

Global Carbon Project Overview of Activity

September 2006 – August 2007



Theme 1: Patterns and Variability

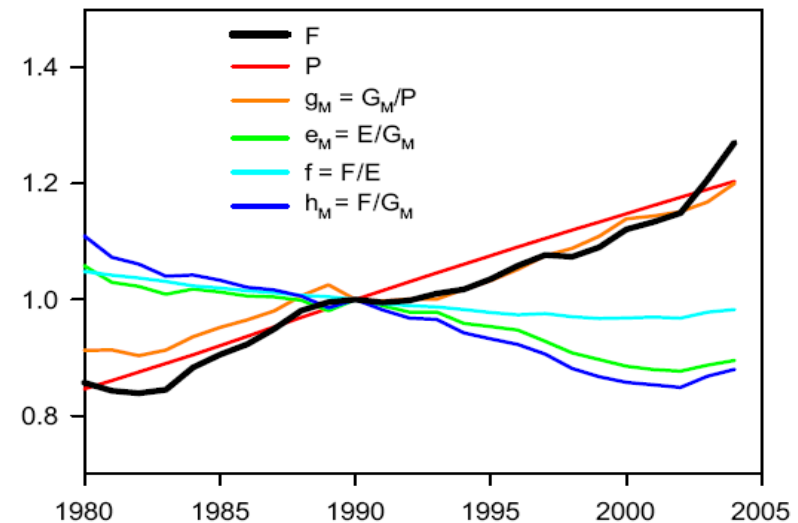
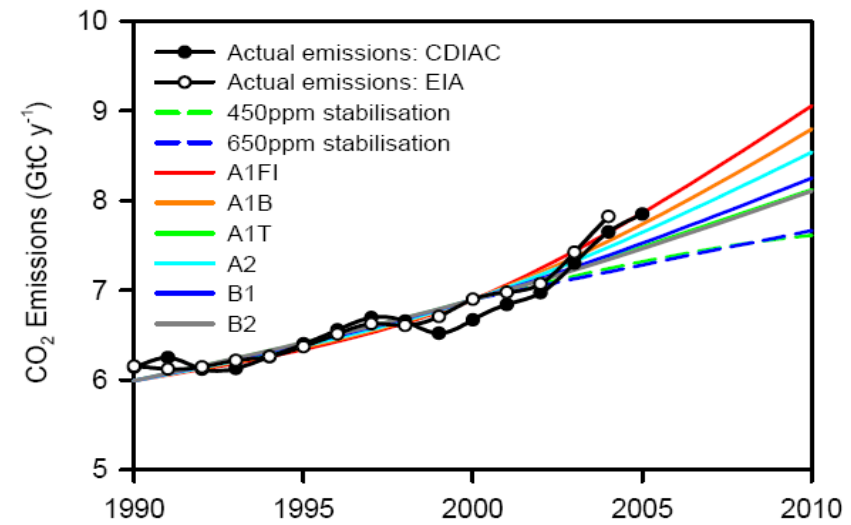


