Sinks and the Kyoto Protocol

Presentation

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Overview

- Sinks and their role in the carbon cycle
- Kyoto Protocol - key provisions on sinks
- Marrakech Accord - key provisions on sinks
  - Annex I Parties
  - Sinks under the Clean Development Mechanism (CDM)
- Reporting requirements for Land Use Change and Forestry
  - UNFCCC
  - Kyoto Protocol
- IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry
- Factoring out
- Vulnerability of forests

Sinks and their role in the carbon cycle (1)

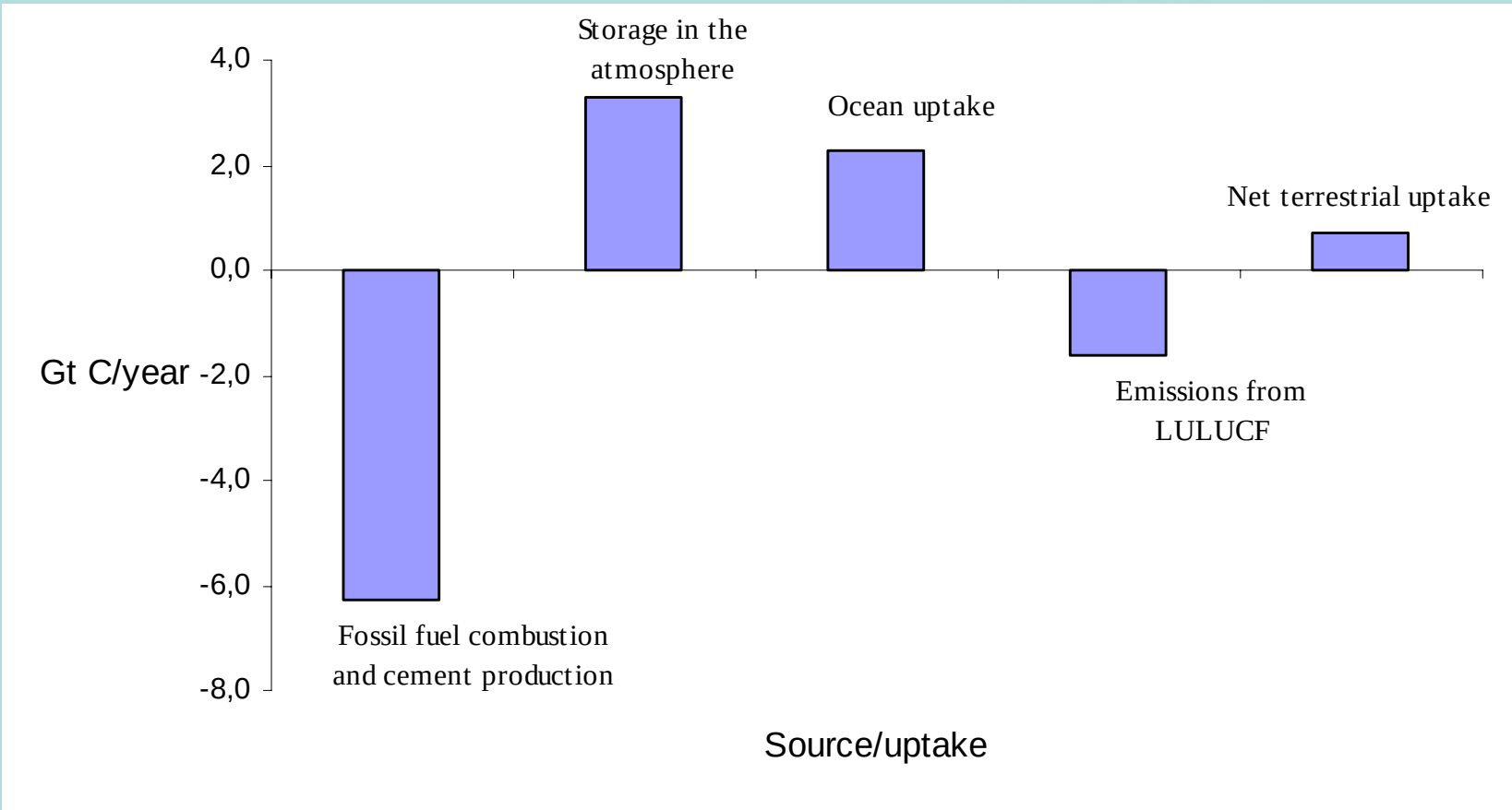
Emissions from fossil fuel combustion and cement production	6.3 ± 0.6 Gt C/yr
Storage in the atmosphere	3.3 ± 0.2 Gt C/yr
Ocean uptake	2.3 ± 0.8 Gt C/yr
Net terrestrial uptake = (1)-((2) + (3))	0.7 ± 1.0 Gt C/yr
Emissions from land-use change	1.6 ± 0.8 Gt C/yr
Residual terrestrial uptake = (4) + (5)	2.3 + 1.3 Gt C/yr

