

IPCC FOURTH ASSESSMENT

CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY



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Intergovernmental Panel on Climate Change Working Group II



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THE PROCESS

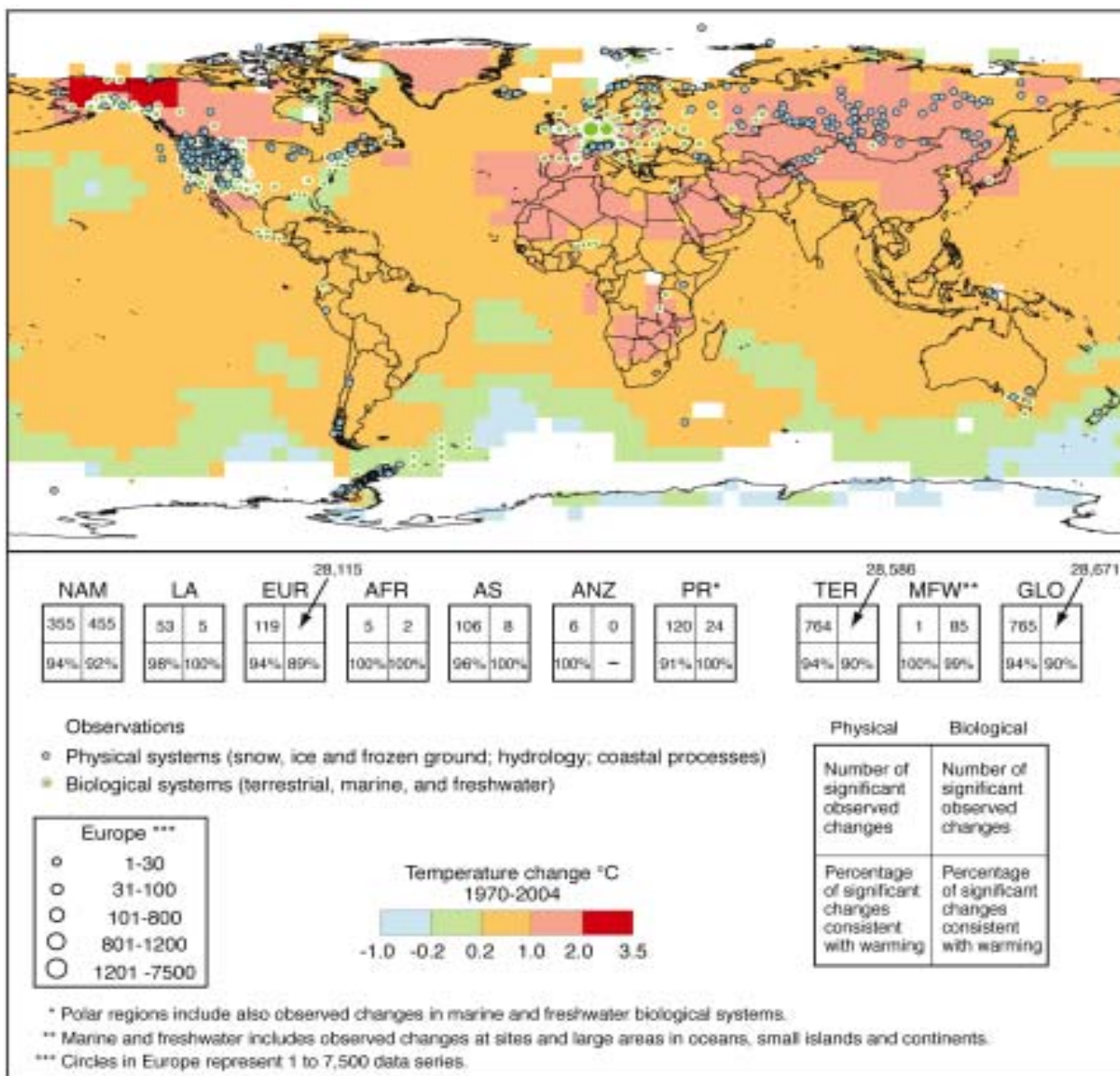
- 394 Authors
- 45 Review Editors
- 4 Review Cycles
- 1,183 Expert Reviewers
- 49,610 Review Comments
- Five year process 2003 – 2007
- Approved in Brussels, 6th April 2007