New Analysis of FF CO₂ Emissions & C Intensity

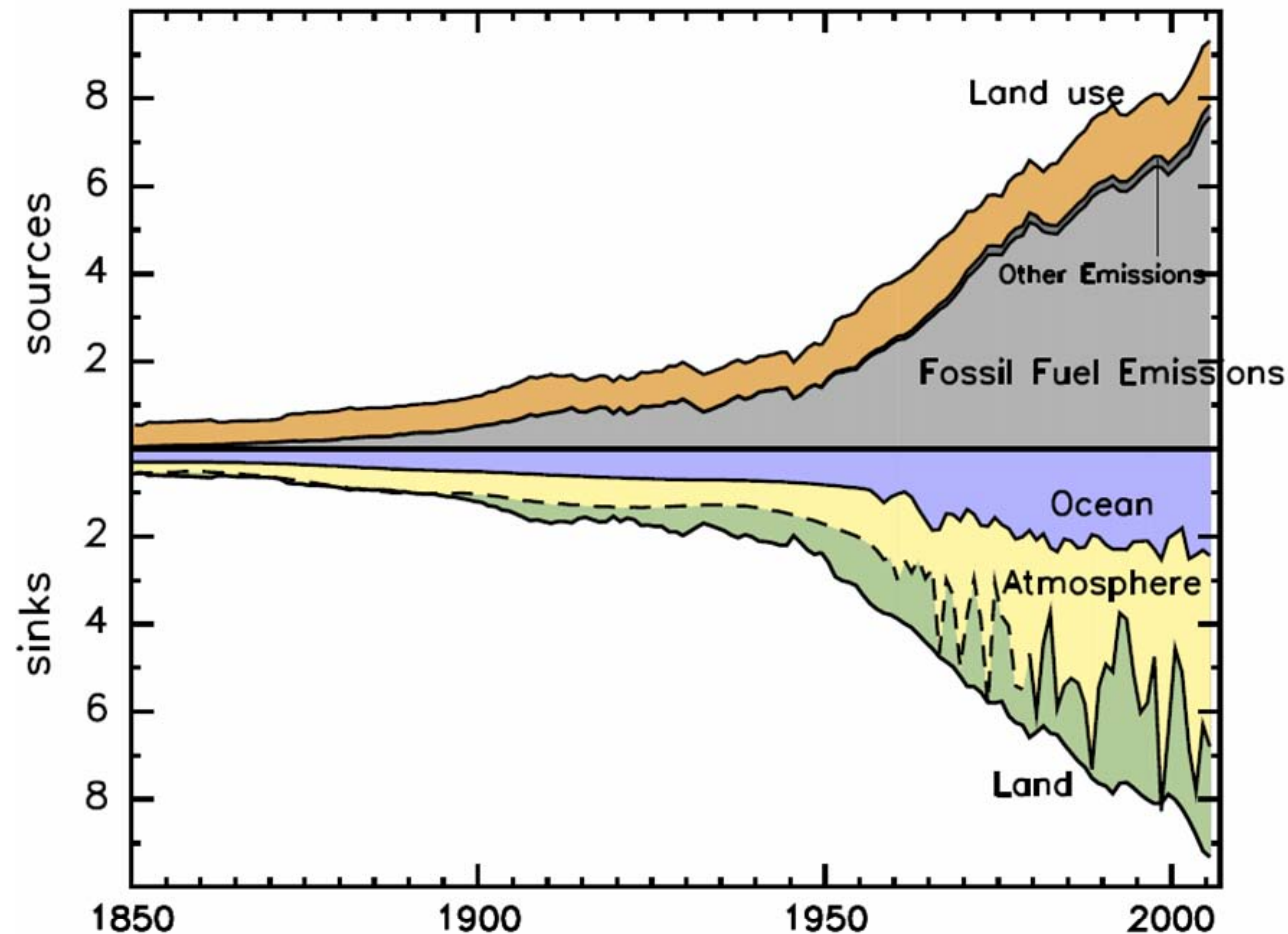
Raupach MR, G. Marland, P. Ciais, C. LeQuere, J.G. Canadell, C.B. Field (2007)

Global and regional drivers of accelerating CO₂ emissions.

PNAS, doi:10.1073/pnas.0700609104



Annual Update of the Global Carbon Budget



2006 budget
finished

PNAS paper in
review

Web materials

Model-Data Fusion Activity

- **OptIC: Optimization InterComparison.** Comparison of parameter estimation methods in terrestrial biogeochemical models

JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 112, G02027, doi:10.1029/2006JG000367, 2007

OptIC project: An intercomparison of optimization techniques for parameter estimation in terrestrial biogeochemical models

Cathy M. Trudinger,¹ Michael R. Raupach,² Peter J. Rayner,³ Jens Kattge,⁴ Qing Liu,⁵ Bernard Pak,¹ Markus Reichstein,⁴ Luigi Renzullo,⁶ Andrew D. Richardson,⁷ Stephen H. Roxburgh,^{8,9} Julie Styles,^{10,11} Ying Ping Wang,¹ Peter Briggs,² Damian Barrett,⁶ and Sonja Nikolova^{2,12}

Received 10 November 2006; revised 1 March 2007; accepted 20 March 2007; published 1 June 2007.

