

Scientists debunk climate change myths

February 25 2014, by Kanina Foss



Category 4-strength Cyclone Favio was closing the gap between Madagascar and mainland Africa on February 21, 2007, preparing to strike Mozambique in coming days. This image from the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite shows Favio stretched across the Mozambique Channel at 9:35 a.m. (local time) Wednesday morning. The outermost bands of clouds on the western side of the storm were already brushing the coast of Inhambane province in southern Mozambique. A thick ring of "boiling" clouds surrounds the eye of the storm. Credit: NASA image by Jeff Schmaltz, MODIS Rapid Response Team, Goddard Space Flight Center

Wits University scientists have debunked two big myths around climate change by proving firstly, that despite predictions, tropical storms are not increasing in number. However, they are shifting, and South Africa could be at increased risk of being directly impacted by tropical cyclones within the next 40 years. Secondly, while global warming is causing frost to be less severe, late season frost is not receding as quickly as flowering is advancing, resulting in increased frost risk which will likely begin to threaten food security.

According to Jennifer Fitchett, a PhD student in the Wits School of Geography, Archaeology and Environmental Studies (GAES), there has been an assumption that increasing [sea surface](#) temperatures caused by [global warming](#) is causing an increase in the number of tropical cyclones.

But looking at data for the south-west Indian Ocean over the past 161 years, Fitchett and co-author Professor Stefan Grab, also from GAES, confirmed the results of previous studies which have found that there has been no increase in the number of tropical cyclones and that much of the perceived change in numbers is a result of improved storm detection methods. "From 1940, there was a huge increase in observations because of aerial reconnaissance and satellite imagery," she says.

The big surprise came when Fitchett and Grab looked at where storms have been happening. As the oceans have warmed and the minimum sea surface temperature necessary for a cyclone to occur (26.5 degrees Celsius) has been moving further south, storms in the south-west Indian Ocean have been moving further south too.

Most cyclones hit Madagascar and do not continue to Mozambique, and those which hit Mozambique develop to the North of Madagascar, but in the past 66 years there have been seven storms which have developed south of Madagascar and hit Mozambique head-on. More notable is that four of them occurred in the past 20 years. "This definitely looks like the

start of a trend," says Fitchett.

South Africa is already feeling the effects of this shift. The cyclones that hit southern Mozambique cause heavy rain and flooding in Limpopo. But according to Fitchett, the trend becomes even more concerning when one considers that the 26.5 degrees Celsius temperature line (isotherm) has been moving south at a rate of 0.6 degrees latitude per decade since 1850. "At current rates we could see frequent serious damage in South Africa by 2050," she says.



Jennifer Fitchett. Credit: University of the Witwatersrand

"This is not what we expected from [climate change](#). We thought [tropical cyclones](#) might increase in number but we never expected them to move."

In a separate study, Fitchett and co-authors looked at different types of

citrus – oranges, lemons and tangerines – in two cities in Iran, where the existence of heritage gardens meant data were easily available. They found that while global warming is causing the fruit trees to flower as much as a month earlier than 50 years ago, which is a very rapid shift, changes in late season frost are not happening nearly as quickly.

Before 1988 there were zero to three days between peak flowering and the last day of frost in Kerman, Iran; since then, the number has increased to zero to 15.

"The layman's assumption is that as temperatures get warmer, there will be less frost. But although the severity of the frost has decreased, the last day of frost hasn't been receding as quickly as the advances in flowering. The result is that frost events are increasingly taking place during flowering and damaging the flowers. No flowers equals no fruit," says Fitchett.

According to the study, at current rates, it will take only 70 years before it becomes a certainty that frost will occur during peak flowering in Kerman. Already, since 1988, frost has occurred during peak flowering in 41% of the years.

"Iran is a top citrus producer but they don't export and we don't yet have data on whether there has been an impact on their citrus yields. We think that if there hasn't already been a huge impact, there soon will be," says Fitchett.

South Africa also produces a lot of citrus – for local and international consumption – and the country has been experiencing similar climate warming to Iran. South African farmers are not yet recording the flowering dates of their crops which makes it hard to repeat the study locally, but according to Fitchett, the threat is of concern.

Fitchett and Grab's paper titled: A 66-year tropical cyclone record for south-east Africa: temporal trends in a global context was published in the *International Journal of Climatology* in February 2014 and evolved out of work Fitchett undertook during her honours degree at Wits.

Her second paper, co-authored with Grab, Dave Thompson (South African Environmental Observation Network) and Reza Rowshan (University of Golestan, Iran), titled: Increasing frost risk associated with advanced citrus flowering dates in Kerman and Shiraz, Iran: 1960–2010, was published in the *International Journal of Biometeorology* in January 2014 and evolved out of work she did during her masters degree at Wits.

According to Grab, who supervised Fitchett's research, there are many questionable reports by scientists, governments and the media on climate change. "We are on a quest to test and challenge such reporting, based on the analysis of quality data available to us. The work of Fitchett and other postgraduate students at Wits University is of the highest international quality and bodes well to a future generation of South African climate and environmental change scientists."

More information: "Increasing frost risk associated with advanced citrus flowering dates in Kerman and Shiraz, Iran: 1960–2010." Jennifer M. Fitchett, Stefan W. Grab, Dave I. Thompson, Gholamreza Roshan *International Journal of Biometeorology*. January 2014 [DOI: 10.1007/s00484-013-0778-0](https://doi.org/10.1007/s00484-013-0778-0)

Fitchett, J. M. and Grab, S. W. (2014), "A 66-year tropical cyclone record for south-east Africa: temporal trends in a global context." *Int. J. Climatol.*. doi: 10.1002/joc.3932

Provided by Wits University

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