MAIN FINDINGS

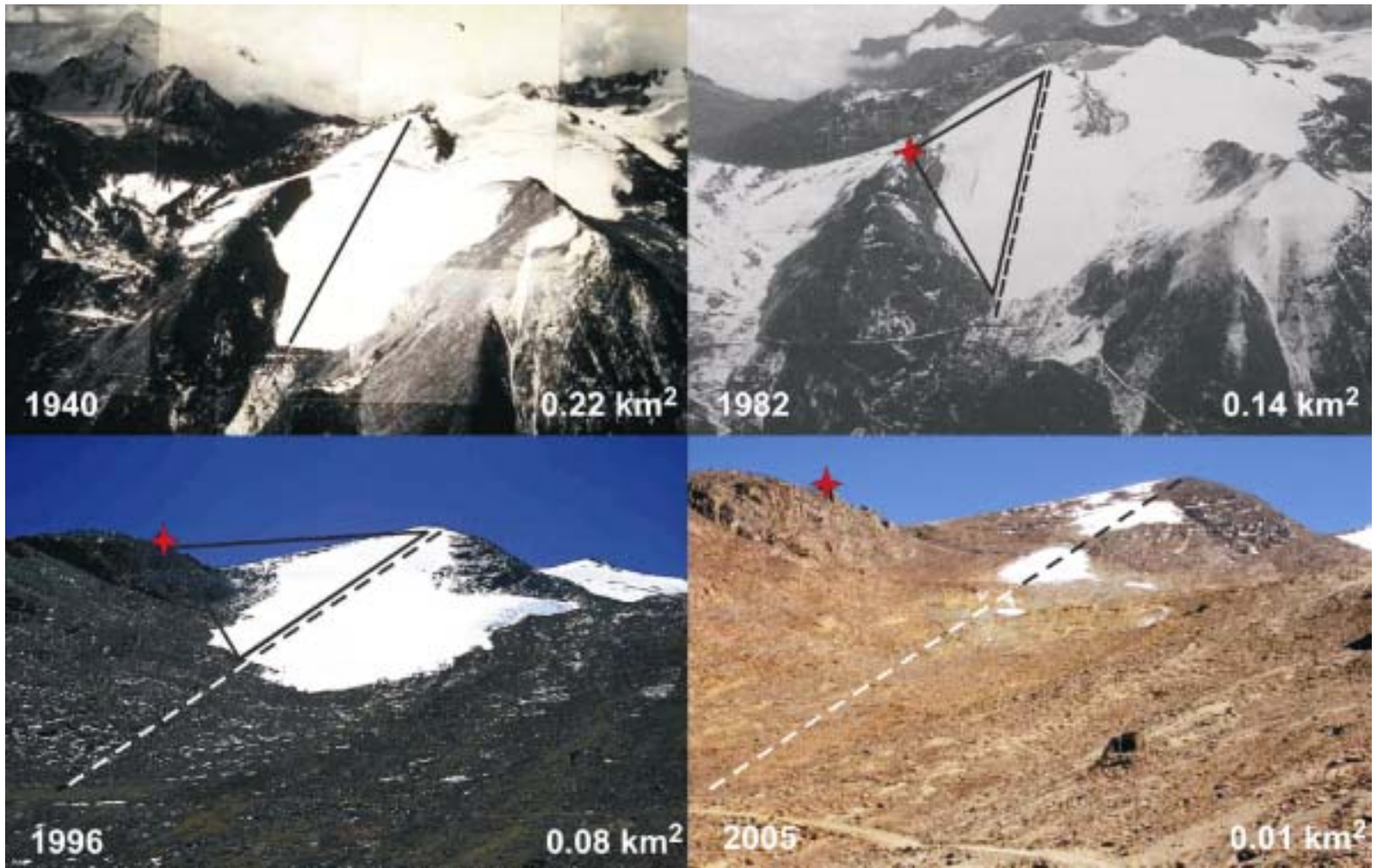
- Impacts are occurring now as a consequence of climate change
- Future possible impacts have been identified