- CarbonFusion

REFLEX : REgional FLux Estimation eXperiment

A model-data fusion inter-comparison project aimed at assessing the capability of extrapolating observations of CO₂ fluxes from intensively studied sites (e.g. flux towers) to other locations (i.e. the surrounding region).



Theme 1

Lead by Raupach, M. Williams



Regional Project on Carbon and Water Issues in SE Asia

1. "Regional project on carbon and water issues in SE Asia"
has funded 7 projects with PIs from Vietnam, Thailand, Singapore, Malaysia, Indonesia and the Philippines in 2006.
2. "Advanced training workshop on carbon and water issues in SE Asia"
An international team of 18 lecturers from 8 countries provided training to 33 junior faculty and senior technician/staff from 13 countries in Southeast Asia (including Australia) and South Asia. The Workshop was organized by the Southeast Asia Regional Committee for START (SARCS) and sponsored by the GCP.



Theme 1

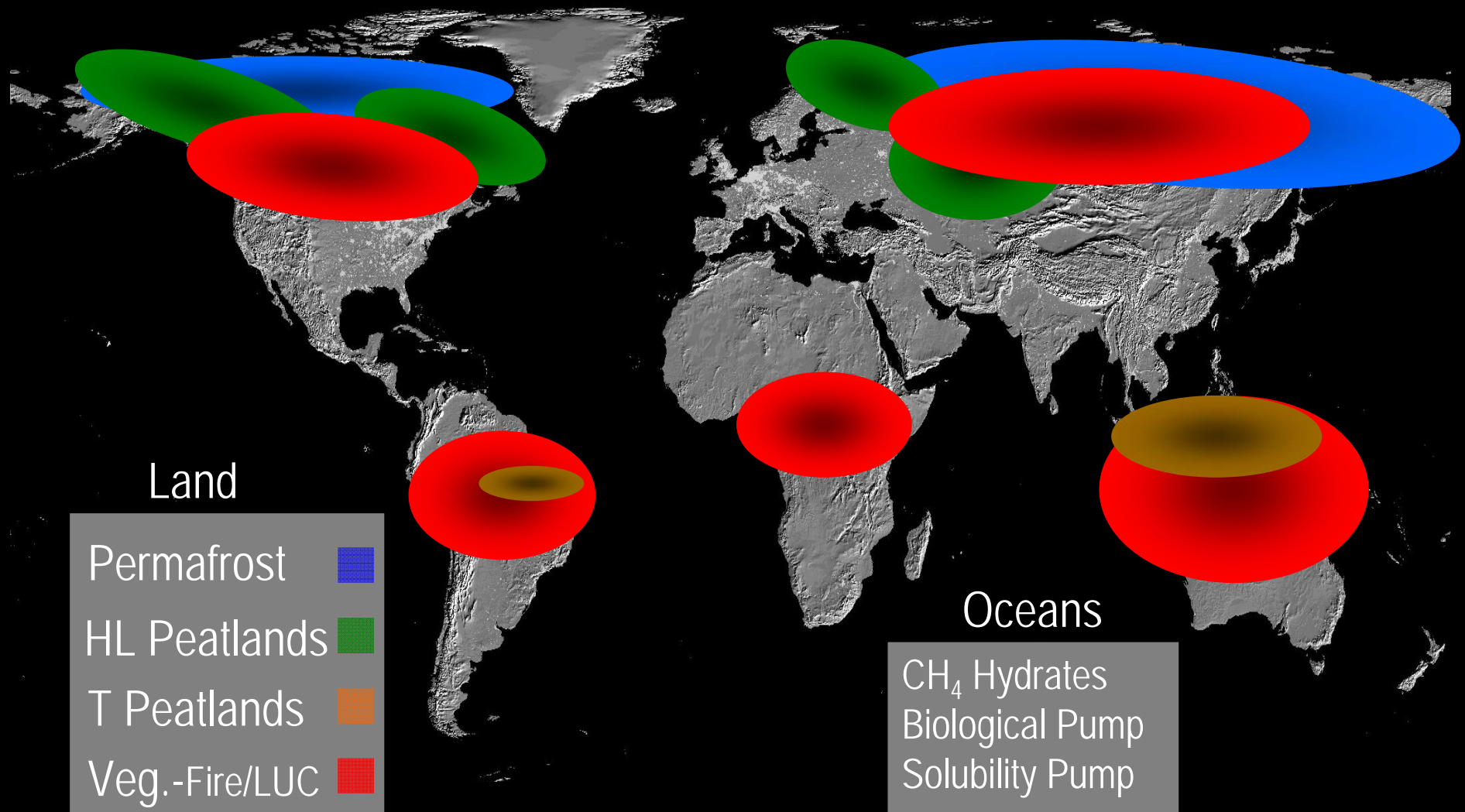
Lead by Chen



Theme 2: Processes and Feedbacks

Vulnerability of the Carbon Cycle in the 21st Century

Hot Spots of the Carbon-Climate-Human System



Vulnerability of Frozen Carbon: Synthesis

Synthesis Papers

To be completed by the end of 2007

1. The vulnerability of permafrost carbon to climate change: conceptual Framework_Ted Schuur et al.
2. Soil organic carbon stocks in the northern circumpolar permafrost region_Charles Tornacai et al.
3. Potential frozen ground changes_Annette Rinke et al.
4. Vulnerability of permafrost carbon: overall synthesis_Chris Field et al.



Theme 2



GLOBAL
CHANGE



