

Side Event UNFCCC COP15

Connecting Biodiversity and Climate Change

Key messages from the AHTEG report

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2010 International Year of Biodiversity

Biodiversity is life
Biodiversity is our life

Biodiversity and climate change are inextricably linked

- *Biodiversity and associated ecosystem services are impacted by climate change*
- *Biodiversity can help people adapt to climate change*
- *Biodiversity can help people mitigate climate change*



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Ecosystem services and climate change

- Climate change affects biodiversity, and changes in biodiversity and ecosystem functioning affect climate change.
 - The carbon and water cycles, two important large-scale processes for life on Earth, both depend on biodiversity — at genetic, species and ecosystem levels
- Climate change is/will be a dominant driver of biodiversity loss.
 - MA scenarios highlight the fundamental interdependence between climate change, energy, biodiversity, wetlands, desertification, food, health, trade and the economy
- Climate change is projected to further adversely affect key development challenges.
 - Including provision of clean water, energy services, and food; maintaining a healthy environment; and conserving ecological systems, their biodiversity, and associated ecological goods and services



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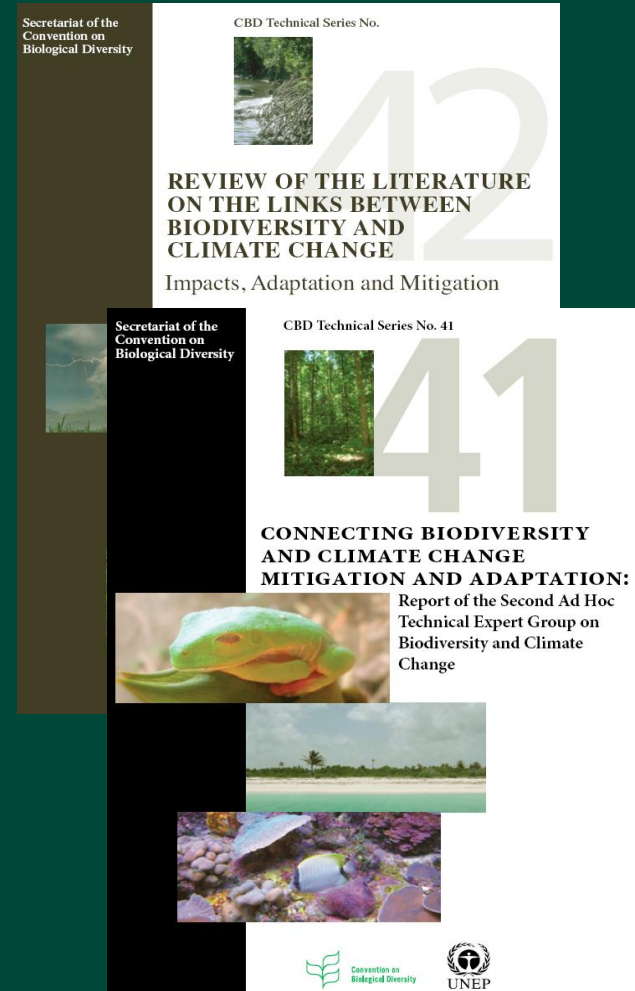
Linkages between Biodiversity and Climate Change

- A second AHTEG on Biodiversity and Climate Change convened in 2008 (decision IX/16) by the Conference of the Parties to the CBD.
 - It met twice since COP9 and produced two documents:

CBD Technical Series No. 41: ***Connecting Biodiversity and Climate Change Mitigation and Adaptation.*** AHTEG report

CBD Technical Series No. 42: ***Review of the Literature on the Links between Biodiversity and Climate Change: Impacts, Adaptation and Mitigation.*** A report produced by WCMC for AHTEG.

- The AHTEG report will be considered at SBSTTA 14 in May 2010.



