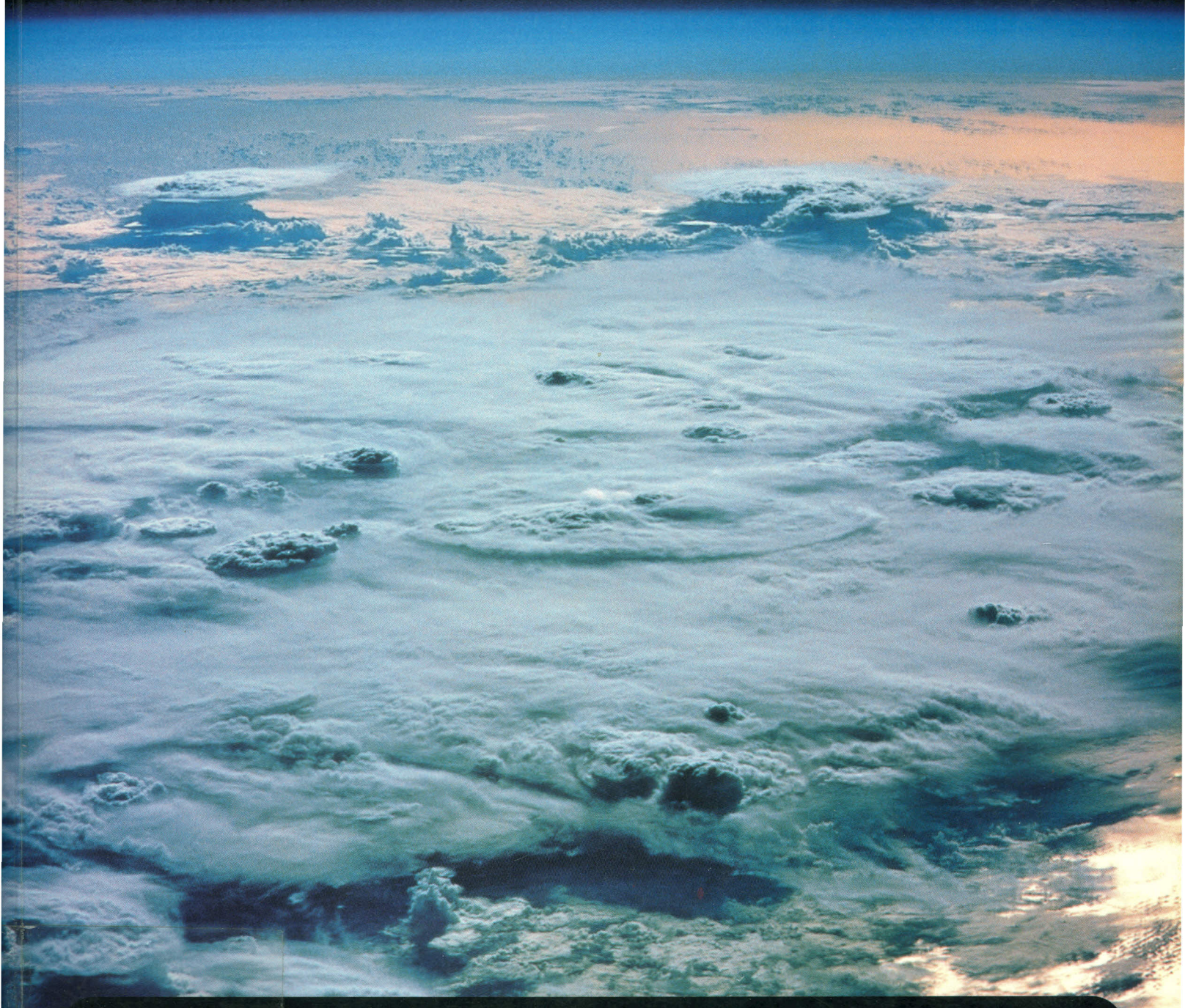
CLIMATE CHANGE 2001

The Scientific Basis



Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change

WMO

UNEP

Climate Change 2001:
The Scientific Basis

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Contribution of Working Group I to the Third Assessment Report
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Source Information: Summary for Policymakers

This appendix provides the cross-reference of the topics in the Summary for Policymakers (page and bullet point topic) to the sections of the chapters of the full report that contain expanded information about the topic.

An increasing body of observations gives a collective picture of a warming world and other changes in the climate system.

SPM Page	Cross-Reference: SPM Topic – Chapter Section
2	*The global average surface temperature has increased over the 20th century by about 0.6°C.* ● Chapter 2.2.2 ● Chapter 2.2.2 ● Chapter 2.3 ● Chapter 2.2.2
4	*Temperatures have risen during the past four decades in the lowest 8 kilometres of the atmosphere.* ● Chapter 2.2.3 and 2.2.4 ● Chapter 2.2.3 and 2.2.4 ● Chapter 2.2.3, 2.2.4 and Chapter 12.3.2
4	*Snow cover and ice extent have decreased.* All three bullet points: Chapter 2.2.5 and 2.2.6
4	*Global average sea level has risen and ocean heat content has increased.* ● Chapter 11.3.2 ● Chapter 2.2.2 and Chapter 11.2.1
4 – 5	*Changes have also occurred in other important aspects of climate.* ● Chapter 2.5.2 ● Chapter 2.7.2 ● Chapter 2.2.2 and 2.5.5 ● Chapter 2.7.2 ● Chapter 2.6.2 and 2.6.3 ● Chapter 2.7.3 ● Chapter 2.7.3
5	*Some important aspects of climate appear not to have changed.* ● Chapter 2.2.2 ● Chapter 2.2.5 ● Chapter 2.7.3 ● Chapter 2.7.3

Emissions of greenhouse gases and aerosols due to human activities continue to alter the atmosphere in ways that are expected to affect the climate system.

