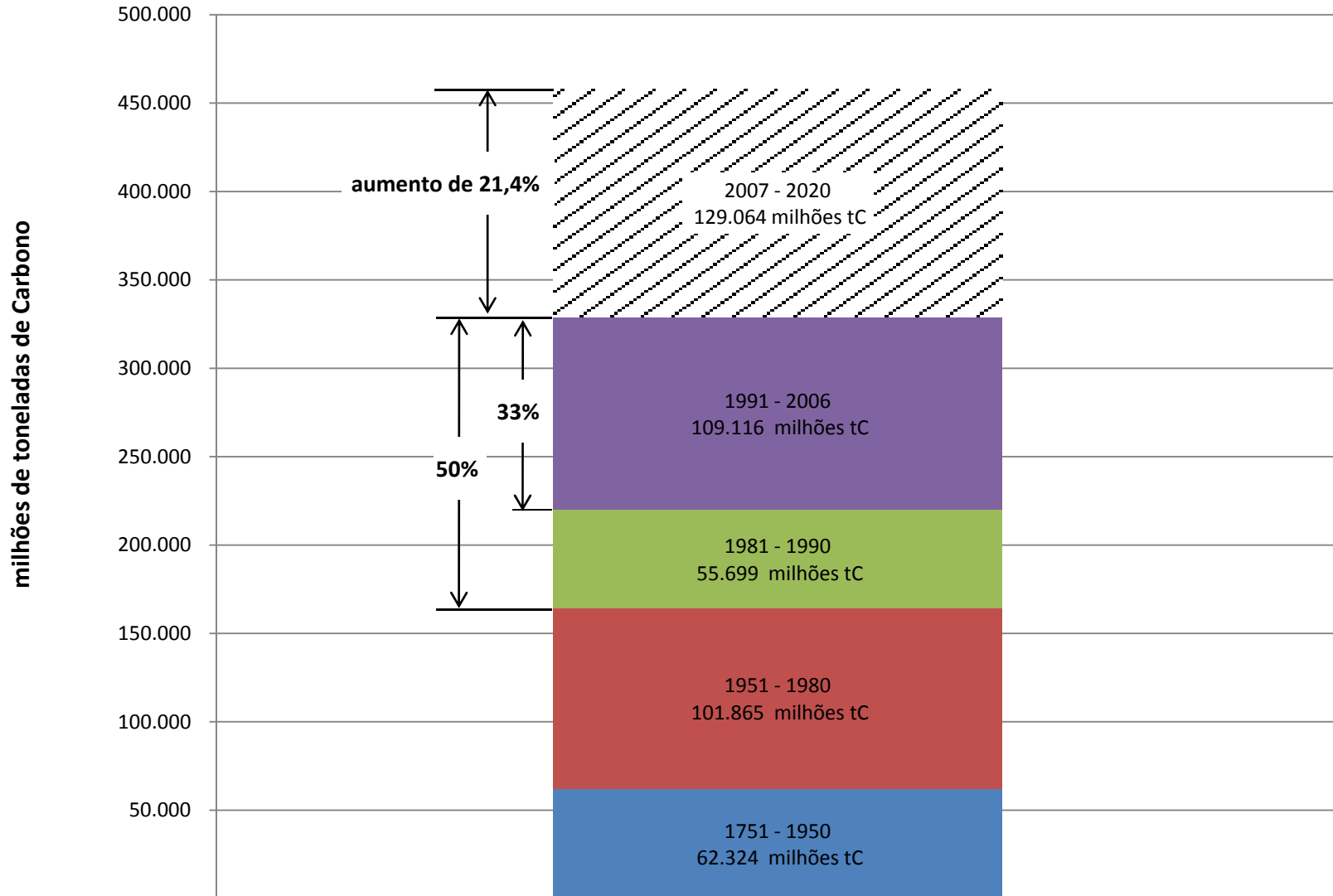
tCO₂ por toe



Emissões

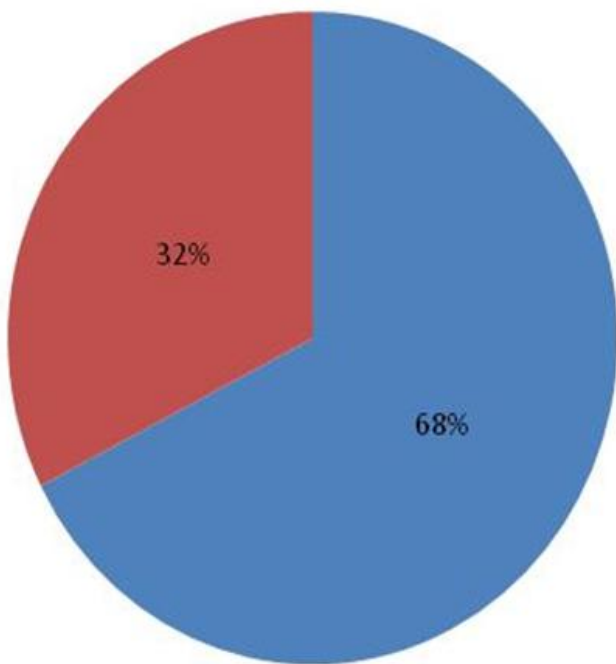


Emissões Cumulativas de CO₂

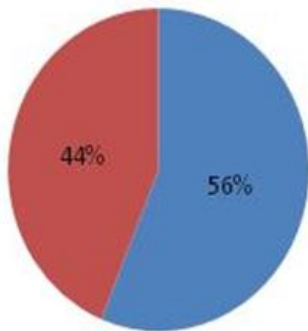


GHG Cumulative Emission

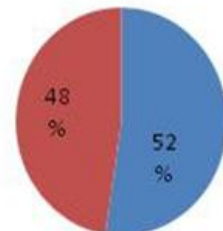
1850 - 2006



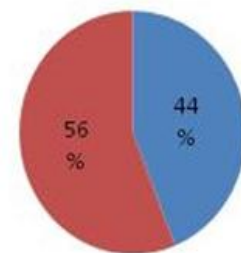
1980 - 2006



1990 - 2006



1990 - 2020



Source: CAIT, 2009

■ Developed countries
■ Developing countries

$$I_c = \frac{CO_2}{GDP}$$

$$CO_2 = \frac{CO_2}{GDP} \times GDP$$

$$\frac{\Delta(CO_2)}{CO_2} = (\Delta I_c) + \frac{\Delta(GDP)}{GDP}$$

Ic = CO2/GDP
Carbonization index

	1990	2005	2007	Meta 2020	% Variação Anual 90- 07	% Variação Anual 05- 20
Mundo	0,63	0,49	0,47	-	-1,69%	-
União Européia	0,47	0,34	0,32	0,22	-2,35%	-3,0%
Estados Unidos	0,69	0,53	0,50	0,31	-1,84%	-3,6%
Brasil	0,20	0,23	0,22	-	0,64%	-
China ¹	1,14	0,63	0,60	0,38	-3,74%	-3,3%
China ²	1,14	0,63	0,60	0,35	-3,74%	-3,9%
India ¹	0,42	0,34	0,33	0,27	-1,39%	-1,5%
India ²	0,42	0,34	0,33	0,26	-1,39%	-1,9%

Relação CO2/GDP PPP

Kg CO2 por US\$ Dolar 2000

