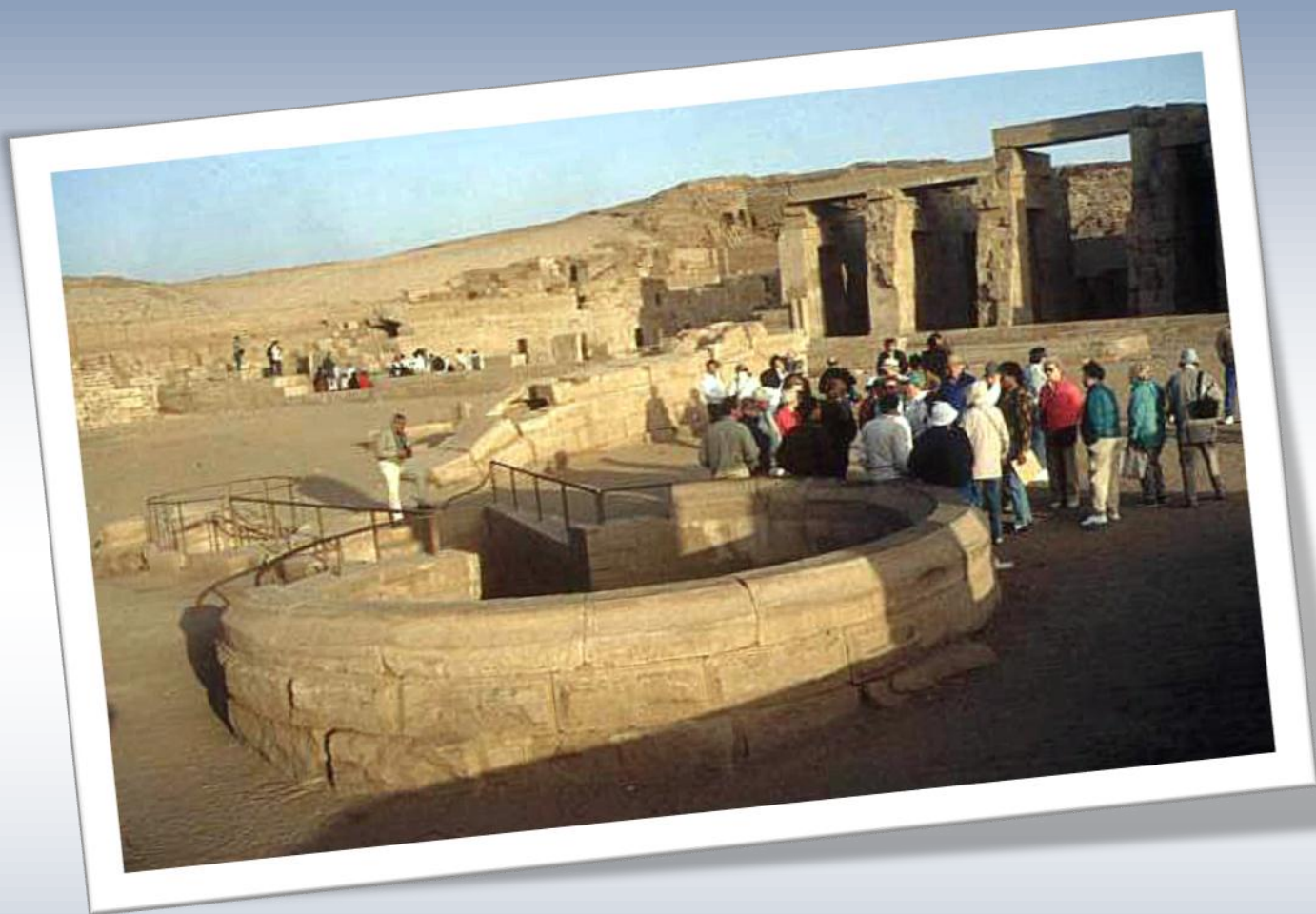


CLIMATE PREDICTABILITY

by W.J.R. Alexander





Climate predictability

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Scientific predictability also raises the question of the scientist's ethical responsibilities. His conclusions must be guided by respect for truth and an honest acknowledgment of both the accuracy and the inevitable limitations of the scientific method. Certainly this means avoiding needlessly alarming predictions when these are not supported by sufficient data or exceed science's actual ability to predict. But it also means avoiding the opposite, namely a silence, born of fear, in the face of genuine problems.

