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Open Letter to Senator, the Hon Simon Birmingham  
Parliamentary Secretary to the Minister for the Environment, with responsibility for water and the  
Bureau of Meteorology  
107 Sir Donald Bradman Drive  
Hilton SA 5033

12<sup>th</sup> August 2014

Dear Senator Birmingham

**Re: Corruption of the official temperature record, and increased unreliability of official seasonal rainfall forecasts**

Repetition is a propaganda technique. The deletion of information from public records, and the use of exaggeration and half-truths are others. The Bureau of Meteorology uses all these techniques, while wilfully ignoring evidence that contradicts its own propaganda. At least that is my conclusion after reading your letter of 8<sup>th</sup> July 2014, with the four-page response to my letter of 4<sup>th</sup> March 2014 to Greg Hunt, and the two-page response to my email, also to Minister Hunt, of 10<sup>th</sup> June 2014.

I could dive into the detail and give example after example to prove my point. The wiser approach, perhaps, is to provide context, and a way forward, including the potential for collaborative research. Because while we can argue about the temperature record, at the end of the day it is rainfall cycles that are most important to this nation. Indeed, the issue of rainfall forecasting is an extremely important one for Australians, and it is probably ultimately dependent on the integrity of the historical temperature data, as I will explain.

*Bureau's Poor Track Record at Rainfall Forecasting*

Over recent years the Bureau's record has been dismal, with significant consequences. Brisbane was flooded in January 2011 by a dam built for flood mitigation, but kept full of water because the Bureau had been telling dam operators, and Brisbane's residents, that drought was the new norm as a consequence of climate change. More recently, the Bureau forecast that spring 2013 in the Murray Darling Basin would be exceptionally wet, but it was dry. The forecast for this autumn was dry, but many parts of the Basin received well above average rainfall. The implications have been significant in terms of lost opportunities for primary producers, and poor water allocation decisions by the Murray Darling Basin Authority.

Professor John Abbot, from Central Queensland University, and I, have benchmarked the skill of the general circulation model that the Bureau has been using to make its official forecasts since May last year. Our conclusion, which has been peer-reviewed and published in the scientific literature (Volume 138, Atmospheric Research), is that the Bureau's model, POAMA, has very limited skill. Indeed a schoolgirl with a pen and paper calculating monthly average rainfalls could do a better job than the Bureau's multi-million dollar supercomputer.

The Bureau's science managers deny this disappointing reality, at great cost to the Australian public. A public who, unless you intervene, are likely to continue receiving official forecasts from what is, essentially, an expensive toy. A toy programmed to generate information that is used to

publish papers that justify the theory of anthropogenic global warming. But, to reiterate, the toy has little or no predictive capacity in reality.

### *Statistical Methods versus Simulation Model for Rainfall Forecasting*

There is a growing body of evidence suggesting that the most skilful medium and long-term rainfall forecasts are made, not by this type of simulation model, which attempts to forecast climate by building a model of assumed real world physical processes, but by using the old approach of statistical modelling in combination with state-of-the-art technology.

The Bureau used very simple statistical models, based on algorithms developed in the early 1980s, before switching to POAMA last year. I have been working on a model using state-of-the-art statistical modelling techniques, in particular, distributed computing, advanced neural networks, and artificial intelligence.

Statistical models rely on the elucidation of patterns in historical data. So, one very important input variable for statistical models used to forecast weather and climate, is historical temperature. This brings me to the issue of the integrity of Australia's temperature record.

### *The Importance of the Historical Temperature Record*

Staff at the Bureau have been actively remodelling historical temperature series so that they better accord with the theory of anthropogenic global warming. Indeed, the integrity of the data is of no immediate practical value to them, because POAMA does not rely on historical temperatures as an input. The integrity of this data, however, is of paramount importance to those using statistical models for rainfall forecasting.

Using the locations of Amberley in southeast Queensland, and Bourke in northwest New South Wales as case studies, I have shown in a paper recently published by the Sydney Institute (Issue 26 of the Sydney Papers Online) how temperature data has been truncated and then homogenized by the Bureau in such a way that cooling trends become warming trends. In the case of Amberley, the Bureau jumps-up the minimum temperature twice to achieve an artificial temperature increase of over 1.5 degree C. This 1.5-degree change is very large given that the entire temperature increase associated with global warming over the 20<sup>th</sup> Century is in the order of 0.8 degree C.

