Amazon drought highlights impact of global warming

Chris Talbot
11 February 2011

Recent scientific research points to serious implications arising from the record Amazon rain forest drought that took place last year. A previous drought in 2005 was regarded as a rare one in a 100-year event, associated with an unusual rise of Atlantic Ocean sea temperatures. However a detailed examination of recent satellite rainfall data compared to similar data over the last decade by a UK-US-Brazilian team showed that the recent drought was in fact more extensive than the 2005 episode [1]. Whereas the 2005 drought was spread over an area of two million sq. km., the 2010 drought extended over three million sq. km.

This is not just a devastating event for the people of Brazil living in the forest region or the Amazon basin. What is of global concern is that the rain forest in a drought period, instead of acting as a net absorber of carbon dioxide and absorbing some of the increase in human-based emissions, actually emits the greenhouse gas on an even bigger scale due to trees dying and rotting.

Using satellite data as well as extensive studies on the ground the research team calculated the additional amount of carbon dioxide produced as a result of the 2005 drought at five billion tonnes (compared, for example, to 5.4 billion tonnes emitted by the US in 2009). Normally the forest has been absorbing carbon dioxide at a rate of about 1.5 billion tonnes a year. Using their satellite data the team estimate the 2010 drought could have resulted in a net production of up to 8 billion tonnes of greenhouse gas.

A more accurate estimate will be obtained by studies to be carried out by the research group at 130 sites in the region, providing they can get the funding. One of the team members, Paulo Brando from the Amazon Institute of Environmental Research (IPAM) in Belem, Brazil, told the BBC, “It could be that many of the susceptible trees were killed off in 2005, which would reduce the number killed last year. On the other hand, the first drought may have weakened a large number of trees, so increasing the number dying in the 2010 dry season.”

The leading scientist of the team, Dr Simon Lewis, from the University of Leeds UK, said: “Having two events of this magnitude in such close succession is extremely unusual, but is unfortunately consistent with those climate models that project a grim future for Amazonia.”

This refers to the possibility, shown up in some of the complex computer models of the earth’s climate, that a “feedback” effect could result in recurring Amazon droughts and higher carbon emissions. Lewis cautioned that there was still considerable uncertainty about what was happening, but warned, “current emissions pathways risk playing Russian roulette with the world’s largest rainforest.”

Dr Lewis featured in the wave of climate change denial in the capitalist media in the run-up to the Copenhagen summit in December 2009. A particularly scurrilous attack was mounted in the UK *Sunday Times*, part of a world campaign in the Murdoch press, trawling through the report of the UN Intergovernmental Panel on Climate Change (IPCC) for alleged scientific errors.

In what was called the “Amazongate” scandal, the newspaper alleged that a claim that 40 percent of the rain forest could be affected by climate change was spurious and cited the reference given in the IPCC report to the campaigning NGO, the World Wildlife Fund. In fact the WWF had based their figure on the work of Dr Lewis’s team, which the IPCC should have cited. Lewis sent a collection of peer-reviewed scientific papers to the *Sunday Times* and it was forced

to issue an apology.

Another indicator of global temperature rise, possibly even more important that the Amazon, is the melting of the Arctic ice cap. The record amount of ice melting in 2007 has not been repeated, a fact that is emphasised by climate change deniers. However in climate change studies it is unwise to base much on a single year's statistics. The long-term shrinkage in the volume of Arctic ice continues, even if complete disappearance of ice cover in the next two or three years, that some had predicted, will not happen. Continuing decline will mean sea levels rising by a few metres over the next decades, with devastating consequences.

After last summer's melt, Dr Walt Meier, at the National Snow and Ice Data Center (NSIDC) in Boulder, Colorado, explained that ice had melted away very quickly, but over a short period. The figures suggested that over the longer term the ice cover would disappear. "the 2040/2050 figure that's been quoted a lot—that's still on track. It could end up being wrong, of course, but the data we have don't disprove it," said Meier. [2]

The mechanisms involved in the melting of the Arctic ice, and the impact on global warming and weather conditions, are not fully understood and the subject of a number of recent studies (in comparison the Antarctic ice volume is possibly increasing, though not at a statistically significant rate).

One study by a UK team on the melting of Greenland glaciers [3] showed that paradoxically they flow more slowly at higher temperatures. This seems to be because melted water under the ice stop it flowing so fast. However the glaciers studied only make up a small part of the Arctic ice cap and another effect has also been revealed that speeds up the melting of the ice [4]. The flow of water northwards in the Atlantic Ocean, usually known as the Gulf Stream, has been found by examining marine sediments off northern Norway to be warmer than at any time than over the last 2,000 years.

The shrinking of Arctic ice affects what is known as albedo—the reflecting of the sun's energy back into space by the ice cover. A team led by Mark Flanner from the University of Michigan has shown, using satellite records from the last three decades, that the absorption of the sun's energy by darker water replacing sea-ice cover has increased by 10-20 percent [5]

It is thought that the declining Arctic ice could be changing atmospheric circulation patterns, leading to the flow of Arctic air downwards into Northern America and Europe, creating cooler than average winters.

The seriousness of the impact of global warming, and the complete inability of the capitalist profit system to take action to reduce emissions, is underscored by the January press release of the UN World Meteorological Organization (WMO) [6]. Commenting on the fact that 2010 was the hottest year on record, equal to 1998 and 2005, the group states: "The year 2010 was characterized by a high number of extreme weather events, including the heat wave in Russia and the devastating monsoonal floods in Pakistan. " In January this year, "floods affected more than 800 000 people in Sri Lanka", the "Philippines were also severely affected by floods and mudslides", flash floods in Brazil "resulted in more than 700 deaths, many of them in mudslides . . . one of the highest death tolls due to a single natural disaster in Brazilian history." Finally they note "Severe flooding occurred in eastern Australia in December and the first half of January, associated with the continuing strong La Niña event . . . In financial terms it is expected to be the most costly natural disaster in Australia's history."

[1] S.Lewis et al, Science, Vol 331,, p 554 (2011).

[2] http://www.bbc.co.uk/news/science-environment-11322310

[3] A.Shepherd et al, Nature, Vol 469, pp 521-524 (2011).

[4] R.F.Spielhagen et al, Science, Vol 331, pp 450-453 (2011).

[5] http://www.climatecentral.org/news/arctic-ice-melt-adding-more-heat-to-the-atmosphere-than-previously-thought/

[6] http://www.wmo.int/pages/mediacentre/press_releases/pr_906_en.html