OBSERVED IMPACTS OF CLIMATE CHANGE

- We can now detect the global effects of anthropogenic warming
 - Second Assessment 1995: detected the anthropogenic influence on climate change
 - Third Assessment 2001: detected the regional effects of anthropogenic warming
 - Fourth Assessment 2007: detected the global effects of anthropogenic warming



Changes in physical and biological systems and surface temperature 1970-2004



Areal extent of Chacaltaya Glacier, Bolivia, from 1940 to 2005

FUTURE IMPACTS OF CLIMATE CHANGE

Six Sectors: Freshwater Resources and their Management; Ecosystems, their Properties, Goods, and Services; Food, Fibre, and Forest Products; Coastal Systems and Low-lying Areas; Industry, Settlement and Society; Human Health

Eight Regions: Africa, Asia, Australia and New Zealand, Europe, Latin America, North America, Polar Regions, Small Islands

SECTORS

Water: Water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.

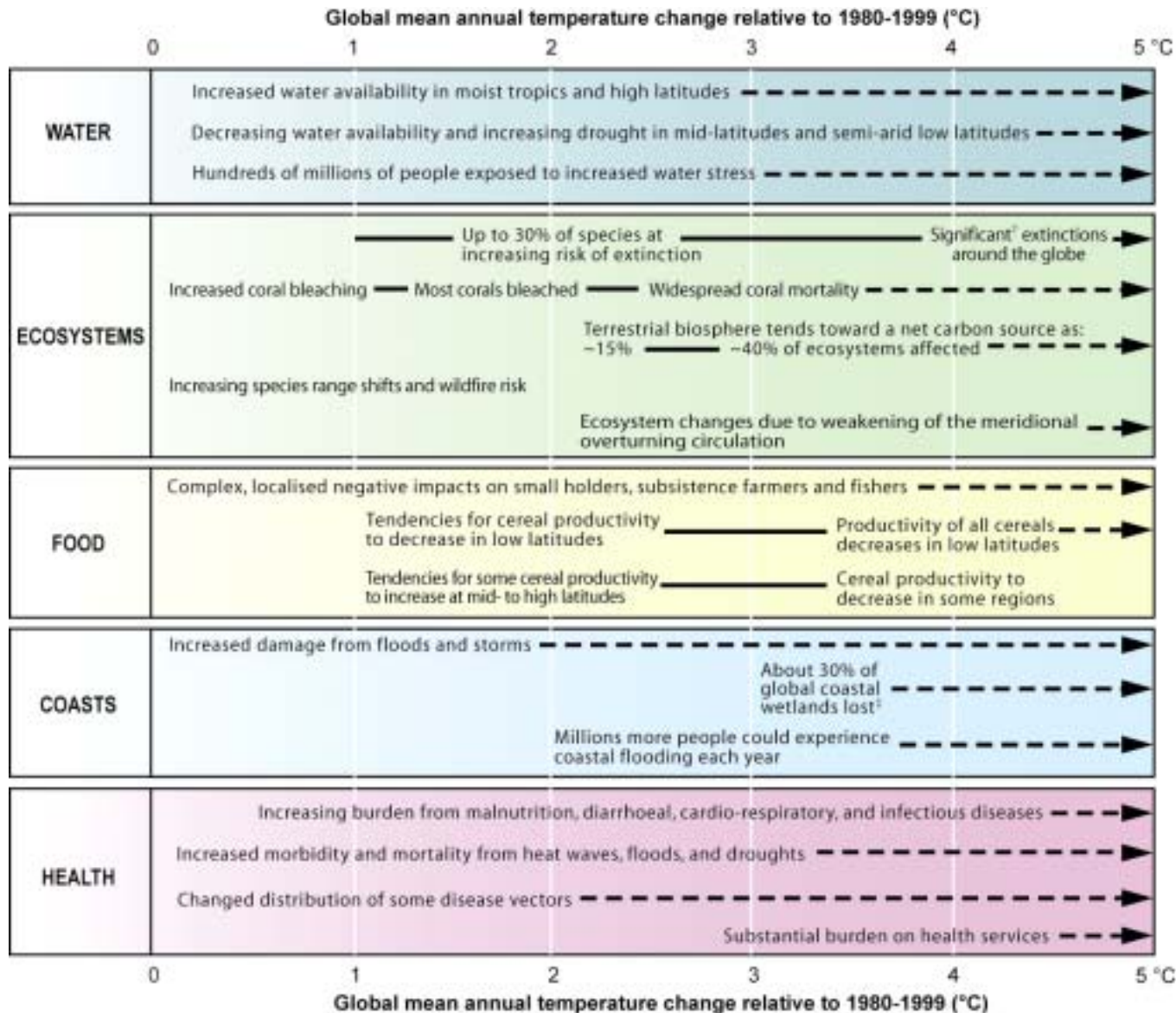
Ecosystems: ~20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

