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Climate

Introduction: The Current Status of our Climate

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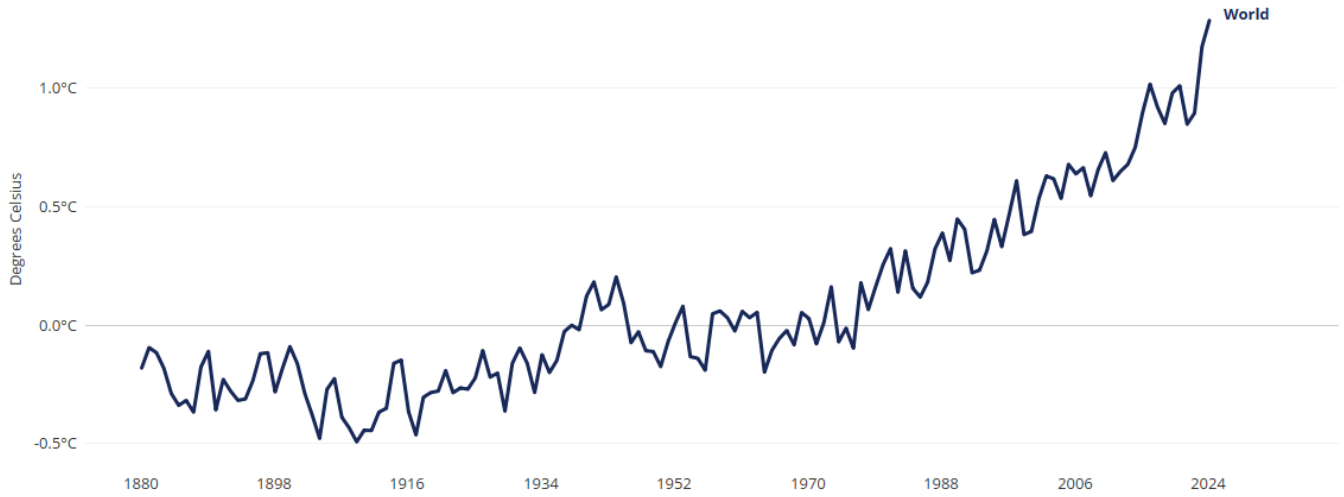
In its landmark 2022 Global Land Outlook report, the UN Convention to Combat Desertification warns, 'At no other point in modern history has humankind faced such an array of familiar and unfamiliar risks and hazards, interacting in a hyper-connected and rapidly changing world.'

In early January 2025, the Copernicus Climate Change Service (C3S) confirmed that 2024 was the warmest year on record and the first calendar year with global surface air temperature exceeding the pre-industrial reference period (1850-1900) by 1.5^{o}C. The daily temperature anomalies for 2024 compared to the previous 80 years, extracted from the C3S data server, are presented in Chart 1.

Chart 1: Global yearly temperature anomaly, 1880-2024

Combined land-surface air and sea-surface water temperature anomaly, given as the deviation from the 1951-1980 mean, in degrees Celsius.



Source: NASA Goddard Institute for Space Studies - GISS Surface Temperature Analysis (2025)

In addition to record-breaking temperatures, 2024 and the beginning of 2025 saw unprecedented extreme weather events across the globe, including prolonged heatwaves in North Africa, devastating wildfires in the Sahel, severe flooding in Southern Africa, and massive wildfires across the western United States, particularly in California and Oregon. In the words of the Secretary-General of the United Nations (UN): 'The era of global warming has ended; the era of global boiling has arrived'.

The consequences of the climate crisis extend far beyond rising temperatures to widespread ecosystem collapse, more frequent and severe weather patterns and increased displacement of vulnerable communities. Scientists attribute a discernible surge in weather-related disaster frequency and losses in the past two decades to climate change. Since 1984, 11 640 weather-related disasters were recorded in the International Disaster Database (EM-DAT), of which 62% occured after 2004. The growing disaster losses trend highlights the intensification and acceleration of the challenges posed by climate change.