Issue:

- Residual terrestrial uptake (or missing sink) > emission reduction commitment under the Kyoto Protocol (1st commitment period)

Sink: any process, activitiy or mechanism which removes a GHG, an aerosol or a precursor of a GHG from the atmosphere

Sinks and their role in the carbon cycle (2)



How LULUCF can contribute to mitigation:

- removal of carbon from the atmosphere and storage by forests and other terrestrial ecosystems
- reduction of emissions from deforestation or other LULUCF activities
- substitution of fossil fuels by sustainable produced biofuels
- substitution of energy intensive products (such as steel, concrete and plastic) by sustainable produced timber
- substitution of fossil fuels by sustainable produced biofuels in combination with carbon capture and storage

Sinks and their role in the carbon cycle (4)

Percentage of LULUCF emissions from total CO_2 emissions

Austria	11 %
EU	6 %
USA	14 %

Kyoto Protocol - key provisions on sinks

- Article 3.3
  - Obligation for Annex I Parties to account for Afforestation, Reforestation, Deforestation since 1990 (gross/net approach)
- Article 3.4
  - Option for Annex I Parties to account for additional activities in the agricultural soils and land-use change and forestry categories since 1990
- LULUCF accounting
  - Sinks are treated as an adjustment to assigned amount (and not as a simple inventory sector)

Marrakech Accord - key provisions on sinks Annex I Parties

- Additional activities under Article 3.4
  - cropland management; grassland management; revegetation - accounting relative to emissions or removals in the base year (net/net approach)
  - forest management - limited to 15% of expected uptakes by forests within an overall cap of 3% of base year emissions (e.g. Austria: 0.63 Mt C/yr)
  - uptakes in the pre-1990 forest could be used to compensate for deforestation debits (specific negotiated deal for Canada, Japan, Russia)
- definition of forests (based on FAO definition)

Marrakech Accord - key provisions on sinks
Sinks under the Clean Development Mechanism (CDM)

- Activities: limited to afforestation, reforestation
- contribution limited to one per cent of base year emissions during the 1st commitment period (2008-2012), times five (Austria: ~3.9 Mio t CO_2)
- specific rules included in decision 19/CP9 (see document FCCC/2003/6/Add.2)
- for small scale projects rules are expected to be adopted by COP10 in December 2004

Reporting requirements for Land Use Change and Forestry UNFCCC (1)

- Revised common reporting tables for LULUCF (Decision 13/CP.9 included in document FCCC/CP/2003/Add.1)
  - improved transparency
  - focus on land-use approach
  - based on IPCC Good Practice Guidance for LULUCF
  - Parties should use new reporting tables for submission 2005 (trial period) and report by 15 May 2005 on their experience

Reporting requirements for Land Use Change and Forestry UNFCCC (2)

- Categories
  - Total land-use categories
  - Forest land
  - Cropland
  - Grassland
  - Wetlands
  - Settlements
  - Other Land
  - Other (e.g. Harvested Wood Products)
- Land remaining land
- Land converted to other land
- GHGs: Net CO_2 emissions/removals; CH_4; N_2O; NO_x; CO