--Pope Benedict XVI, 6 November 2006

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This report is my independent contribution to the rapidly growing divergences of opinions on the whole climate change issue. It is based on many years of study together with my co-authors, colleagues, research assistants, students and others, plus a wealth of publications on this and related subjects.

I have neither requested nor received any financial or material support from any source in connection with the issues described in this report.

Climate and taxes

This well at Kom Umbu on the banks of the Nile River was built in Roman times. It was connected to the river. The relationship could be calculated between the number of steps inundated each year and the extent of the area that was inundated by beneficial flood water, and was therefore taxable,. This was the world's first prediction model!

Today in some Western nations, taxes are levied to control greenhouse gas emissions into the atmosphere that are claimed to result in undesirable climate change.



All photographs and illustrations in this report and the accompanying PowerPoint presentation are by the author unless indicated otherwise.

Introduction

When scientists are silenced by colleagues, administrators, editors and funders who think that simply asking certain questions is inappropriate, the process begins to resemble religion rather than science. Under such a regime, we risk losing a generation of desperately needed research.

--Stephen Ceci and Wendy M. Williams, The scientific truth must be pursued, Nature, 12 February 2009.

Motivation

My direct involvement in the climate change issue started in 1993 when I was requested by the Department of Water Affairs to host a small meeting at the University of Pretoria to discuss the possible effects of climate change on water resources. By then I was thoroughly familiar with the numerical properties of the hydroclimatic processes. I informed the meeting that there were no unexplained anomalies or trends in the data. That remains my view right through to the present day.

My principal motivation and continued efforts in undertaking these studies were driven by the alarmist views of those who maintain that emissions of carbon dioxide and other gases into the atmosphere from various sources have already caused global warming with a whole range of adverse consequences. These will increase in future if no measures are taken to control them. Therefore drastic steps must be taken to reduce our dependence on coal for energy production.

South Africa is almost completely dependent on coal for power generation. We are the second largest exporter of coal. Coal mining is a rapidly expanding industry. Actions to reduce our dependence on coal will have a relatively much larger per capita effect than that of the major developed countries of the world. The measures will reduce our economic competitiveness and must inevitably have an adverse effect on the welfare of the people of this country.

Above all, the measures will be fruitless. There is no scientifically believable evidence to support these claims. The claims are clearly driven by international politics, not science. This was demonstrated by the total failure of the Copenhagen conference last December. It is nevertheless inevitable that there will be damage to the natural environment when actions are taken to accommodate population growth and at the same time to increase the welfare of the millions of poor and disadvantaged people of the African continent including South Africa. I have personal experience of their plight.

Means have to be found to enable us to develop solutions for progress with the minimum of environmental damage. This can only be achieved through coordination and cooperation between the affected disciplines. Instead of this cooperation, the other side have resorted to confrontation and vilification of those of us who have spent our careers developing the infrastructure of our country within economic and environmental constraints.

This report provides an independent perspective on this whole climate change issue based on decades of study and practical experiences. When I started undertaking voluntary work in Alexandra township I reported that there were people living in conditions that no human beings on this planet should have to endure. On one occasion two mothers approached me and pleaded ‘*Help us please*’. I have not forgotten.

Historical background

Climate is never constant. Climate and its consequences are ever-changing phenomena.

The need for multi-year climate predictions is as old as civilisation itself. The best-known example is Joseph’s biblical prophecy. It is documented in all three religious texts – Islam, Judaism and Christianity.

Behold, there came seven years of great plenty throughout the land of Egypt - and there shall arise after them seven years of famine. Genesis, 41, 29-30.

The ancient civilisations did not develop in the mild climates of Europe with their plentiful water supplies but along the major rivers in the arid climates of the Middle East. The annual flooding of the fertile floodplains of the Nile River was the foundation on which the ancient civilisations of Egypt were built. They must have appreciated the need for developing a predictive ability based on observations of river levels. The earliest evidence of routine hydrological observations is the regular horizontal engravings on a stone wall on an island at Aswan in the Nile River. These were used for measuring the water levels in the river some three thousand years ago.