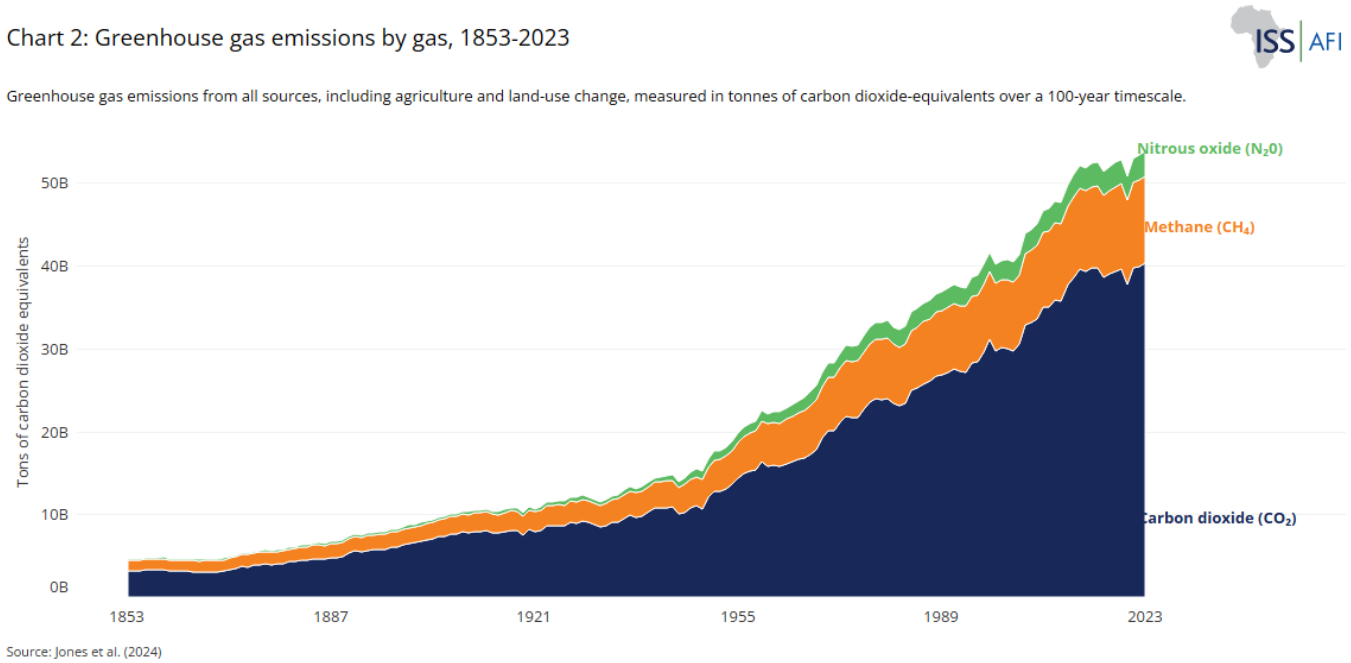
Concurrently, climate-induced displacement is also rising, with millions of people forced to relocate due to the adverse effects of changing weather patterns. According to the database of the Internal Displacement Monitoring Centre (IDMC) more than 240 million internal displacements occurred between 2013 and 2023 due to natural disasters (the vast majority due to storms and floods). 2022 proved particularly disruptive with 32 million people displaced in countries such as the Phillippines, Nigeria, India, China, Pakistan, Somalia, Bangladesh and Ethiopia due to flooding, storms and droughts.

The unfolding crisis underscores the widening gap between current global climate policies and the ambitious targets set by the 2015 Paris Agreement. This agreement sought to limit global temperature increases to below 2°C above pre-industrial levels, with a concerted effort to strive for a more ambitious 1.5°C limit. However, recent data suggests that the 1.5°C threshold has already been breached, signalling an urgent need for enhanced adaptation and mitigation measures.

Strengthening climate adaptation efforts is essential and should align with the Sendai Framework for Disaster Risk Reduction, which was adopted in 2015. This framework underscores the importance of reducing disaster risk and building resilience in the face of rising natural hazards, acknowledging the interconnectedness of climate change, disasters, and sustainable development. Additional frameworks, such as the Global Adaptation Goal (GAG) and the Adaptation Communication under the United Nations Framework Convention on Climate Change (UNFCCC), also provide avenues for enhancing international cooperation on adaptation strategies.

Yet, despite numerous frameworks and policies and the well-established understanding that a growing population and human-induced activities, notably fossil fuel burning and unsustainable land use practices, have been significant contributors to the climate crisis, global average concentrations of carbon dioxide (CO_2) in the atmosphere have persistently risen year after year, reaching record high levels in 2024. The World Meteorological Organization (WMO) has warned that human activities have raised the CO_2 content in the atmosphere by more than 50% from pre-industrial levels, warming the planet to the unprecedented levels observed today. In May 2024, CO_2 in the atmosphere was recorded at 426.7 parts per million (ppm) over Hawaii's Mauna Loa Observatory, a staggering increase from the 320 ppm recorded in 1960 and the pre-industrial levels of 280 ppm. The data in Chart 2 on direct atmospheric CO_2 measurements from 1958 to 2024 is extracted from NOAA monthly measurements. These alarming trends underscore the urgent need for immediate and sustained action to mitigate rising temperatures and escalating climate disruptions.

Chart 2: Greenhouse gas emissions by gas, 1853-2023



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About the authors

Ms Alize le Roux joined the AFI in May 2021 as a senior researcher. Before joining the ISS, she worked as a principal geo-informatics researcher at the CSIR, supporting various local and national policy- and decision-makers with long-term planning support. Alize has 14 years of experience in spatial data analysis, disaster risk reduction and urban and regional modelling. She has a master's degree in geographical sciences from the University of Utrecht, specialising in multi-hazard risk assessments and spatial decision support systems.

Dr Jakkie Cilliers is the ISS's founder and former executive director. He currently serves as chair of the ISS Board of Trustees, head of the African Futures and Innovation (AFI) programme at the Pretoria oce of the Institute, and is an extraodinary professor at the University of Pretoria. His 2017 best-seller Fate of the Nation addresses South Africa's futures from political, economic and social perspectives. His three most recent books, Africa First! Igniting a Growth Revolution (March 2020), The Future of Africa: Challenges and Opportunities (April 2021), and Africa Tomorrow: Pathways to Prosperity (June 2022) take a rigorous look at the continent as a whole.

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