WCP
Climate



Vulnerability of Carbon in Peatlands

- Synthesis of state of knowledge on the “Vulnerability of carbon in tropical peatlands”. Special feature in Ecosystems_Canadell et al. (in ECOSYSTEMS). To be completed October 2007
- New APN grant to support science-policy interface on “Climate and tropical peatlands” with focus on biofuel from palm oil in Southeast Asia_Parish-Canadell (2007-2008)
- Synthesis paper on the role of high latitude peatlands in the global carbon cycle_Juul Limpens et al (for Biogeosciences). To be completed October 2007
- Riverine carbon in West Kalimantan (Chen’s Program). Ongoing.

Vulnerability of Ocean Sinks and Sources

Trend in sea-air $p\text{CO}_2$ (μatm per decade)

observed trend (confidence)	link to climate index	size of pool at risk	longevity
process	model performance	potential abrupt change	level of understanding

North Pacific:

0 or - (medium)	ENSO and PDO	?	?
circulation and biology	good for IAV, unassessed for trend	unknown	medium

Arctic:

not enough observations	AO	?	?
water fluxes and circulation	unassessed	yes	poor

North Atlantic:

0 or + (medium)	NAO	?	?
circulation and T	medium to poor*	link to MOC	medium

Mode water formation regions (by basins?):

low O_2 , high DIC	NAO-PDO-SAM	200-800 m	decades to centuries
circulation, surface buoyancy fluxes and winds	medium to poor	yes	medium

Equatorial Pacific:

0 to + in west, - in east. NET is -	ENSO and PDO	?	?
upwelling of DIC	good	link to SOI	good

Integrated coastal ocean:

not enough observations	local	?	?
Nutrient and C input, upwelling (winds)	very poor	unknown	poor