There can be little doubt that the Joseph’s biblical predictions (circa 1700 BC) of seven years of plenty followed by seven years of drought were based on these observations.

Kom Umbu was built in Roman times. There is a large well in the courtyard with a spiral staircase winding down its sides. The bottom of the well is connected to the river. An annual tax was levied on farmers whose land benefited from inundation by the fertile floodwater. The tax collectors developed a simple model relating the number of steps under water in the well, to the farms that were inundated. By counting the number of steps under water each year, the tax collectors could determine which lands were inundated and therefore taxable. **This was the world’s first prediction model.**

Hurst’s Ghost

In 641 AD - more than a thousand years ago - an architecturally beautiful water level gauging structure was built on Rodda Island in the Nile River at Cairo. The record from the Rodda Nilometer is the longest available hydrological record in the world.

Given a long record of river flow, the minimum capacity required to sustain the specified demand from a dam without interruption can be determined using simple arithmetic analyses. A little thought will show that this depends on the most severe drought sequence (the Joseph Effect) in the period of record.

Continuing on this line of thought, it must be obvious that a long record is likely to contain a more severe drought sequence than a short record. It is also obvious that the

greater the year-to-year variability of the flow in the river the greater the storage capacity required to meet the specified demand.

The range R is the required storage capacity ignoring all evaporation and other losses. Assuming a record length of n years and a standard deviation of the time series of S , then

$$R_n / S_n \sim n^h$$

Theoretically, h should have a value of 0.5 for normally (or log-normally) distributed sequences of independent random values.

In 1950 the civil engineer R.E. Hurst analysed 1080 years of data from the Rodda Nilometer recorded during the period 641 to 1946, which he used to determine the required storage capacity of the proposed new Aswan High Dam. He found an unexplained anomaly in the data. He then analysed other long geophysical records, where he found the same anomaly. These were sediment deposits in lakes (2000 years), river flow (1080 years), tree rings (900 years), temperature (175 years), rainfall (121 years), sunspots and wheat prices.

Hurst applied the Rippl method to successive segments of equal length, i.e. $n=10, 20$ etc and found an unexplained anomaly in the data. The value of the coefficient h for the Nile River was approximately 0.75. **He then analysed other long geophysical records, where he found the same anomaly.** This anomaly became known as the Hurst Phenomenon, or Hurst's Ghost.

The information in Table 1 was published 60 years ago. It is important to note that the same multiyear anomalies that were present in the flow records of the Nile River are also present in other climatological and geophysical processes. Surely it must be very obvious that all these processes must be related to a single cause. The only conceivable cause is variations in received solar energy.

Table 1. Values of the Hurst coefficient for various geophysical phenomena.		
Process	n	h
Nile maxima	1040	0.75
Deposits in lakes	2000	0.69
Tree rings	900	0.80
Temperatures	175	0.70
Rainfall	121	0.70
Sunspots	?	0.70
Wheat prices	?	0.69

Given this information how can climate change scientists claim that the multi-year irregularities in the data are caused by human activities? Putting it the other way round, how can they distinguish between natural variability that has been observed since biblical times, and the superimposed human-related consequences? I have undertaken diligent studies of long hydro-climatological data series for the past 30 years. If present,

trends related to human activities were undetectable while the solar signal was very clear.

For more than two decades these anomalies were studied by hydrologists and mathematicians. The studies included the effects of serial correlation. This is the relationship between the value in a particular year with that in previous years. When this could not be identified in the data, the assumption had to be made that no meaningful serial correlation existed. However, once the records became long enough to identify the presence of 21-year serial correlation and its synchronous linkage with sunspot activity, then everything fell into place.

There you have it. Nearly 60 years ago the civil engineer R.E. Hurst demonstrated that the proxy data from tree rings and other sources used by the IPCC to determine past global temperatures possessed anomalies that are related to the Joseph Effect. This in turn is related to concurrent variations in received solar energy.