SPM Page	Cross-Reference: SPM Topic – Chapter Section
5	Chapeau: "Changes in climate occur …" Chapter 1, Chapter 3.1, Chapter 4.1, Chapter 5.1, Chapter 6.1, 6.2, 6.9, 6.11 and 6.13
7	*Concentrations of atmospheric greenhouse gases and their radiative forcing have continued to increase as a result of human activities.*
	Carbon dioxide: ● Chapter 3.3.1, 3.3.2, 3.3.3 and 3.5.1 ● Chapter 3.5.1 ● Chapter 3.2.2, 3.2.3, 3.5.1 and Table 3.1 ● Chapter 3.5.1 and 3.5.2
	Methane: ● Chapter 4.2.1
	Nitrous oxide: ● Chapter 4.2.1
	Halocarbons: ● Chapter 4.2.2
	Radiative forcing of well-mixed gases: ● Chapter 4.2.1 and Chapter 6.3
	Stratospheric ozone: ● Chapter 4.2.2 and Chapter 6.4
	Tropospheric ozone: ● Chapter 4.2.4 and Chapter 6.5
9	*Anthropogenic aerosols are short-lived and mostly produce negative radiative forcing.* ● Chapter 5.2 and 5.5.4 ● Chapter 5.1, 5.2 and Chapter 6.7 ● Chapter 5.3.2, 5.4.3 and Chapter 6.8
9	*Natural factors have made small contributions to radiative forcing over the past century.* ● Chapter 6.11 and 6.15.1 ● Chapter 6.9 and 6.15.1 ● Chapter 6.15.1

Confidence in the ability of models to project future climate has increased.

SPM Page	Cross-Reference: SPM Topic – Chapter Section
9	Chapeau: "Complex physically-based …" Chapter 8.3.2, 8.5.1, 8.6.1, 8.10.3 and Chapter 12.3.2
9	● Chapter 7.2.1, 7.5.2 and 7.6.1 ● Chapter 8.4.2 ● Chapter 8.6.3 and Chapter 12.3.2 ● Chapter 8.5.5, 8.7.1 and 8.7.5

There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.

SPM Page	Cross-Reference: SPM Topic – Chapter Section
10	Chapeau: "The SAR concluded: The balance of evidence suggests …" Chapter 12.1.2 and 12.6
10	● Chapter 12.2.2, 12.4.3 and 12.6 ● Chapter 12.4.1, 12.4.2, 12.4.3 and 12.6 ● Chapter 12.2.3, 12.4.1, 12.4.2, 12.4.3 and 12.6 ● Chapter 12.4.3 and 12.6. ● Chapter 12.6 ● Chapter 12.4.3 ● Chapter 12.4.3 and 12.6
10	"In the light of new evidence and taking into account the …" Chapter 12.4 and 12.6
10	"Furthermore, it is very likely that the 20th century warming has …" Chapter 11.4

Human influences will continue to change atmospheric composition throughout the 21st century.

SPM Page	Cross-Reference: SPM Topic – Chapter Section
12	Chapeau: "Models have been used to make projections …" Chapter 4.4.5 and Appendix II
12	*Greenhouse gases* ● Chapter 3.7.3 and Appendix II ● Chapter 3.7.1, 3.7.2, 3.7.3 and Appendix II ● Chapter 3.7.3 and Appendix II ● Chapter 3.2.2 and Appendix II ● Chapter 4.4.5, 4.5, 4.6 and Appendix II ● Chapter 3.7.3
12	*Aerosols* ● Chapter 5.5.2, 5.5.3 and Appendix II
12	*Radiative forcing over the 21st century* ● Chapter 6.15.2 and Appendix II

Global average temperature and sea level are projected to rise under all IPCC SRES scenarios.

SPM Page	Cross-Reference: SPM Topic – Chapter Section
13	*Temperature* ● Chapter 9.3.3 ● Chapter 9.3.3 ● Chapter 2.2.2, 2.3.2 and 2.4 ● Chapter 9.3.3 and Chapter 10.3.2 ● Chapter 8.6.1, Chapter 12.4.3, Chapter 13.5.1 and 13.5.2 ● Chapter 10.3.2 and Box 10.1 ● Chapter 9.3.2
13	*Precipitation* ● Chapter 9.3.1, 9.3.6, Chapter 10.3.2 and Box 10.1
15	*Extreme events* Table 1: Chapter 2.1, 2.2, 2.5, 2.7.2, 2.7.3, Chapter 9.3.6 and Chapter 10.3.2 ● Chapter 2.7.3 and Chapter 9.3.6
16	*El Niño* ● Chapter 9.3.5 ● Chapter 9.3.5
16	*Monsoons* ● Chapter 9.3.5
16	*Thermohaline circulation* ● Chapter 9.3.4
16	*Snow and ice* ● Chapter 9.3.2 ● Chapter 11.5.1 ● Chapter 11.5.1 ● Chapter 11.5.4
16	*Sea level* ● Chapter 11.5.1

Anthropogenic climate change will persist for many centuries.