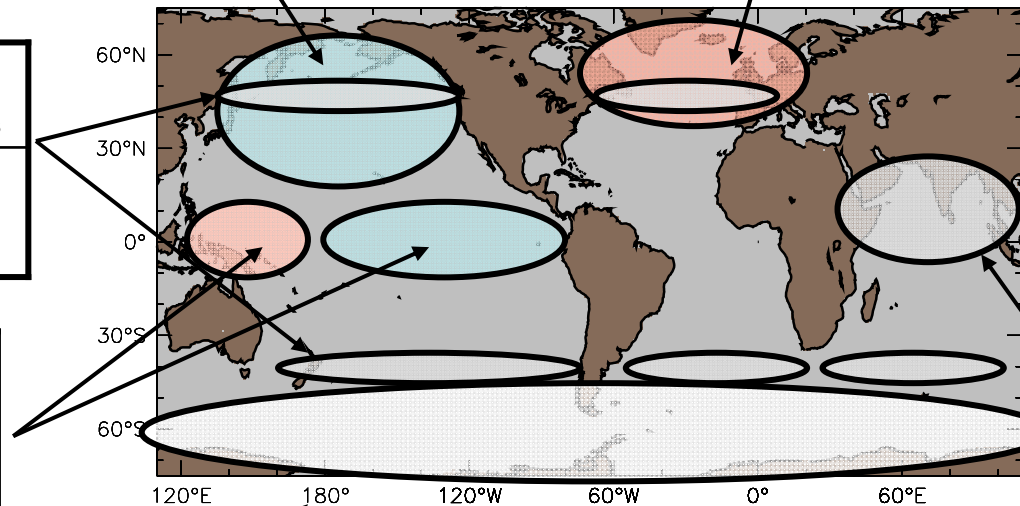
Southern Ocean:

weakening of 0.1 PgC/y/decade at least since 1981 (medium)	SAM and ENSO	deep ocean	+ feedback on decadal time-scale. affects the long-term equilibration of atm CO_2
increased upwelling from increased winds	medium to poor	not identified	medium

Tropical Indian:

not enough observations	IOD	?	?
biological production	-	unknown	poor?

Potential abrupt changes: MOC and deep water formation, arctic ice melt and land ice, SO winds, mode waters buoyancy, biological processes (particularly at high lat acidification, T-NEP), N changes in coastal ocean



caveat:

- *based on what comparison?
- missing regions?

Vulnerabilities: Synthesis and Integration

- Raupach MR, Canadell JG (2006)

Observing a vulnerable carbon cycle.

In: Observing the Continental Scale Greenhouse Gas Balance of Europe (eds. H. Dolman, R. Valentini, A. Freibauer), Springer, Berlin (in press).

- Canadell JG, Gifford R, Houghton S, Pataki D, Raupach MR, Smith P, Steffen W (2007)

Saturation of the terrestrial carbon sink.

In: Terrestrial Ecosystems in a Changing World, Canadell JG, Pataki D, Pitelka L (eds.). The IGBP Series. Springer, Berlin


Theme 3: Carbon Management





Urban and Regional Carbon Management

List of activities after Mexico SSC Meeting:

- Thematic workshops
 - Institutional dimensions (with IHDP) on 5th December 2006 in Bali
 - Urbanization and development pathways (with IIASA) on 28-30th March 2007 in Tsukuba
- Science Policy interfacing
 - UNFCCC COP-12 side-event (with ECN Policy Studies Netherlands) on 15th November 2007 in Nairobi
- Forum creation for energy-emission modeling
 - A workshop on modeling low-carbon society (with Asia Energy-Environment Modeling Forum) on 30-31 May 2007 in Beijing