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Climate change impacts are unavoidable

- Climate change impacts have already been observed.
- Climate change will exacerbate other pressures acting on natural systems, including land use change, invasive alien species and disturbance by fire.
- Climate change will have predominantly adverse impacts on many ecosystems and services essential for human well-being.
- Biodiversity is highly vulnerable to climate change;
 - an increasing number of ecosystems, including areas of high biodiversity, are likely to be further disrupted by a temperature rise of 2°C or more above pre-industrial levels.
 - roughly 10 per cent of species will face an increasingly high risk of extinction for every 1°C rise in global mean surface temperature (up to an increase of about 5°C).
 - Wetlands, mangroves, coral reefs, Arctic ecosystems and cloud forests are particularly vulnerable to climate change.
 - Without strong mitigation action, some cloud forests and coral reefs would may cease to function within a few decades.

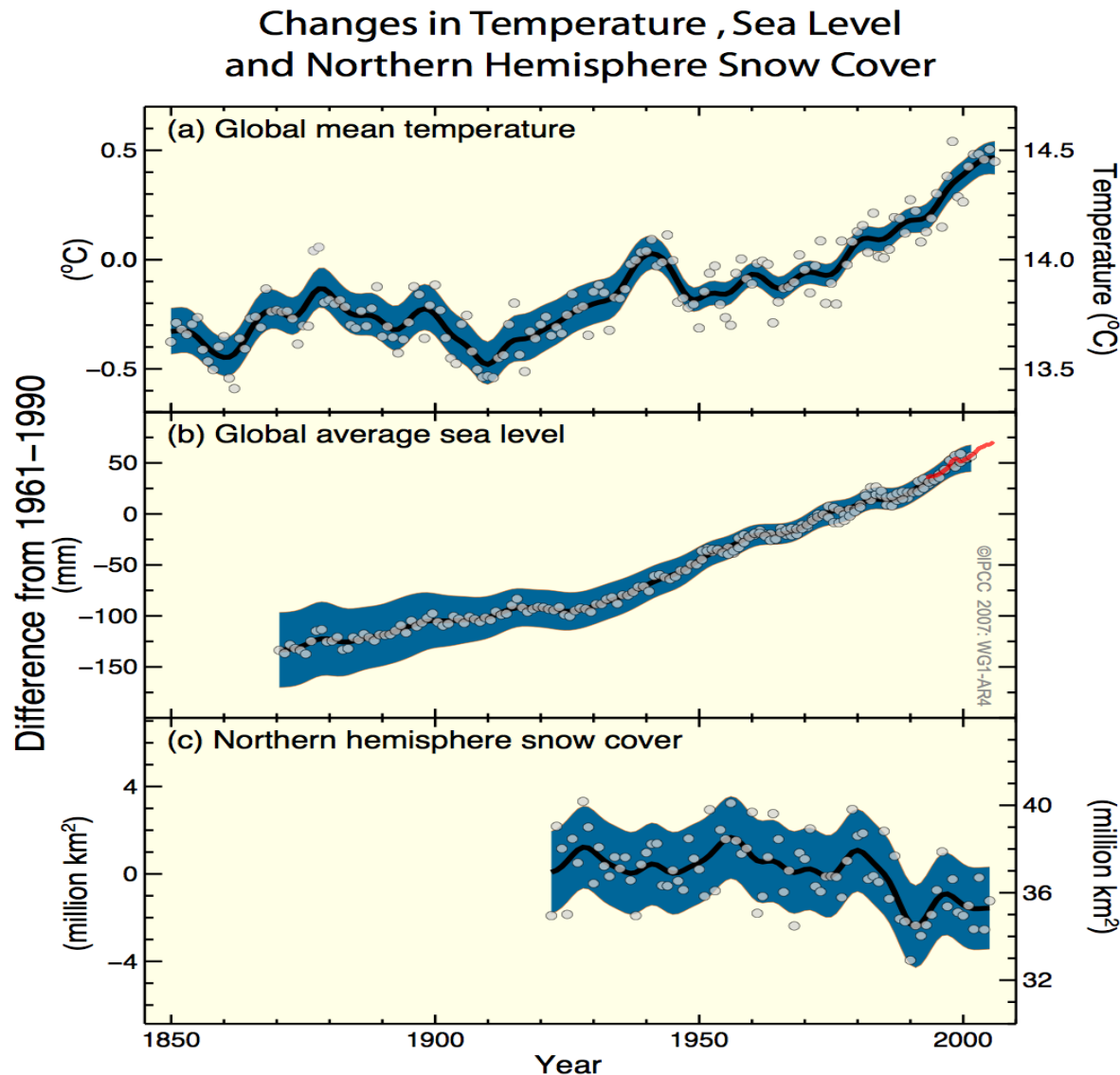


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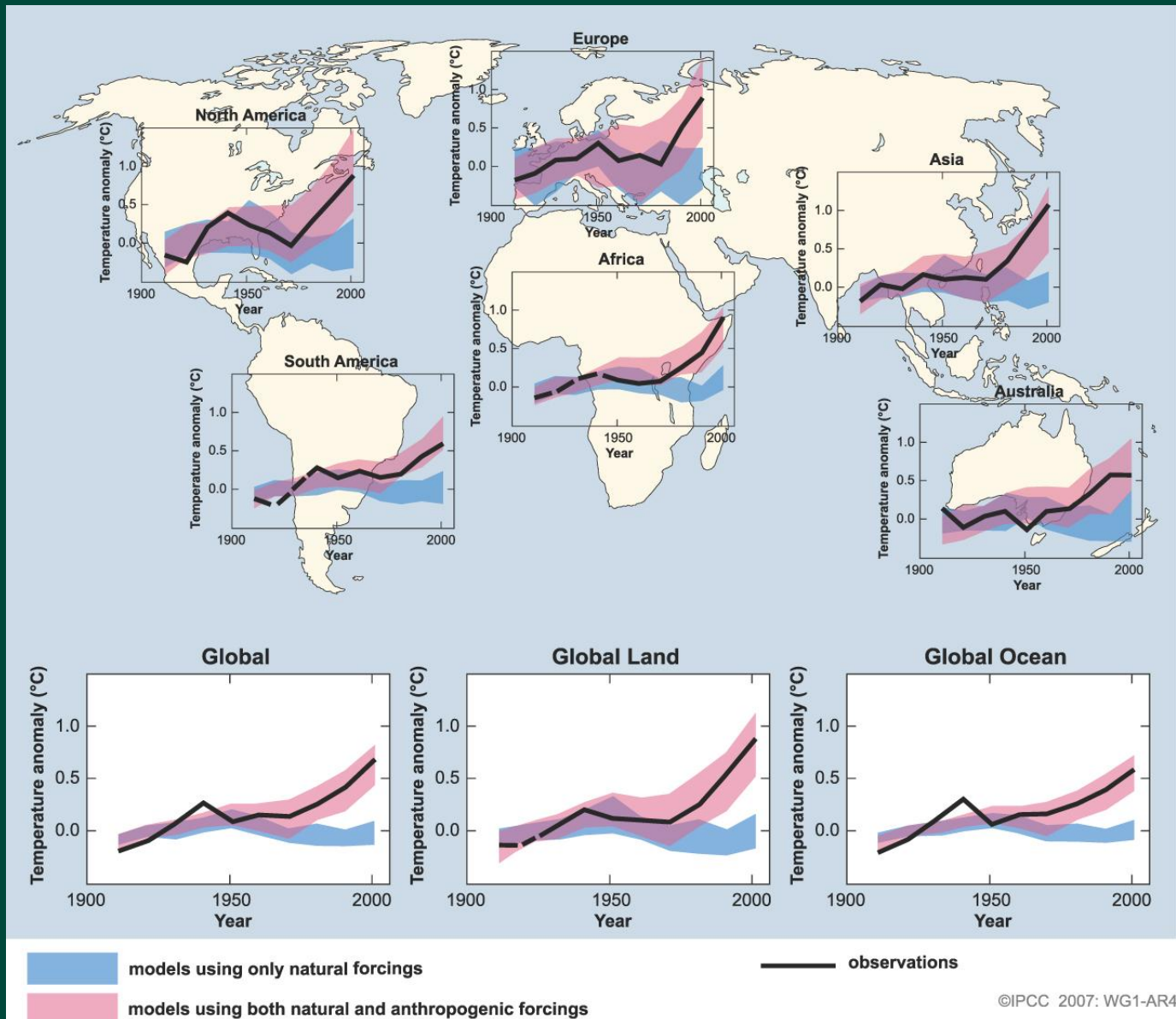
Climate change – unprecedented rates of change

