



Friends of the Earth  
Les Amis de la Terre  
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## Friends of the Earth International Climate Change Briefing

### INDICATIONS OF CLIMATE CHANGE - RECENT EXTREME GLOBAL WEATHER EVENTS

*„It is no longer a question of whether the earth’s climate will change but when, where and by how much.“*

John Robert T Watson, Chairman of the  
United Nations Inter-Governmental Panel on Climate Change, 1999.

#### CLIMATE CHANGE AND WEATHER EXTREMES

During the closing decades of the 20<sup>th</sup> century record breaking temperatures and a run of extreme weather events rang the alarm bells. The trend is continuing into the 21<sup>st</sup> century and this briefing catalogues some of the extreme weather events that have occurred during the last few months, along with signs in the environment that our climate is really changing.

The Chairman of the United Nations Inter-Governmental Panel on Climate Change, John Robert T Watson, said *„It is no longer a question of whether the earth’s climate will change but when, where and by how much.“* [1]. Man-made emissions of greenhouse gases are agreed to be the key contributing factor to climate change. The most important of these gases is carbon dioxide which is released when fossil fuels - coal, oil, gas - are burnt.

The 1990s were not only the warmest decade of the 20<sup>th</sup> century but also of the millennium [2]. In addition to this trend of higher temperatures we can also expect increases in the following:

- intense precipitation;
- long dry spells;
- frequency of hurricanes;
- extremely high temperature events [3]

Furthermore, there is the possibility of unpleasant surprises, as the response of the climate system to

radiative forcings could be non-linear, with quite irregular changes such as fluctuations in the behaviour of El Niño, one of the main drivers of climate variability (see below), and stagnation of the Ocean Conveyor Belt.

The economic costs of climate change are now recognised. In November 1998, the Worldwatch Institute and Munich Re – the world’s largest reinsurer – issued a report which assessed the total losses, worldwide, from storms, floods, droughts, and fires for the first eleven months of that unusual year. The staggering sum, at that time, was a record \$89 billion: nearly 50 percent higher than the previous record of \$60 billion in 1996. In addition to material losses, these weather-related events had taken an estimated 32,000 lives, while displacing 300 million people from their homes: more than the populations of Canada and the United States combined. [4] The insurance industry is certainly worried about the soaring costs of severe weather damage and is already refusing cover for various weather events in certain regions.

#### The heat is already on

1998 was the hottest year of the millennium [2]

The 6 hottest years on record have occurred during the 1990s [2]

Temperatures have risen about 0.6 degrees centigrade since 1860 when records began [5]

one single extreme weather event can be directly attributed to climate change. But in light of the evidence that climate change is happening already, and the knowledge that weather extremes pose real risks to human life and economic well-being, predictions should not be taken lightly. The extreme weather events which have characterised recent trends have all too often been a source of misery to many. Major cuts in greenhouse gas emissions are needed urgently to slow down climate change and eventually stabilise concentrations of greenhouse gases in the atmosphere.

### DURING THE LAST FEW MONTHS ...

*The extreme global weather events listed below have all happened during the last three months. As stated above, none can be directly, individually attributed to human induced climate change, but together they demonstrate the alarming frequency of the occurrence of such events. Reflection on these recent events brings home the immediacy of climate change and gives an indication of the devastating impact that individual weather events have on the lives of the people affected.*

[The report is presented as excerpts from daily news reports.]