<http://www.gcp-urcm.org>
<http://www.globalcarbonproject.org>

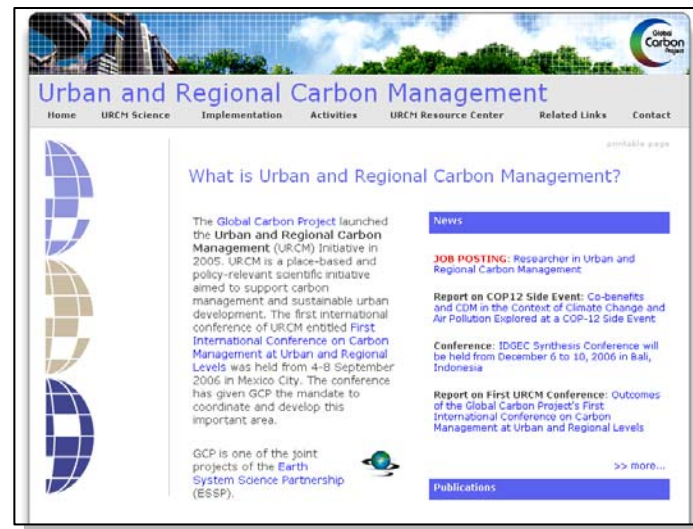


Urban and Regional Carbon Management

The Global Carbon Project launched the "Urban and Regional Carbon Management" (URCM) Initiative in 2005. URCM is a place-based and policy-relevant scientific initiative aimed to support carbon management and sustainable urban development. The first international conference of URCM entitled "Managing Carbon at Urban and Regional Levels: Connecting Development Decisions with the Global Issues" was held from 4-8 September 2006 in Mexico City. The conference has given GCP the mandate to coordinate and develop this important area.

Urban and Regional Carbon Management

- Goal
 - Syntheses, thematic papers, scientific networking and community building
- Products examples
 - Dhakal, Shobhakar and Michele Betsill (2007). Challenges of Urban and Regional Carbon Management and the scientific response, *Local Environment- The International Journal of Justice and Sustainability*, Taylor and Francis publications, accepted for publication, forthcoming.
 - Dhakal, Shobhakar (2007). Climate Change and Cities: The Making of a Climate Friendly Future, Chapter in "Urban Energy Transitions" (Editor: Prof. Peter Droege of University of New Castle Australia), Elsevier Publication. In Press.
 - URCM Science framework
 - URCM Brochure and poster
 - URCM Web-page, www.gcp-urcm.org
 - Web-based URCM Resource Center (under preparation)



Carbon Sequestration and Policy – Beyond 2012



Science bases for
"Options for including
Agriculture and Forestry
Activities in a Post-2012
International Climate
Agreement"