Now let us put all this together. The very essence of climate change theory is that human activities cause global temperatures to increase with a whole range of consequences including increases in floods, droughts and threats to water supplies. This temperature increase is the foundation on which climate change theory is built.

In 1978 Klemes, a leading stochastic hydrologist, produced his detailed overview paper ***The Hurst Phenomenon: A Puzzle?*** In it he addressed the most puzzling problem that faced academics and practitioners alike. It was very clear that the properties of the hydrological and geophysical time series could not be replicated in mathematical models that assumed random variability about a constant mean. It was clear that the mean was not constant with time.

The next problem was to quantify the behaviour of the mean and its causes. Mathematicians and stochastic hydrologists were eventually forced to give up. They could not describe the changes in the mean values either mathematically or causally.

I was one of the few who travelled an altogether different route. My point of departure, also in 1978, was to determine whether or not a predictable linkage existed between solar activities (using sunspot numbers as proxies) and the hydrological processes. Following this route I succeeded where mathematicians and stochastic hydrologists failed. **The mean is not constant but varies from year to year in 21-year sequences.**

These sequences are closely but not exactly, synchronous with the double sunspot cycle. My co-author Fred Bailey discovered and quantified this relationship. It is the consequence of the sun's wobble as it moves through galactic space under the influence of the orbiting planets.

This leaves the whole IPCC position in total disarray. The public are being misled by the IPCC and its followers with their claim that under natural conditions the climatological processes are sensibly constant and that human activities will result in steady changes in time, all the way through to 100 years into the future. They then claim that by controlling greenhouse gas emissions we can prevent this from happening.

This is simply impossible. All global climate model projections are based on unchanging mean values as their point of departure. Are climate modellers completely unaware of all these anomalies in climate that have been observed since biblical times?

The solution can only be achieved in an atmosphere of multidisciplinary cooperation, truth and honesty. Sadly, these requirements are absent in much of the climate change literature.

[For those who would like a more detailed background to the problem of time series analyses, I strongly recommend that you obtain a copy of Klemes' benchmark paper ***The Hurst Phenomenon: A Puzzle?*** It was published in **Water Resources Research** Vol 10, No 4, in August 1978. Consider this report as an unofficial appendix to his paper!]

It is of particular relevance to this report to note that this anomalous behaviour based on over a thousand years of continuous records, is obviously related to climatic perturbations. It is present in sediment deposits in lakes, river flow, tree rings, temperature, rainfall, sunspots and wheat prices. This raises the immediate question – **why was this readily available information completely ignored by climate change scientists?**

Subsequent developments

Other important developments followed in rapid succession. The Harvard World Water Programme (1950-1956) was the first large-scale hydrological research effort. The electronic computer was developed during World War II to break the secret Enigma code used by the German forces. Soon afterwards IBM developed commercial mainframe computers. They appreciated that one of the principal future applications of electronic computers would be in data storage and processing. They also identified collectors of hydrological data as potential clients. The Department of Water Affairs was one of the earliest users of IBM equipment in South Africa. Their IBM computer occupied three air-conditioned rooms and was far less powerful than today's laptops.

IBM employed three mathematicians to promote the use of mathematics for the analysis of hydrological data. From then onwards, professional mathematicians and statisticians were closely involved in water resource studies.

Research was directed towards developing mathematical descriptions of the properties of river flow that could be used directly for determining the storage capacities of dams required to sustain given demands. The first assumption was that the annual river flows were independent of one another. This is similar to successive numbers generated by a roulette wheel. It was also assumed that the data were Normally distributed. However, they soon ran into trouble when they attempted to replicate the Hurst Phenomenon. The next step was to assume that a relationship existed between the flow in one year and that in previous years, which is described as persistence. One of the problems was that the records available at that time were too short to determine this relationship with confidence.

A sense of frustration is evident in the many research papers published at that time. Here is a selection of some of the more pertinent observations. Wallis, Mandelbrot and O'Connell were IBM mathematicians.

Lloyd (1967) referred to the Hurst phenomenon and commented that either the theorists' interpretation of their own work was inadequate or their theories were falsely based. **Mandelbrot and Wallis (1968)** introduced the terms *Noah Effect* to describe the

fact that extreme precipitation can be very extreme indeed, and *Joseph Effect* to describe the fact that a long period of high or low precipitation can be extremely long.