MEXICO & BELIZE : October 2, 2000

A powerful hurricane was last week edging on to land in eastern Mexico's Yucatan peninsular and north eastern Belize yesterday, pounding the area with heavy rains and 135mph winds prompting the authorities to evacuate high risk zones. Parts of Honduras and Nicaragua were deluged with water and put on alert for likely flooding. *The Guardian* 2/10/00

VIETNAM, CAMBODIA & THAILAND:  
September 2000

1.2 Million Cambodians and several thousand Vietnamese have been affected by the worst floods to hit Vietnam's Mekong Delta for decades. The death toll has risen to 173 in Cambodia, the highest in decades, and to 119 - mostly children - in Vietnam yesterday. Forty seven deaths have been reported in Thailand and Laos is also affected but casualty numbers were not known. Source: *Planet Ark* 19, 20 & 27 Sept, & *Guardian* 19/9/00

JAPAN: September 13, 2000

Flooding and landslides from Japan's worst rains in at least a century killed seven people, forced the evacuation of 45,000 and snarled transport through the nation's industrial heartland yesterday. The floodwaters poured through residential areas when two rivers burst their banks following the torrential rains. The downpour of up to 60 cm (18 inches) was spawned by typhoon Saomai some 2,200 km (1,300 miles) to the south, which struck the southern island of Okinawa. [7]

INDIA: September 1, 2000

Waters of a swollen river in the Indian state of Andhra Pradesh have started to recede, officials said yesterday, after more than a week of floods that have brought misery to millions. The monsoon-driven floods, the worst in the southern state in decades, have left thousands homeless and damaged or destroyed large areas of crops. At least 165 people died in the floods. [7]

CROATIA: September 1, 2000

Croatia estimates the damage suffered from this year's drought and forest fires at 2.74 billion kuna (\$300 million), local media reported yesterday. The extraordinary drought - now in its fifth month - could reduce fruit, grape and grain crops to just 30-50 percent of initial forecasts. Hail storms destroyed large areas under grapevine and other cultures, causing 107 million kuna in damage. [7]

USA: August 2000

Uncontrolled blazes roar across the U.S. West, as fire officials reported a total of more than 1.6 million acres (648,000 hectares) ablaze in 13 western states. Record and near-record temperatures in Kansas were shaping up to make the Midwestern state the hottest place in the United States yesterday, with a forecasted high of 110 degrees. And searing heat was also taking a toll in Oklahoma, Nebraska, Texas and parts of Missouri as forecasters predicted temperatures to climb well above 100 degrees Fahrenheit throughout the region. Farmers are watching their crops wither in the fields. Those growing corn, soybeans, sorghum and other fall crops are badly in need of rain and a respite from the heat, particularly those who farm dryland and rely on rain to provide needed moisture. [7] 28&29/08/00

CROATIA: August 25, 2000

Fires caused by a long drought are raging along Croatia's Adriatic coast and its hinterland,

ravaging pine forests and olive groves and threatening villages and roads, state media reported. [7]

**SLOVENIA:** August 24, 2000

An extended period of drought from March until the end of June would cause losses of some 17 billion tolar. The catastrophic drought has caused huge damage, especially in eastern and southern Slovenia. [7]

**TAIWAN :** August 24, 2000

Typhoon Bilis ripped through Taiwan yesterday leaving at least 11 people dead including eight orchard workers buried by a mudslide in a central area still recovering from a devastating earthquake. [7]

**KENYA:** August 23, 2000

More than three million people are facing starvation as drought sweeps through Kenya leaving hundreds dead and tens of thousands of cattle seeking sustenance on the streets of Nairobi. Eighty per cent of the country has been hit by drought. *Daily Telegraph 23/8/00*

**INDIA** August 10 & 14, 2000

At least 4.5 million people have been made homeless by heavy flooding in India. In the northeastern state of Assam, which has suffered three waves of flooding as well as flash floods since the end of June, a huge river island has been engulfed by water and its 100,000 inhabitants have been forced to flee. More than 200,000 hectares (490,000 acres) of crops are affected. Official figures from India, Nepal, Bhutan and Bangladesh show 184 people have died and 115 gone missing since swollen rivers began gushing off the Himalayas two weeks ago. [7]

**IRAN :** August 4, 2000

Iran's worst drought in 30 years has inflicted severe damage on the country's agriculture and livestock and threatens to displace millions of people, the United Nations said yesterday. Two years of consecutive droughts has affected 18 of Iran's 28 provinces and more than half of the country's 60 million population. According to the report, 2.8 million tonnes of Iran's wheat crops and 280,000 tonnes of barley have been destroyed and an estimated 800,000 head of livestock have died of malnutrition and thirst. [7]

The Slovenian Ministry of Agriculture said yesterday that damage to crops caused by low rainfall was set to exceed the ministry's earlier forecast of some 25.2 billion tolar (\$109 million).