Food: At lower latitudes, crop productivity is projected to decrease for even small local temperature increases (1-2° C). At higher latitudes crop productivity is projected to increase for temperature increases of 1-3° C, then decrease beyond that.

Coasts: Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s.

Industry, Settlement and Society: The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Human Health: Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity.



¹ Significant is defined here as more than 40%.

² Based on average rate of sea level rise of 4.2 mm/year from 2000 to 2080.

REGIONS

Africa: By 2020, between 75 and 250 million people are projected to be exposed to an increase of water stress due to climate change.

Asia: Projected crop yields could increase up to 20% in E and SE Asia while they could decrease up to 30% in C and S Asia by the mid-21st century.

Australia and New Zealand: Significant biodiversity loss is projected to occur by 2020 in some ecologically-rich sites including the Great Barrier Reef and Queensland Wet Tropics.

Europe: Initially, climate change is projected to bring benefits to Northern Europe (reduced energy demand for heating, crop and forest growth increases) whilst Southern Europe is expected to experience increased heat waves, wildfires and reduced crop productivity.

Latin America: By mid-century, climate change is projected to lead to the gradual replacement of tropical forest by savanna in eastern Amazonia.

North America: Cities currently experiencing heat waves will experience many more in the future with adverse health impacts.

Polar Regions: Climate change is projected to impact natural ecosystems with detrimental effects on many organisms including migratory birds, mammals and higher predators.

Small Islands: Deterioration in coastal conditions e.g., through beach erosion and coral bleaching is expected to affect local resources e.g., fisheries and tourism.



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- Coral reef and mangroves seriously threatened with warmer SST
 - Under the worst SLR scenario, mangroves are very likely to disappear in low-lying coastlines
 - *Amazonia*: loss of 43% of 69 tree species by the end of 21st century; savannisation of eastern part.
 - *Cerrados*: Losses of 24% of 138 tree species for a temperature increase of 2°C
 - Reduction of suitable lands for coffee
 - Increases in aridity and scarcity of water resources
 - Sharp increase in extinction of: mammals, birds, butterflies, frogs, and reptile by 2050.
 - Water availability and hydro-electric generation seriously reduced due to reduction in glaciers
 - Ozone depletion and skin cancer
 - Severe land degradation and desertification
 - Rio de la Plata coasts threatened by increasing storm surges and sea level
 - Increased vulnerability to extreme events
- Areas in red correspond to sites where biodiversity is yet severely threatened and this trend is very likely to continue in the future.