IPCC 4th Assessment
Report 2007



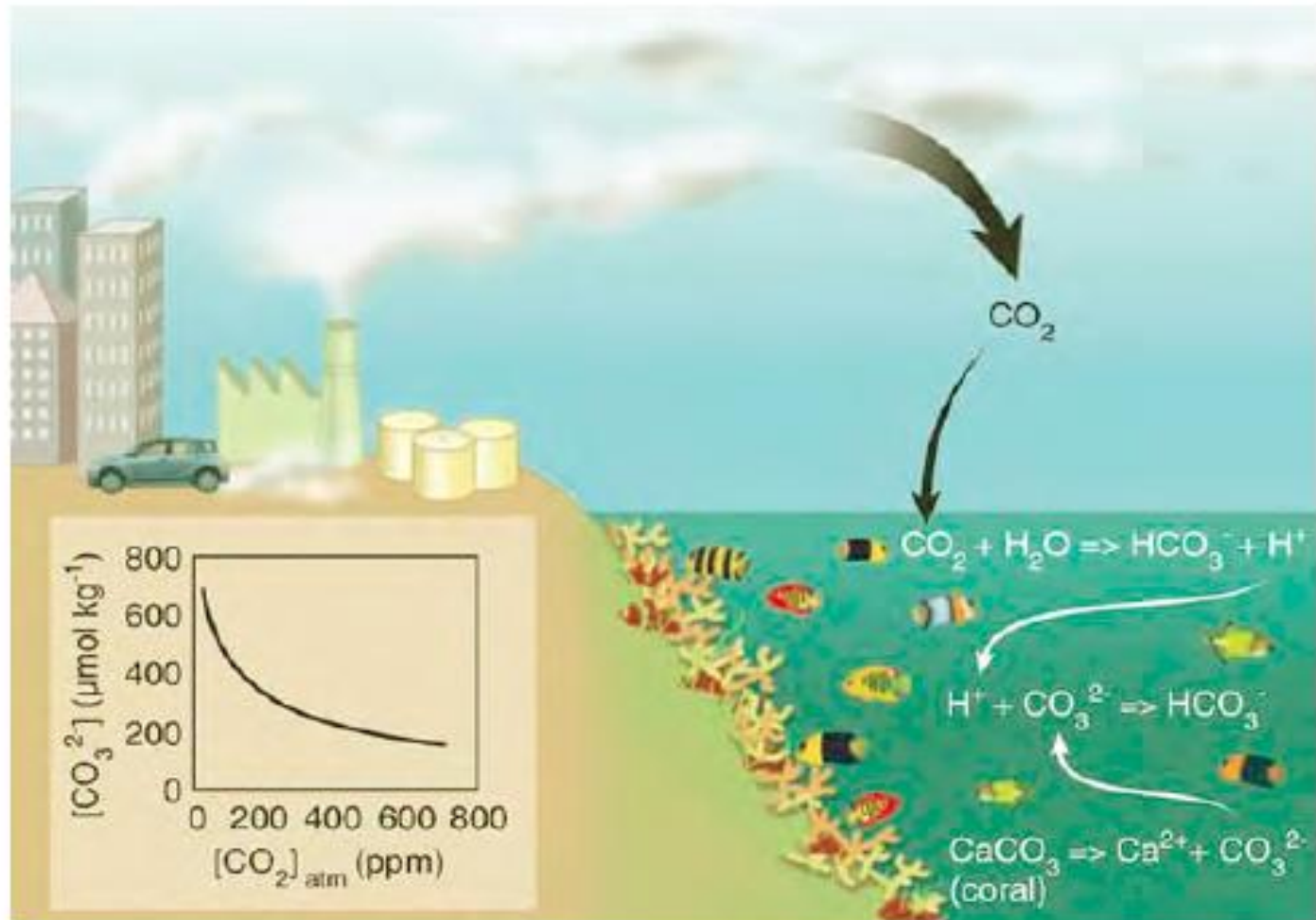
Global and continental temperature change