SPM Page	Cross-Reference: SPM Topic – Chapter Section
17	● Chapter 3.2.3, Chapter 4.4 and Chapter 6.15 ● Chapter 9.3.3 and 9.3.4 ● Chapter 11.5.4 ● Chapter 11.5.4 ● Chapter 11.5.4

Further work is required to address remaining gaps in information and understanding.

SPM Page	Cross-Reference: SPM Topic – Chapter Section
17 – 18	All bullet points: Chapter 14, Executive Summary

Source Information: Technical Summary

This Appendix provides the cross-reference of the topics in the Technical Summary (page and section) to the sections of the chapters that contain expanded information about the topic.

Section A: Introduction

TS Page	Technical Summary Section and Topic – Chapter Section
22	*A.1 The IPCC and its Working Groups* Introduction to the Intergovernmental Panel on Climate Change (from the IPCC Secretariat, Geneva) or the IPCC web page at http://www.ipcc.ch
22 – 23	*A.2 The First and Second Assessment Reports of Working Group I* IPCC, 1990a: Climate Change: The IPCC Scientific Assessment. J.T. Houghton, G.J. Jenkins and J.J. Ephraums (eds.), Cambridge University Press, Cambridge, United Kingdom, 365 pp. IPCC, 1992: Climate Change 1992: The Supplementary Report to the IPCC Scientific Assessment. J.T. Houghton, B.A. Callander and S.K. Varney (eds.), Cambridge University Press, Cambridge, United Kingdom, 198 pp. IPCC, 1994: Climate Change 1994: Radiative Forcing of Climate Change and an Evaluation of the IPCC IS92 Emission Scenarios. J.T. Houghton, L.G. Meira Filho, J. Bruce, Hoesung Lee, B.A. Callander, E. Haites, N. Harris and K. Maskell (eds.), Cambridge University Press, Cambridge, United Kingdom, 339 pp. IPCC, 1996a: Climate Change 1995: The Science of Climate Change. Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T., L.G. Meira Filho, B.A. Callander, N Harris, A. Kattenberg, and K. Maskell (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 572 pp.
23 – 24	*A.3 The Third Assessment Report: This Technical Summary* Background to these questions is in Chapter 1. Box 1: What drives changes in climate? – Chapter 1.

Section B: The Observed Changes in the Climate System

TS Page	Technical Summary Section and Topic – Chapter Section
26 – 29	*B.1 Observed Changes in Temperature* Temperatures in the instrumental record for land and oceans – Chapter 2.2.2 and 2.3. Temperatures above the surface layer from satellite and weather balloon records – Chapter 2.2.3 and 2.2.4. Surface temperatures during the pre-instrumental record from the proxy record Last 1,000 years – Chapter 2.3. Last glacial and deglaciation – Chapter 2.4.
30	*B.2 Observed Changes in Precipitation and Atmospheric Moisture* Annual land-surface precipitation – Chapter 2.5.2. Water vapour – Chapter 2.5.3. Cloud amounts – Chapter 2.5.5.
30	*B.3 Observed Changes in Snow Cover and Land- and Sea-Ice Extent* Snow cover and land-ice extent – Chapter 2.2.5. Sea-ice extent – Chapter 2.2.5. Arctic sea-ice thickness – Chapter 2.2.5.
31 – 32	*B.4 Observed Changes in Sea Level* Changes During the Instrumental Record Tide gauge data for the 20th century – Chapter 11.3.2. Box 2: What causes sea level to change? – Chapter 11.2. Changes during the pre-instrumental record – Chapter 11.3.1.
32 – 33	*B.5 Observed Changes in Atmospheric and Oceanic Circulation Patterns* El Niño-Southern Oscillation (ENSO) – Chapter 2.6.2 and 2.6.3. North Atlantic, Arctic, and Antarctic oscillations – Chapter 2.6.5 and 2.6.6.
33	*B.6 Observed Changes in Climate Variability and Extreme Weather and Climate Events* Heavy and extreme precipitation – Chapter 2.7.2. Tropical and extra-tropical storms – Chapter 2.7.3.
33	*B.7 The Collective Picture: A Warming World and Other Changes in the Climate System* A warming world – Chapter 2.8. Little or no change – Chapter 2.2.5 and 2.7.3.

Section C: The Forcing Agents That Cause Climate Change

Section D: The Simulation of the Climate System and Its Changes

Section E: The Identification of a Human Influence on Climate Change

Section F: The Projections of the Earth's Future Climate

Section G: Advancing Understanding

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