**BRAZIL:** August 4, 2000

Mudslides triggered by five days of torrential rain in Brazil's northeast have killed at least 47 people and forced some 120,000 to abandon their homes in the region's worst flooding in 25 years. [7]

***And in the months before that.....***

*Below is a summary of the major weather events that occurred in the previous months.*

**ETHIOPIA:** April 2000

Drought and forest fires devastate crops in Kenya and Ethiopia threatening livelihoods of 8 million people.

**SOUTHERN AFRICA:** February 2000

Floods drive more than 100,000 people from their homes in Mozambique, Botswana and South Africa. Thousands are stranded on treetops in Mozambique and the risk of disease threatens a major public health crisis.

**FRANCE:** December 1999

Storms tear through France, kill 83 people and leave many without power for 2 months.

**VENEZUELA:** December 1999

Up to 30,000 people die and 150,000 are made homeless as torrential floods, mudslides and overflowing rivers sweep through the country.

**ORISSA, INDIA:** November 1999

A cyclone devastates parts of eastern India killing up to 10,000 people and washing entire villages into the Bay of Bengal.

**USA:** August 1999

Over 250 people die as a result of a heatwave gripping much of the north-east. Agricultural disaster areas are declared in 15 states with losses in West Virginia alone exceeding \$80 million.

CANADA : July 17, 2000

The death toll from Canada's worst tornado in 13 years rose to 10 as the military joined the search for more possible victims at a lakeside trailer park in Alberta ripped apart by Friday's storm. [7]

JAPAN : July 10, 2000

The Izu island chain south of Tokyo offers some of the clearest seas in the world. But over the past few weeks, it has offered visitors to the popular tourist destination just about everything nasty that nature can dish out. There have been a volcanic blast, landslides, mudslides, flooding, earthquakes, and to wash it all down, a typhoon pelted the area with strong winds, heavy rains and high waves. [7]

SOUTH-EASTERN EUROPE : July 6, 2000

Italy and the Balkans sizzled yesterday as a heat wave from the Sahara desert scorched a path through the region - killing four people, sending hundreds to hospital and damaging crops. Temperatures in Bucharest, Sofia and Belgrade hit record highs, and on the Italian island of Sardinia the thermometer touched 50 degrees Celsius (122 degrees Fahrenheit). Four people died from the heat in Bulgaria. The baking heat also scorched crops - yet more bad news for the region's farmers who are still reeling from a winter drought. Fires continued to sweep vast areas, devastating forests, farmland and forcing hundreds of people to evacuate their homes. [7]

## GLOBAL INDICATORS OF CLIMATE CHANGE

*Below are some examples of changes in the natural world, observed recently. These observations, along with numerous other pieces of evidence, indicate that climate change is already underway*

Ice cores drilled through a glacier more than four miles up in the Himalayan Mountains have yielded a highly detailed record of the last 1,000 years of earth's climate in the high Tibetan Plateau. Based on an analysis of the ice, both the last decade and the last 50 years were the warmest in 1,000 years. The core also showed a clear record of at least eight major droughts caused by a failure of the South Asian Monsoon, the worst of these a catastrophic seven-year-long dry spell that cost the lives of more than 600,000 people. Science Sept 2000

### The Spread of Disease

*Warming accelerates the breeding rates of disease-bearing insects. It is also propelling them to altitudes and latitudes which were only a few years ago too cold to support their survival. At current rates of warming, scientists estimate that mosquito-borne epidemics will double in the tropical regions and increase 100-fold in the temperate regions (where we live) – leading to as many as 80 million new cases a year of malaria alone in the next century. [6]*

USA West Nile virus is a mosquito-borne illness that for the second year in a row has sickened people and killed birds in New England and the mid-Atlantic states. The virus, which can cause a form of encephalitis, killed seven people in 1999 in the United States, all in the Queens section of New York. This year at least 13 people have been infected with West Nile virus in New York, and four in New Jersey, officials say. Since July, New York City has been conducting an aggressive insecticide spraying campaign throughout the city.