IPCC 4th Assessment Report 2007

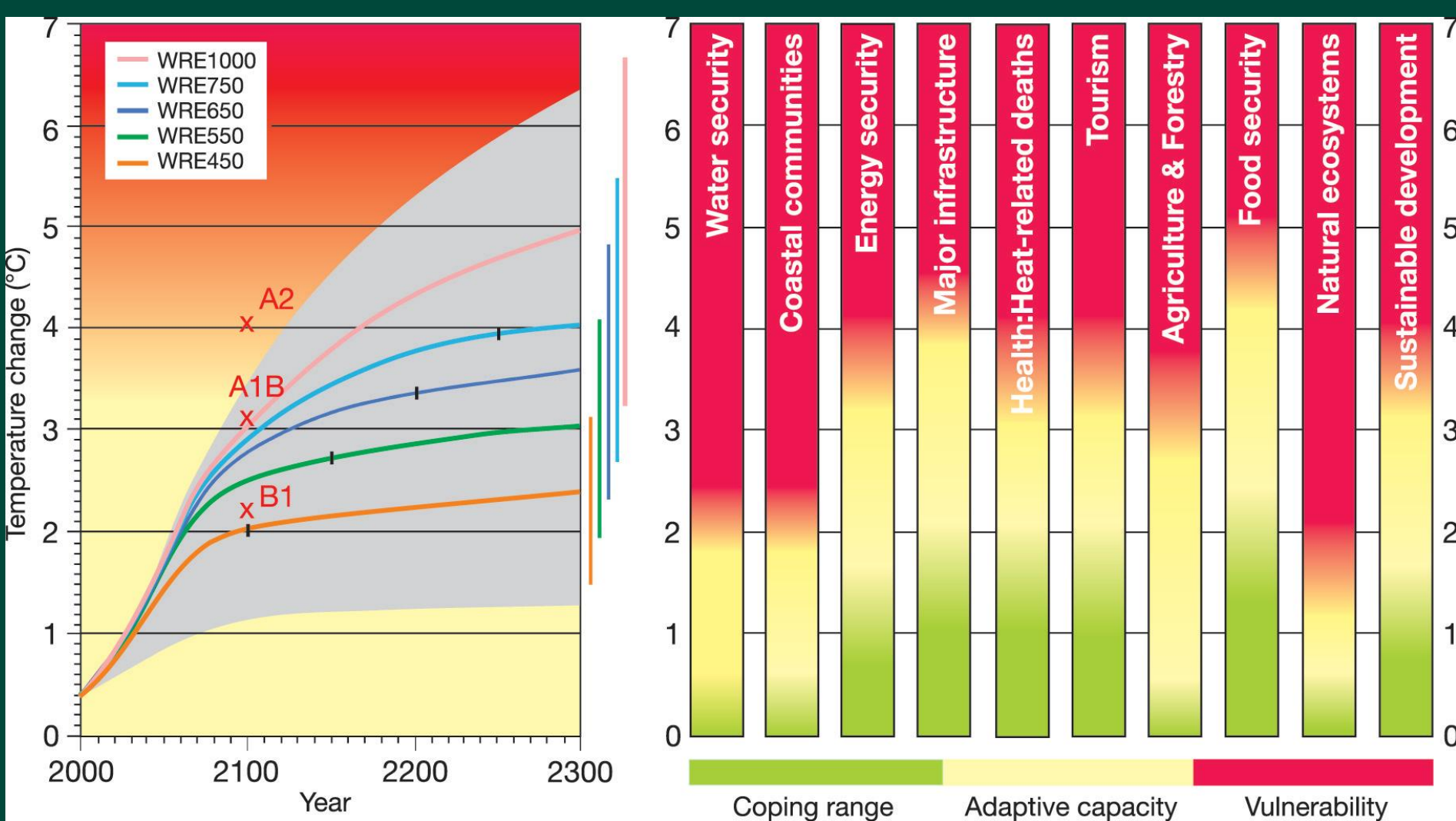


Ocean acidification

Figure 18. Linkages between the buildup of atmospheric CO_2 , the increase in ocean acidity and the decrease in carbonate ion concentration.