Dr Dennis Jensen MP, one of my co-authors, was so concerned by this remodelling that he has met with science managers at the Bureau to discuss the homogenization process. Dr Jensen was assured that homogenization results in a better overall temperature record, and that world's best practice is applied in the design and application of the relevant algorithms. But the clearly stated intent of homogenization is to correct for changes in equipment, siting, and/or other factors that could conceivably introduce non-climatic factors into the temperature record. This must be the ultimate test and rationale for homogenization, (James Hansen et al. 2001, Volume 106, Journal of Geophysical Research and Lei Zang et al. 2014, Volume 115, Theoretical and Applied Climatology). The Bureau, however, is applying the algorithms subjectively and without supporting metadata, in such a way that the temperature record is completely altered, despite the absence of evidence that there were any changes in siting, equipment, or any other factor which could have conceivably introduced a non-climatic discontinuity.

To reiterate, that the temperature record for Australia has been corrupted in this way, is of no practical consequence to climate scientists at the Bureau, because they do not use historical data for forecasting either rainfall or temperature – they use simulation models that attempt to recreate the climate based on assumed physical processes. This, remodelling is of considerable political value to them, because the remodelled data better accords with the theory of anthropogenic global

warming. This is a theory on which the current senior management at the Bureau have built their careers.

An unfortunate consequence is that the few scientists attempting to develop better rainfall forecasts using statistical methods may be using corrupted historical data, because this homogenized data is labelled 'high quality' and promoted by the Bureau. For example, researchers may have obtained sub-optimal results in the application of their wavelet-based, multiple linear regression model for forecasting monthly rainfall for South Australia, because they used significantly truncated and homogenized 'high quality' data from the Bureau (Xinguang He et al., Volume 34, International Journal of Climatology). A different Adelaide-based university researcher recently contacted me wanting access to the temperature data that Professor Abbot and I use for our rainfall forecasting. We do not use the High Quality or ACORN-SAT temperature datasets as input to our model because we understand the extent of the tampering.

### *The Potential for Collaboration and Importance of Benchmarking*

In order to help restore some skill to the medium-term rainfall forecasts currently issued by the Bureau, and some integrity to the historical temperature record, Professor Abbot and I are keen to work with the Bureau. In particular, we would welcome the Bureau's involvement in a weather and climate forecasting group at the Noosa Campus of Central Queensland University. Three PhD/Masters scholarships in weather and climate forecasting using artificial neural networks are currently being advertised through Central Queensland University with modest funding from the B. Macfie Family Foundation. One of five proposed projects has, as its objective, the development of techniques for creating continuous series of high quality temperature data.

A contribution from the Federal Government towards this initiative would be most welcome, even if it were only matching funding to increase the stipend we can potentially offer the students, and/or provide assistance and/or resources for advertising of the scholarships. Obviously, if significant funding could be committed by your government to our goal of developing skilful medium-term rainfall forecasts using the most advanced statistical models available, we could much more quickly move to the development of a forecasting model that had operational capacity.

Of course, the skill of a rainfall forecast can be very easily and objectively benchmarked through statistics such as root mean square error. But benchmarking requires all players to make their output available. Of great concern to Professor Abbot and myself, the Bureau recently formally notified us that they would no longer provide forecast data from POAMA in a form against which we can benchmark output from our statistical model.

We know that the Bureau attempts to hide POAMA's lack of skill to the public by providing only vague probabilistic forecasts. It is unacceptable that the Bureau has now withdrawn the capacity for future benchmarking in the scientific literature, including against our statistical model. We request that you intervene and, as suggested in my letter to Minister Hunt, insist that the Bureau publish the actual quantity of rain forecast by POAMA and that this information be maintained in a dedicated archive.

### *Dangers in Vague Probabilistic Forecasts*

I note that in response to my letter, the Bureau have claimed that they do not publish actual rainfall quantities for publicly issued forecasts because, and I quote, "the science, conducted here and overseas, shows such forecasts to be as yet unreliable". Indeed, the forecasts generated by POAMA are unreliable. As I have explained above, they have very little, if any real skill. But rather than admitting this, forecasts are converted by the Bureau into a probability and then presented to the public and industry as though they have some value. In fact they can be very misleading in the

context of the Australian climate, which is characterised by long periods of below median rainfall often followed by a season of extreme rainfall.