Key hotspots in Latin America

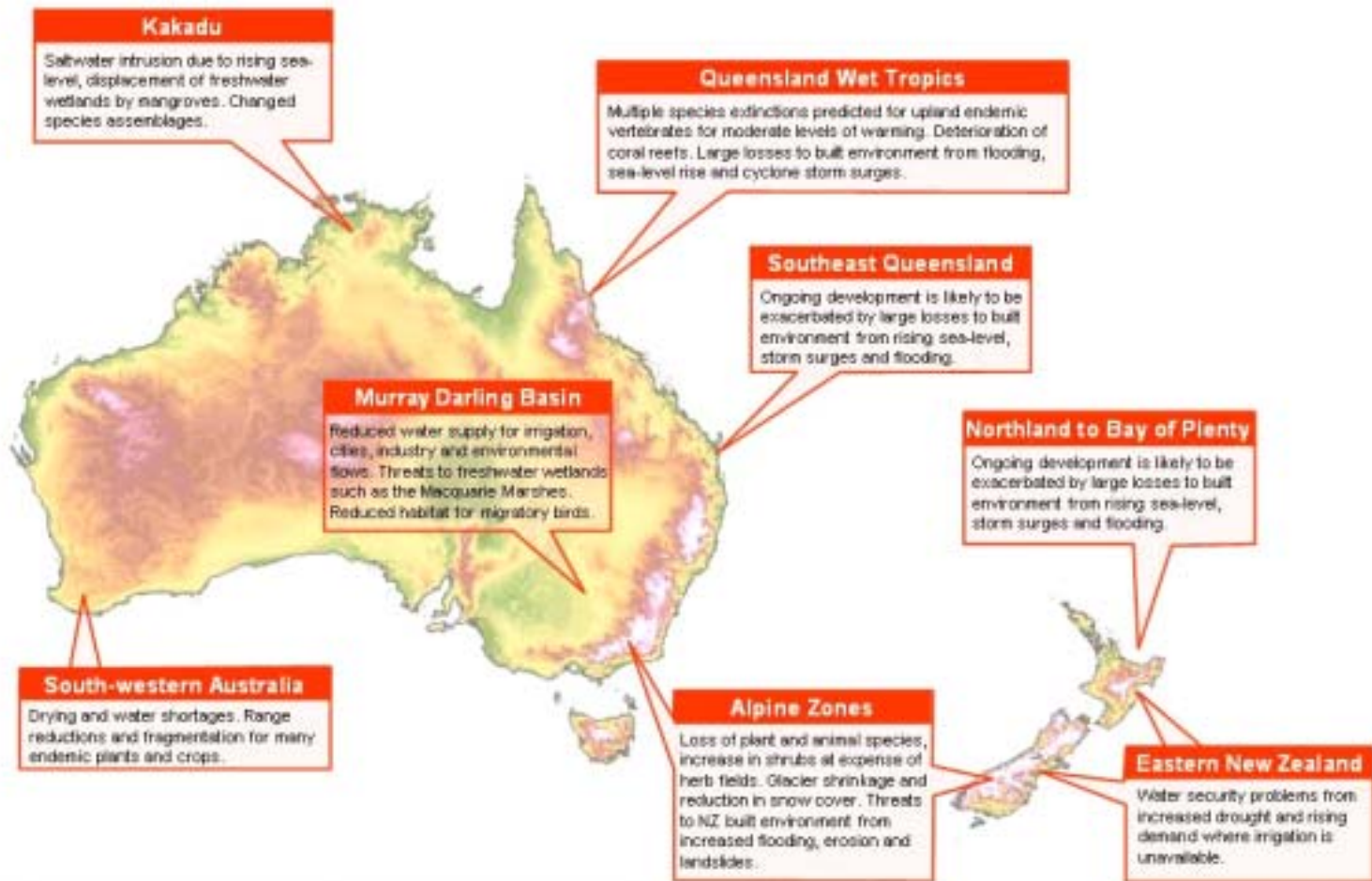


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Key hotspots identified for Australia and New Zealand, assuming a medium emissions scenario for 2050

CONCLUSIONS

Some systems, sectors and regions are likely to be especially affected by climate change

The most vulnerable sectors are:

- Some ecosystems
 - Terrestrial: tundra, boreal forest, mountain, mediterranean-type ecosystems;
 - Along coasts: mangroves and salt marshes; and
 - In oceans: coral reefs and the sea ice biome.
- Low-lying coastal regions due to the threat of sea-level rise and increased occurrence of extreme weather events.
- Water resources in mid-latitudes and the dry tropics due to decreases in rainfall and higher rates of evapotranspiration.
- Agriculture in low-latitude regions due to reduced water availability.
- Human health in areas with low adaptive capacity

CONCLUSIONS

The most vulnerable regions are:

- The Arctic, because of the impacts of high rates of projected warming on natural systems.
- Africa, especially the sub-Saharan region, because of current low adaptive capacity.
- Small islands, due to high exposure of population and infrastructure to sea-level rise and increased storm surge.
- Asian megadeltas, such as the Ganges-Brahmaputra and the Zhujiang, due to large populations and high exposure to sea-level rise, storm surge and river flooding.

In all regions, there are certain areas, sectors and communities which are particularly vulnerable, for example the poor, young children and the elderly.