Approximately 25% of the CO_2 emitted by humans in the period 2000 to 2006 was taken up by the ocean where it combined with water to produce carbonic acid, which releases a proton that combines with a carbonate ion. This decreases the concentration of carbonate, making it unavailable to marine organisms that form calcium carbonate shells. (Source: Hoegh-Guldberg et al. 2007)



Vulnerability to climate change for key sectors in the Australia and New Zealand region

(Fig 11.4, WG II, IPCC 2007; see also Australia's Biodiversity and Climate Change - <http://www.climatechange.gov.au/publications/biodiversity/~media/publications/biodiversity/biodiversity-summary-policy-makers.ashx>).

Ecosystem-based Adaptation

using biodiversity and ecosystems services in overall strategy to help people adapt to the adverse effects of climate change

- integrating biodiversity and provision of ecosystem services in adaptation is cost-effective, can generate social, economic and cultural co-benefits and help maintain resilient ecosystems.
 - includes the sustainable management, conservation and restoration of ecosystems to provide services that help people adapt to climate change.
 - many countries (e.g. South Africa and the Maldives) recognise role of biodiversity conservation in national climate change adaptation plans.
- potential benefits for indigenous peoples and local communities; will likely become an important component of societal adaptation to impacts of climate change.
- important that adaptation decisions are subject to risk assessment, scenario planning and adaptive management approaches to recognise and incorporate trade-offs e.g. using wetlands for coastal protection at the expense of wildlife values and recreation



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Ecosystem-based Adaptation

- Many ecosystem-based activities can be designed and implemented to enhance the conservation and management of biodiversity and longer term provision of key ecosystem services.
- Examples of ecosystem-based adaptation activities include:
 - Coastal defence through the maintenance and/or restoration of mangroves and other coastal wetlands to reduce coastal flooding and coastal erosion.
 - Sustainable management of upland wetlands and floodplains for maintenance of water flow and quality.
 - Conservation and restoration of forests to stabilize land slopes and regulate water flows.
 - Establishment of diverse agroforestry systems to cope with increased risk from changed climatic conditions.
 - Conservation of agrobiodiversity to provide specific gene pools for crop and livestock adaptation to climate change.



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Ecosystem-based approaches to climate change

- Key elements of ecosystem-based approaches to managing climate change include:
 - Focussing on relationships and processes within ecosystems (i.e. resilience);
 - Enhancing benefit-sharing;
 - Using adaptive management practices;
 - Carrying out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate; and
 - Ensuring inter-sectoral cooperation.
- Applies for
 - sectoral adaptation measures of sectors
 - sectoral mitigation activities targeted at enhancing carbon stocks in terrestrial ecosystems



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Co-benefits of ecosystem-based climate change responses (pp. 43-44, TS41)

Activity	Adaptive Function	Social and cultural	Economic	Biodiversity <small>(linked to carbon, water, climate services)</small>	Mitigation
<i>Mangrove conservation</i>	Protection against storm surges, coastal erosion associated with sea level rise etc.	Fisheries and prawn cultivation – local employment and food security	Income generated through mangrove products	Conservation of mangrove-dependent species	Conservation of carbon stocks (above and below ground)
<i>Forest conservation and sustainable forest management</i>	Maintenance of nutrient and water flow, prevention of land slides	Recreation, culture, shelter	Ecotourism, recreation, sustainable logging	Conservation of habitat for forest-dependent species	Carbon storage
<i>Restoration of degraded wetlands</i>	Maintenance of nutrient and water flow, quality, storage and capacity Protection from flood or storm, inundation	Sustained provision of livelihood, recreation, employment opportunities	Increased livelihood generation, revenue from recreational activities, sustainable use, sustainable logging of pl trees	Conservation of wetland flora, fauna breeding and feeding habitat, including stopover sites for migratory species	Reduced emissions from carbon mineralisation
<i>Diverse agroforestry in agricultural land</i>	Diversification of agricultural production to cope with changed climate	Contribution to food and fuel wood security	Generation of income from sale of timber, firewood, etc.	Conservation of biodiversity in agricultural landscape	Carbon storage (above and below ground biomass)
<i>Conservation of agrobiodiversity</i>	Provision of specific gene pools for crops and livestock adaptation to climate variability	Enhance food security, diversification of food products, conservation of local, traditional knowledge and practices	Income generation in difficult environments Pollination of cultivated crops by bees	Conservation of genetic diversity of crops and livestock	
<i>Conservation of medicinal plants</i>	Availability of local medicines to deal with health problems resulting from climate change or habitat degradation	Local communities have reliable local supply of medicines, conservation of local, traditional knowledge	Source of income for local people	Enhanced medicinal plant conservation (genetic diversity)	Bee and insect pollination for cultivated crops
<i>Sustainable management of grassland</i>	Protection against flood, storage of nutrients, maintains soil structure	Recreation and tourism	Income for local communities e.g. grass products	Forage for grazing animals, diverse habitat for animals	Carbon storage