Published this year



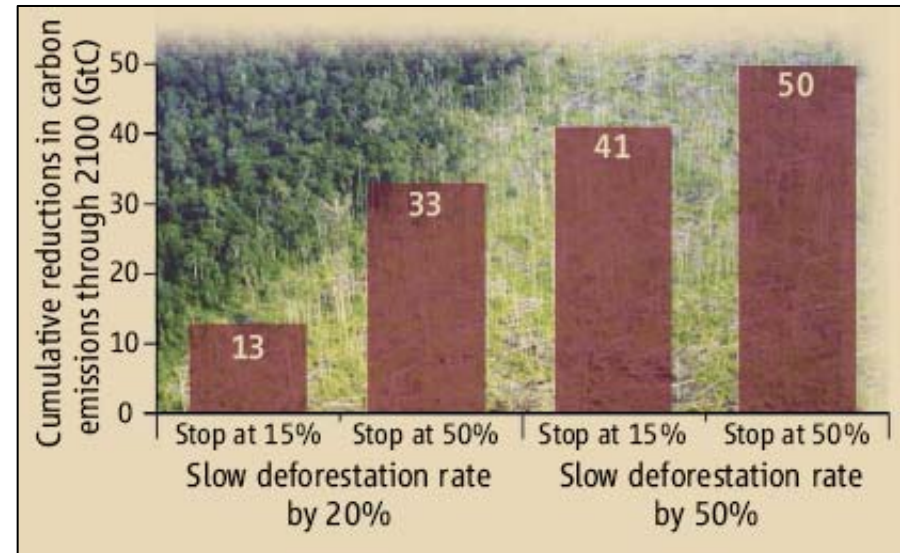
Theme 3

Lead by Schlamadinger, Yamagata



Avoided Deforestation

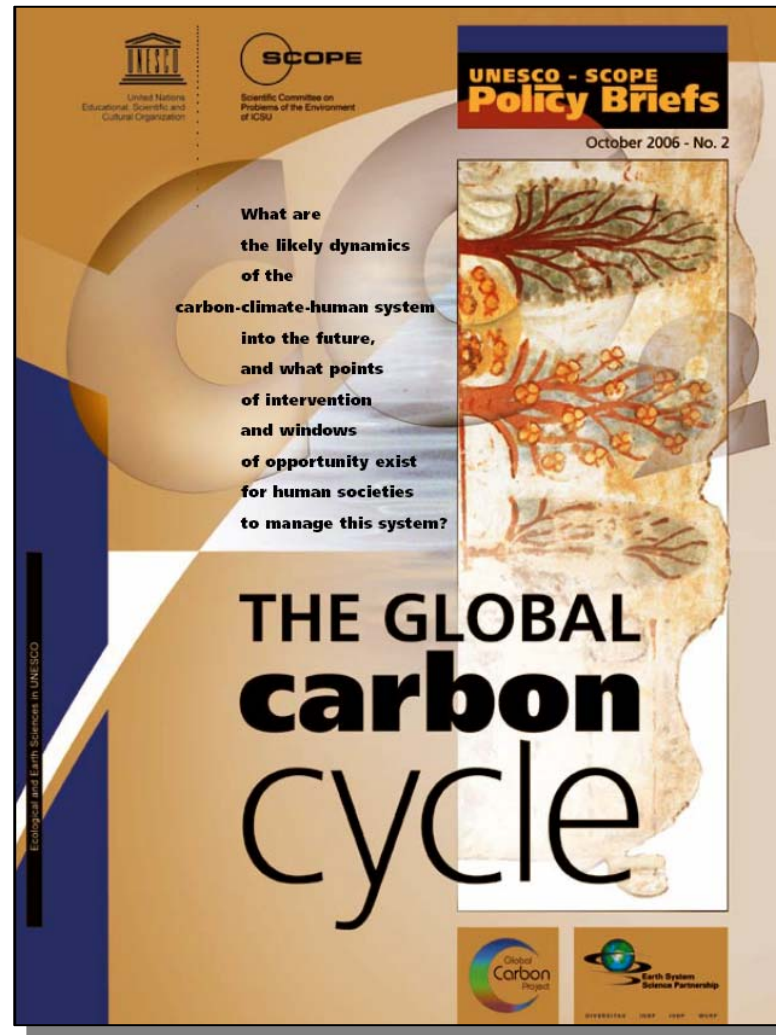
Gullison RE, Frumhoff PC, Canadell JG,
Field CB, Nepstad DC, Hayhoe K,
Avissar R, Curran LM, Friedlingstein,
Jones CD, Nobre C
2007
Tropical forests and climate change.
Science 316: 985-986.



GCP Wide: Program Developments



Policy Briefing for UNESCO-SCOPE



6,000 printed
(almost gone)



Project Wide



Carbon Reductions and Offsets Report



1st SSC meeting with
Zero Net Emissions

¼ Million Kms

6 times around the world
(equator)

15 July 2007

A GCP report for the ESSP

Liese Coulter, Pep Canadell, Shobhakar Dhakal

1. Introduction
2. Carbon management and cultural change
3. Carbon emission efficiencies
4. Voluntary carbon offsets
5. Carbon offset criteria
6. Project standards
7. Carbon offset providers
8. Calculating carbon emissions
9. The GCP carbon neutral program
10. Conclusions
11. Web links
12. References