The virus, named for the region of Uganda and Egypt where it is most common, is spread to humans by the bite of an infected mosquito. It is not transmitted from human to human, or from birds to humans. Most infected people do not experience symptoms, but in the elderly or other vulnerable individuals such as those with weak immune systems, West Nile can be fatal. The deadliest West Nile virus outbreak this year has been in Israel, where at least 10 people have died and more than 120 people have become ill. [7] 28/09/00

### Drought

CHINA 'Drought Creates New Chinese Desert - Chinese Farmers See New Desert Erode Their Way of Life': Rising sands are part of a new desert forming on the eastern edge of the Qinghai-Tibet Plateau, a legendary stretch once known for grasses reaching as high as a horse's belly and home for centuries to ethnic Tibetan herders. The spread of wastelands on these 9,000 foot-high steppes, and across the pastures and farmed hillsides of a broad swath of northern China, is threatening to rend patterns of life that depend intimately on the land and to strand millions of herders and farmers who have no other place to go in a country with virtually no decent, unused land. The desert is the combined result, scientists say, of severe overgrazing that has destroyed the thin topsoil, and a decade of hotter, drier weather, including three straight years of extreme drought. *The New York Times* 30/07/00

**AUSTRALIA** Australia's August rainfall was generally below average in regions that had been affected by deficiencies at the end of July, the National Climate Centre at the Bureau of Meteorology said. In particular there was no improvement in the southeast of the country where deficiencies had been present for nearly four years, it said. Rainfall for the past 47 months in southern Victoria and in the southeast of South Australia were the lowest for the region since at least 1900, it said. [7] 11/09/00

**TURKEY** After the driest summer in 20 years, Turkish officials are warning that they cannot supply Syria with all the water it wants from the Euphrates and Tigris rivers. The announcement will cause concern in the Middle East, where water is one of the most sensitive strategic issues. The Guardian 02/10/00

**BURUNDI** Burundi's coffee production is set to drop this year, mainly due to drought, a senior official said yesterday. The harvest is put at 18,500 tonnes, compared with 31,000 in 1999. [7] 22/09/00

### **Sea Level Rise**

**PACIFIC ISLANDS** Rising sea levels have already endangered sacred sites and drowned some small islands off the tiny nations of Kiribati and Tuvalu, including the islet of Tebua Tarawa, once a landmark for Tuvalu fishermen. Kiribati has already had to move roads inland on its main island as the Pacific Ocean has eaten into the shore. Rising sea levels have already seeped into some islands' soils, making them too salty to grow vegetables. In Tuvalu, farmers are beginning to grow their taro crops in tin containers filled with compost instead of traditional pits. [7] Nov 1998

### **Coral Reefs Die**

**BELIZE** The highest sea temperatures ever recorded in the Caribbean have caused the first mass die-off of coral in Belize in 3,000 years. The high temperatures in 1998 lasted for several months and caused much of the Belizean coral reef to bleach and die, according to a study by American scientists that has been published in the latest issue of the journal Nature. "There is growing concern that global climate change is degrading coral reef ecosystems, with coral mortality increasing as a result of bleaching and emergent diseases. Our results from Belize appear to justify this concern," said researcher Richard Aronson. Serious coral bleaching has been previously reported in the Pacific and Indian oceans.