Ecosystem based mitigation

- A portfolio of land use management activities can contribute to the objectives of the UNFCCC, UNCCD and CBD. Activities including:
 - protection of natural forest and peatland carbon stocks,
 - sustainable management of forests,
 - use of native assemblages of forest species in reforestation activities,
 - sustainable wetland management and restoration of degraded wetlands; and
 - sustainable agricultural practices
- Activities play an important role in limiting increases in atmospheric greenhouse gas concentrations and human-induced climate change, in addition to stringent reductions in fossil fuel emissions of greenhouse gases.



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REDD

Activities to reduce emissions from deforestation and forest degradation (REDD-plus)

- potential to deliver significant co-benefits for forest biodiversity if mechanisms are designed appropriately.
- This means:
 - recognizing the contribution of diverse forests, in particular primary forests, to long-term carbon sequestration/storage;
 - respecting the rights of indigenous and local communities;
 - addressing important forest governance issues such as illegal logging and land tenure.



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REDD

- REDD activities should take biodiversity into consideration to help maintain forest ecosystem resilience and thus the long-term stability of the carbon pool.
 - Primary forests - generally more carbon-dense and biologically diverse than other forest ecosystems, including modified natural forests or plantations.
 - In modified natural forests, resilience and biodiversity can be enhanced by addressing underlying drivers of deforestation/degradation and improving the sustainable management of forests.
- Effectively managing and expanding protected areas and networks protects biodiversity and enhances carbon storage as part of a broader landscape approach.
- Sustainable land management is an important goal for the CBD, the UNCCD and the UNFCCC.



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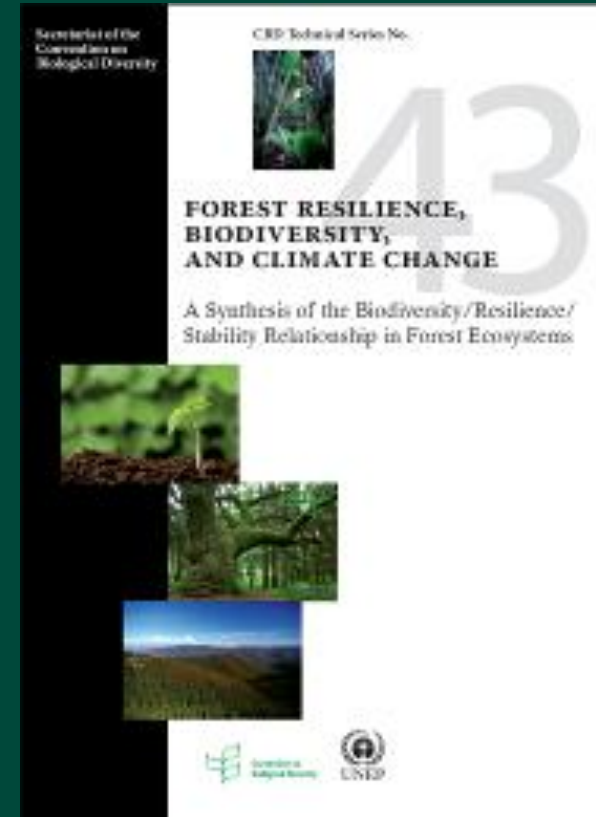