Reporting requirements for Land Use Change and Forestry
Kyoto Protocol (1)

- Decision expected by COP10 (December 2004)
- draft tables prepared during SBSTA20 (Bonn, June 2004)
- reporting tables will allow to report data according to Approach 2 (Survey of land use and land-use change (statistical approach) and according to Approach 3 (Geographically explicit land use data)

Reporting requirements for Land Use Change and Forestry
Kyoto Protocol (2)

- Guidance on reporting of supplementary information on LULUCF activities under Article 3.3 and 3.4
  - General information (e.g. definition of forest, elected activities)
  - Land-related information (e.g. spatial assessment unit used)
  - Activity-specific information (e.g. description of methodologies plus underlying assumptions)
  - other information (key category analysis)
  - Information relating to Article 6 (Project under Article 6)
- For further details: FCCC/SBSTA/2004/L.15/Add.1

Reporting requirements for Land Use Change and Forestry
Kyoto Protocol (3)

- By activity (afforestation and reforestation, deforestation; forest management; cropland management; grazing land management; grazing land management; revegetation)
- Change in carbon pool reported (above-ground biomass; below-ground biomass; litter; dead wood; soil)
- GHG sources reported (fertilization (N_2O); drainage of soils under forest management (N_2O); disturbance associated with land-use conversion to croplands (N_2O); liming (CO_2); biomass burning (CO_2, CH_4, N_2O))

IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry

- Overview
- Consistent Representation of Land Areas
- LUCF Sector Good Practice Guidance
- Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol
- Cross-Cutting Issues
- Glossary

- Further details: http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm

Factoring out

- Full resolution would require the ability to distinguish between direct management effects and background uptake due to CO2 and nitrogen fertilization, and the age structure of forests
- IPCC found that this is not likely to be feasible in the medium term at least.
- Solutions:
  - accept full accounting of carbon stocks, irrespective of whether the increases are due to mitigation effort
  - adopt an approximate approach to factoring out
  - decide not to include sinks at all

Integration: Vulnerability

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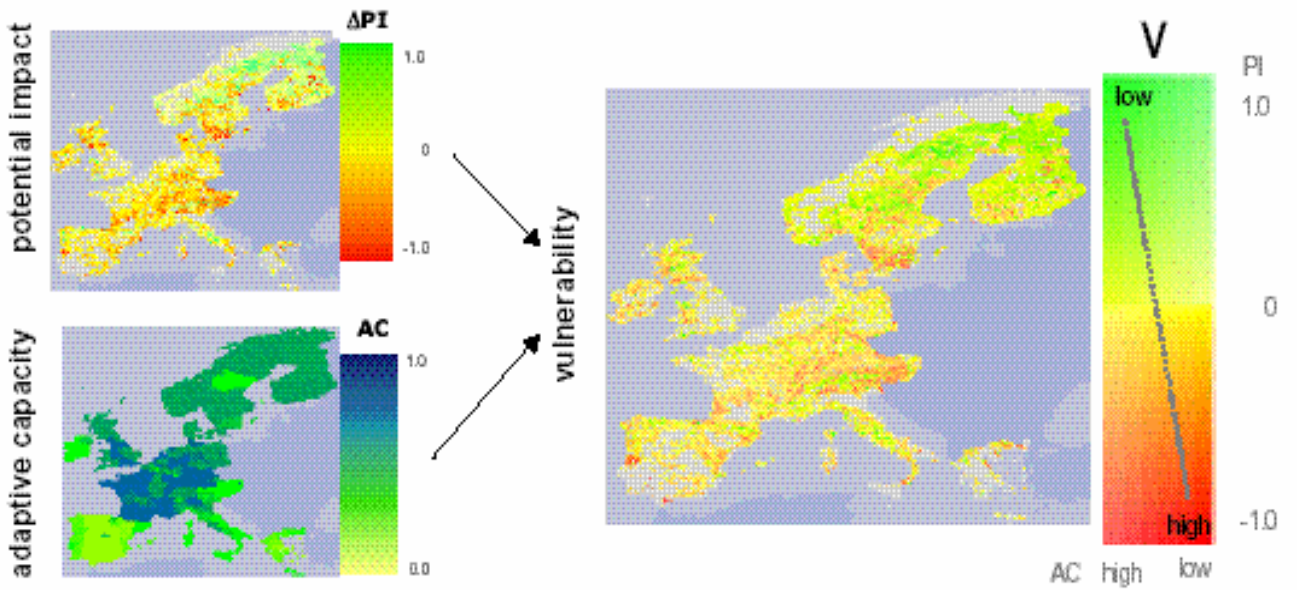
Visual overlay