<http://www.gristmagazine.com/grist/> and Nature 04/05/00

**SEYCHELLES** Global warming has killed most of the coral around the Indian Ocean islands of the Seychelles. "By May, 80 percent of the corals in the Seychelles had already died," Thomas Goreau of the U.S.-based Global Coral Reef Alliance told reporters, adding that water temperatures had risen to 33 Celsius (91 Fahrenheit) from the usual 29 C (84 F). Goreau said the warmer waters had led to unprecedented levels of coral bleaching throughout the Indian Ocean, adding that the damaged coral would never fully recover. The environmentalist said the damage was even more extensive at three protected marine parks in the Seychelles archipelago, where over 90 percent of the coral was dead. The parks are popular snorkelling sites for the many tourists who visit the Seychelles each year. Local environmental officials said it was too early to assess the impact of the coral bleaching, but said they feared that it could affect stocks of the colourful tropical fish which live among the coral. Goreau said the warm area of water had moved north towards the Maldives islands and Sri Lanka. [7] 04/01/99

### **Melt Down**

Glaciers are melting and the Arctic Sea ice has thinned dramatically since the 1960's and the 70s; nearly 40 percent in less than 30 years. A recent NASA aerial survey indicates severe thinning of the Greenland ice sheet. Mastny, L. Worldwatch Institute, 6/03/00

Most of earth's glaciers are retreating at accelerating rates. The biggest glacier in the Peruvian Andes 20 years ago was retreating by 14 feet a year. Today it is retreating by 99 feet a year. [6]

### **Signs of Habitat Changes**

Climate change unseen since the Ice Age is threatening a third of the world's habitat. A report released on 30/08/00 by the World Wildlife Federation For Nature warned that the Earth's temperature was rising at such a rapid speed that many animal and plant species will likely perish. World Wildlife Federation For Nature 30/08/00

The Inuit people of Canada have noticed that near Hudson Bay, Canada's gateway to the north seas, ice is thinner and has formed seasonably later, affecting polar bears, which usually ride the thick ice slabs to hunt seals and voyage to their winter retreat. They say that the warming of the tundra,

the vast permanently frozen treeless zone lying between the ice cap and the timber line, has altered migration routes of caribou, the North American reindeer. The Inuit rely heavily on these animals as part of their sustainable way of life. They also say they've noticed grizzly bears, wolverines and other insects and birds that are more commonly found to the south. [7] 30 & 31/08/00

Polar bears have resorted to attacking whales for food in the Arctic, due to the fall in numbers of penguins. The Great Bear Foundation says the simple food chain in the Arctic has been seriously affected by Global Warming which destroys the ice which is an essential shelter for plankton seals and penguins alike. The Observer 4/7/99

The waters of the Atlantic have warmed so much, that observers have seen tropical fish which have never before been seen in northern waters. Among fish spotted in the North Atlantic are Amberjack, Mahi-Mahi and Blue Marlin, according to experts at the Woods Hole Oceanographic Institute. WBUR (National Public Radio) (Local news) 26/8/99

Bird species in North America have shifted their habitat range 60 miles further north in the last 20 years due to the warming up of previously unsuitable habitats. Guardian 17/8/99

Earlier migration and egg-laying dates have been recorded for several bird species along with earlier budburst and flowering of plants. DETR Indicators of Climate Change in the UK 1999

The surface waters of the eastern Pacific have warmed by 2 degrees in the last 20 years – independent of El Niño events. That has led to a 70 percent decline in the population of zooplankton, a five percent decline in fish populations. [6]

## WHAT ABOUT EL NIÑO?

Studies have indicated that an increase in global temperature may lead to an increase in both the frequency and the intensity of future El Niños. Robert May, UK Government Chief Scientific Advisor said that „if global warming continues, perturbation to weather systems like this [El Niño] are likely to become more common“ (DTI, 30<sup>th</sup> September 1997).