Forest Resilience, Biodiversity and Climate Change

- Synthesis of 400+ peer-reviewed articles:

Forest resilience and stability depend on biodiversity, at multiple scales

- Implications e.g. for REDD permanence: biodiversity more than ‘co-benefit’



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Impacts of climate change response measures - mitigation

- need to be aware of potential for adverse impacts of climate change response measures (eg. geo-engineering, renewable energy) on biodiversity/ecosystem services, depending on design and implementation.
- For example:
 - CBD COP 9 called for precautionary approach to be applied to ocean fertilization activities given uncertainty over its impacts on marine biodiversity and associated ecosystem services.
 - the UK Royal Society found that this technique had not been proved to be effective and had high potential for unintended and undesirable ecological side effects
 - Without appropriate consideration of the implications for marine ecosystems of responses to climate change, may put at risk important services provided, for example, by coral reefs worldwide which have been estimated to have an average annual value of \$172 billion^[1],

^[1] TEEB analysis

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Impacts of climate change response measures - adaptation

- Sectoral adaptation can have both positive and negative consequences for biodiversity and ecosystem services, depending on the way in which such strategies are implemented, for example:
 - Increasing the diversity of landscapes and interconnecting agro-ecosystems, natural floodplains, forests and other ecosystems can contribute to the climate resilience of both human communities and biodiversity and ecosystem services.
 - Hard infrastructure in coastal areas (e.g. sea walls, dykes, etc.) can often adversely impact natural ecosystem processes by altering tidal current flows, disrupting or disconnecting ecologically related coastal marine communities, and disturbing sediment or nutrition flows.
- Tools to identify opportunities to increase positive and reduce negative impacts of adaptation on biodiversity include strategic environmental assessments (SEA), environmental impact assessments (EIA), and technology impact assessments that facilitate the consideration of all adaptation (and mitigation) options.



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Impacts of climate change response measures - adaptation

- The planning and implementation of effective adaptation activities that take into account impacts on biodiversity, can benefit from:
 - Considering traditional knowledge, including the full involvement of indigenous peoples and local communities.
 - Defining measurable outcomes that are monitored and evaluated.
 - Building on a scientifically credible knowledge base.
 - Applying the ecosystem approach.
- To optimize effectiveness and generate biodiversity co-benefits, adaptation activities should:
 - Maintain intact and interconnected ecosystems to increase resilience and allow biodiversity and people to adjust to changing environmental conditions.
 - Restore or rehabilitate fragmented or degraded ecosystems, and re-establish critical processes such as water flow to maintain ecosystem functions.
 - Ensure the sustainable use of renewable natural resources.
 - Collect, conserve and disseminate traditional and local knowledge, innovations and practices related to biodiversity conservation and sustainable use with prior and informed consent from traditional knowledge holders.



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Valuation and incentive measures

- ensure that economic and non-economic values of biodiversity and ecosystem services are taken into account when planning and undertaking climate change related activities.
- incentives should be carefully designed to consider cultural, social, economic and biophysical factors while avoiding market distortions



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CBD Reports and REDD&Biodiversity Newsletter

- Ad Hoc Technical Expert Group report “**Connecting Biodiversity and Climate Change**”, October 2009 (TS 41)
- **Review of the Literature on the Links between Biodiversity and Climate Change – Impacts, Adaptation and Mitigation** Oct 2009 (TS 42)
- **Forest Resilience, Biodiversity, and Climate Change**, October 2009 (TS 43)
- **Scientific Synthesis of the Impacts of Ocean Acidification on Marine Biodiversity** (TS 46)
- **REDD & Biodiversity e-Newsletter**: dissemination of good practice examples; news; announcements by SCBD and partners

available at www.cbd.int/copenhagen



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Panel Discussion

The Earth Negotiations Bulletin Summary is
at

<http://www.iisd.ca/climate/cop15/enbots/11dece.html>



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