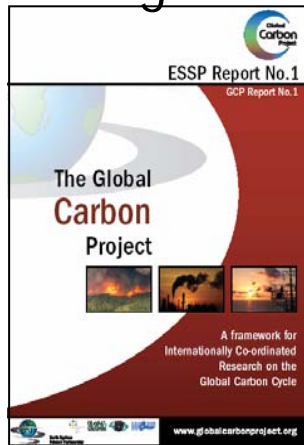


Project Wide



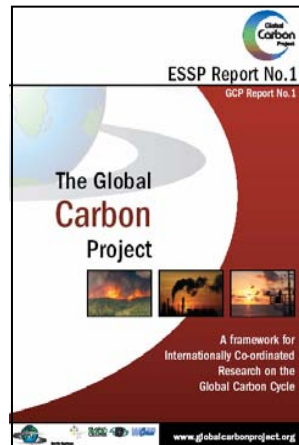
Publications

English



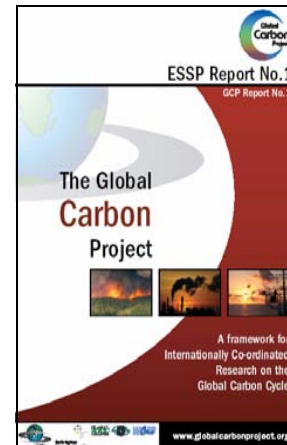
Oct. 2003

Chinese



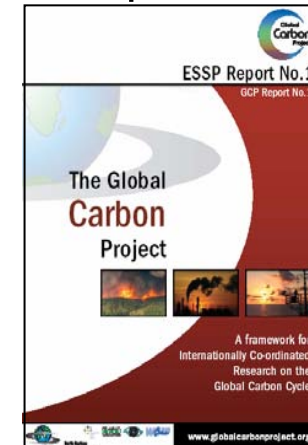
Nov. 2004

Russian

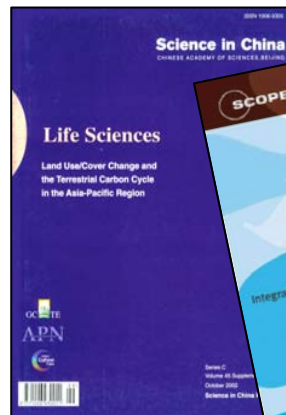


June 2005
[Exe.Sum.Only]

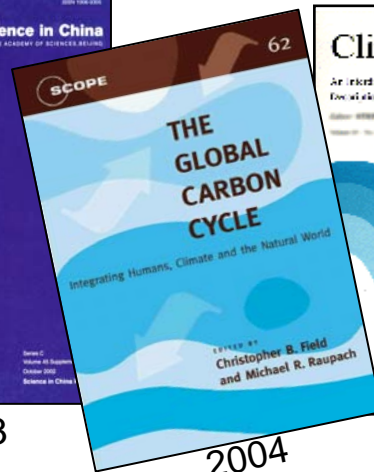
Japanese



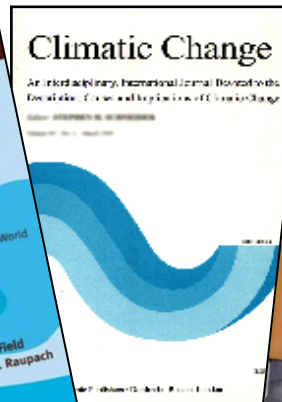
March 2006



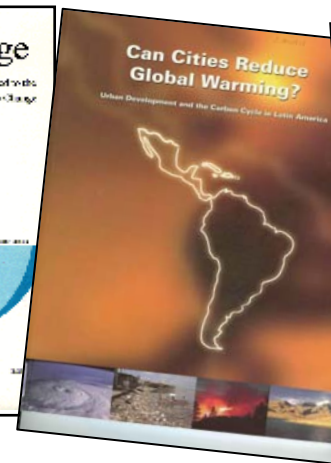
2003



2004



2004



2005



2007

Project Wide



Homepage: New Structure and Look



Project Wide





www.globalcarbonproject.org
info@globalcarbonproject.org