The El Niño Southern Oscillation (ENSO) is a naturally occurring phenomenon. Weakening easterly trade winds result in higher sea temperatures in the tropical Pacific, and cause major changes in global weather patterns. El Niños are set in motion at irregular intervals, altering the course of weather and climate, around the world, for up to a year or so. The most recent were in 1982-83, 1986-87, 1990-95, and 1997-98. The record-breaking and long-lasting El Niño of 1997-98 began in April of the first year and persisted until May of the next. During this period, extreme weather events were reported from around the world.

The 1997-98 El Niño almost certainly contributed to establishing 1998 as the world's warmest year on record. The most severe drought of the 1997-1998 El Niño struck Indonesia, with the result that many of the fires commonly set to clear land for agriculture raged out of control for weeks on end. So much ash was carried into the air that respiratory problems were reported as far as 1000 km (about 600 miles) away, and the loss of visibility was held responsible for the crash of a commercial airliner. El Niño-related drought and associated wildfires continued into 1998 in Brazil, Mexico, and Florida. As expected with El Niño, flooding hit Peru and Ecuador but also Chile, and coastal fisheries were disrupted. [4]

Predictions about future El Niños are hard to make, but the probability that they will be of increased intensity and frequency due to higher global temperatures might spell out more misery for many of the world's nations.

## CONCLUSIONS

The extreme weather events catalogued above could become more common if we fail to take action to cut emissions of greenhouse gases now.

Recent years have seen a number of 'floods of the century' and the hottest year on record. In the short-term it is difficult to distinguish between natural variability and climate change, so it is not possible to definitely link a specific weather event (or sequence of events) to climate change. However, there are indications that the human footprint on the climate system is becoming increasingly visible. The IPCC said in 1996 that recent changes in climate are „*unlikely to be entirely natural in origin*“ [3].

The next IPCC assessment report (third assessment report, TAR), due out in spring 2001 is expected to produce more evidence.

It is clear however, that climate change threatens more frequent and extreme weather events such as those experienced recently and catalogued in this briefing. Droughts, floods, cyclones and storm surges, with knock-on effects for ecosystems, fires, pests outbreaks, human health, our settlements and food security, might increase in frequency and intensity. For millions, this could mean homelessness, missing relatives, crop failure, famine, disease or death. It is the poor countries which are likely to suffer most. The industrialised countries, having polluted the atmosphere with greenhouse gases over the last century, will also be hit. But they will be much more able to react to extreme weather events and to protect their people.

Avoiding such an outcome will require deep cuts in emissions of greenhouse gases now.

In November 2000 the World's governments will meet in The Hague, The Netherlands to finalise the Kyoto Protocol, the key environmental treaty to tackle climate change. Decisions taken at this summit (known as COP6, the sixth Conference of Parties to the United Nations Framework Convention on Climate Change) will determine the environmental effectiveness of the Protocol. From the evidence submitted in this report, it is imperative that governments agree on measures that result in real and permanent reductions in greenhouse gas emissions.

**References**

- [1] John Robert T Watson, Chairman of the United Nations Inter-Governmental Panel on Climate Change, 1999.
- [2] Climatic Research Unit, Norwich: Global Temperature Record, 2000
- [3] Inter-Governmental Panel on Climate Change (1996) Climate Change 1995: The Science of Climate Change. Cambridge University Press.
- [4] K. Trenberth, Consequences, vol 5, No5, 1999.
- [5] The Meteorological Office . The greenhouse effect and climate change. A briefing from the Hadley Centre. Bracknell. Oct. 1999.
- [6] The Heat is Online: Ross Gelbspan  
[www.heatisonline.org/main.cfm](http://www.heatisonline.org/main.cfm)
- [7] Planet Ark; the environment news from Reuters news agency. [www.planetark.org](http://www.planetark.org)

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Friends of the Earth International is a federation of autonomous environmental organizations from all over the world. Our members, in 61 countries campaign on the most urgent environmental and social issues of our day.

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