To illustrate this point, let us consider the location of Nebo in Queensland's Bowen Basin. The Bowen Basin is a coal-mining region that was devastated by the flooding of December 2010. In December 2010, Nebo received 459.8 mms of rainfall, exceeding the median December value by a factor of 5.25 or 525%. The probabilistic forecast issued by the Bureau, giving a 50-55% chance of exceeding the seasonal median for the location of Nebo for December 2010, although arguably correct, was grossly unsatisfactory providing inadequate warning of the impending flooding.

That is, the information provided by the Bureau's probabilistic forecasts did not differentiate between rainfall exceeding the median by 1%, or exceeding the median by 525%. The forecast is appraised as equally "correct" under the 1% and 525 % exceedance using the Bureau's methodology, which is endorsed by the World Meteorological Organisation.

To be clear, the percentage probability assigned and reported says nothing about the actual quantity of rainfall to be anticipated, only the chance of anticipated rainfall during a period being above or below the median. This, of course, provides an enormous range of actual outcomes where any given forecast can be regarded as "correct" or successful from the perspective of the Bureau. From the perspective of the Queensland citizen, however, the consequences of anticipating a small percentage increase in rainfall, with 55% probability, and then actually experiencing 525% above median can be a matter of life and death. Indeed 38 lives were lost, directly attributed to flooding in Queensland during December 2010 and January 2011 and 85% of Queensland coalmines had to either restrict production or close entirely. By May 2011, Queensland's coal mining sector had recovered to only 75% of its pre-flood output, costing the Queensland economy \$5.7 billion.

### *In Conclusion*

Australia is a land that has experienced periods of intense heat and also bitter cold, but of even more concern, long droughts often broken with flooding rains.

I wrote to Minister Hunt on 4<sup>th</sup> March explaining the extent to which the Bureau of Meteorology appears to be acting in its own interests, or at least the interests of senior management, rather than working to provide the best possible seasonal rainfall forecasts for Australians. More recently, in particular in my presentation to the Sydney Institute, I detailed the extent to which Bureau staff have corrupted the official historical temperature record so it more closely accords with the theory of anthropogenic global warming. I detailed some of these issues concerning the corruption of the temperature record in my more recent email to Minister Hunt of 10<sup>th</sup> June, as well as suggesting that a cooling trend may be establishing across north-eastern Australia contrary to recent statements from the Bureau. In this email I provided evidence for the cooling trend, evidence that the Bureau did not dispute in its response. Rather it suggests that this cooling trend is somehow consistent with sustained warming.

Your reply of 8<sup>th</sup> July on behalf of the Minister suggests a complete indifference to the issues that I raised in my letter and email, and also an inability to see the contradictions so evident in the "package of responses" that you provided from the Bureau as an attachment.

So what is the point of the Australian parliament if it fails to provide any oversight when there is clear evidence that an important government agency is not acting in the best interests of the nation? I will also ask, what is the point of the fourth estate if it also fails to act on this information? Indeed, I provided the information as open correspondence that was copied to key journalists.

I wrote the letter to Minister Hunt on 4<sup>th</sup> March as a series of seven questions. I had originally hoped that these questions would be tabled by Dr Jensen as I understood that the House of Representatives was the place for critical review of the functions of government, and Dr Jensen is the most highly qualified member of the Australian parliament in any area of science. These questions were then reformulated for Minister Hunt as I was advised that it would be unlikely that Dr Jensen would be able to present the questions as such to the parliament. Now I am told that you are responsible for this area of government, yet you appear unwilling to take any interest in the relevant evidence. Yet at heart are two issues of great political and practical importance to all Australians: the reliability of the claim that 2013 was the hottest year on record; and the unreliability of official seasonal rainfall forecasts since the Bureau moved to the use of a general circulation model in May last year.

In this letter I have again provided evidence, and also context, and a possible way forward through collaborative research, because facts don't cease to exist just because they are ignored.

Yours sincerely

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