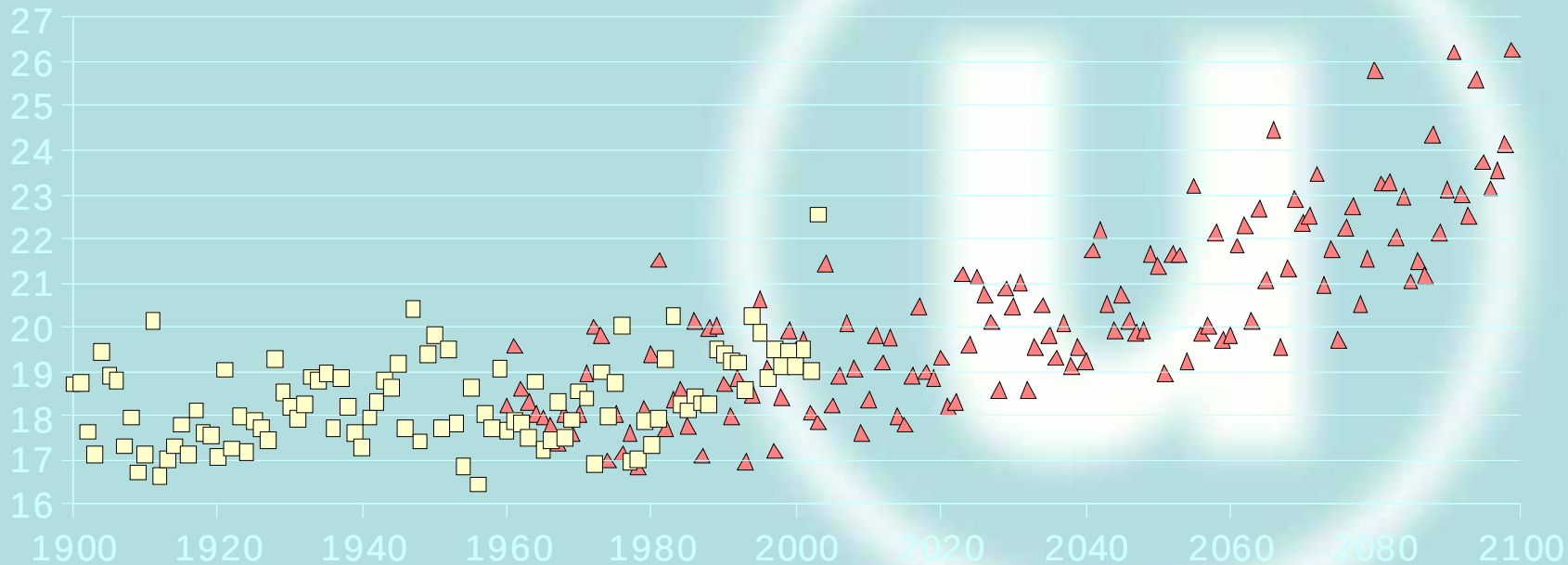
Forestry: wood production



V = f(PI, AC)

A relationship that is not specified beyond *high PI* and *low AC* → *high V*.

Vulnerability (2)
S.Planton - Meteo France (CNRM)



CO_2-Konzentration Mauná Loa