Yevjevich (1968) stated that attempts at long-range forecasts of water supply based entirely on meteorological processes had misdirected research and raised false expectations. **Wallis and Matalas (1971)** noted that there was a tendency for high flows to follow high flows and for low flows to follow low flows. This was referred to as hydrologic persistence and was attributed to storage processes in the atmosphere or in the drainage basin, either surface or subsurface.

Yevjevich (1972) commented that one of the earliest deterministic methods used in hydrology was the application of the concept of almost-periodic series to various hydrological sequences in search for their hidden periodicities. However, their extrapolation as the prediction of future events represented one of the most spectacular failures of past hydrologic investigations.

Wallis and O'Connell (1973) maintained that the presence or absence of long-term persistence could radically alter the expected value of reservoir design storage and hence the estimate of the firm yield. Finally, **Klemes (1974)** commented that ever since Hurst published his famous plots for some geophysical time series, the classical Hurst phenomenon continued to haunt statisticians and hydrologists, and that **attempts to derive theoretical explanations from the classical theory of stationary stochastic processes have failed**. (My emphasis.) Now, more than 30 years later, this observation remains valid. The hydrological processes are not stationary. This non-stationarity has to be accommodated in advanced water resource analyses, and equally importantly, in global climate models.

In retrospect, one can only admire the insight of these early hydrologists. From then onwards hydrologists lost their way. The problem arose from the inherent assumption that multiyear periodicity was not present in the hydrometeorological data. This being so, it should have been relatively easy to determine the relationship between one observation and immediately previous observations. When they failed to detect appreciable dependence, they assumed that multiyear persistence, if present, was not hydrologically meaningful, and could be safely ignored. They should have taken more notice of the 1973 comment by Wallis and O'Connell above. Perhaps they misinterpreted Yevjevich's 1972 comment, and confused the undeniable presence of persistence, with the erroneous assumption of continuous cyclicity.

Another 30 years have passed. You would have thought that by now we should be able to quantify these regular above and below average sequences in our rivers. They are critically important for water resource development and operation. This has not happened. Why?

We have to go back to the basics. We all know what a flood is but what about a drought?

What is a drought?

Just as a tunnel is not a structure (it is an empty hole) a drought is a non-event (it is the absence of something). There are other difficulties when trying to formulate the definition of a drought.

How can we measure degrees of absence of something? Only by introducing the dimension of time.

If it has been absent for a long time it is more severe than if it has been absent for a short time.

But then it may not have been altogether absent. Is being altogether absent for a short time more severe than been partially absent for a long time? The answer to this question depends on the application. This in turn depends on the storage in the system. Users of water from a storage dam may not notice a short, severe drought, but a subsistence farmer in the catchment may go bankrupt. A commercial farmer in the catchment may survive because he has stored money in the bank to accommodate such an eventuality.

Therefore the key to surviving a variable process is storage - either storage of water in a dam, or storage of lucerne in a barn, or storage of money in a bank. But how much storage is required to accommodate variable conditions? This depends on the severity-duration relationship of the process.

The analytical methodology required for determining the severity-duration relationship, is three-dimensional time series analysis.

With the above in mind, what do climate change scientists mean when they predict that global-warming will increase the severity of droughts? **Most importantly, do they understand how these issues are addressed and solved in South Africa and elsewhere in the world?**

How can climate change scientists, who generally have minimal experience in numerical and statistical methods, proclaim that global-warming will result in an increase in the frequency of damaging droughts? The detection of changes, should they occur, will involve the application of complex analytical procedures and additional decades of observations.

Drought prediction

The IPCC and South African climatological literature are replete with claims that droughts caused by climate change will adversely affect millions of people on the African continent. But if you ask them when, where, and what the severity and duration of the droughts will be, you will be met with silence. This is because it is impossible for climate models to produce this information.

With all the above in mind, imagine the consequences if a global drought should occur before the global economies recover. This possibility has been the source of my deepening concern.

I can understand the difficulty in communicating this prediction to the public without raising alarmist fears. I cannot understand the deliberate attempts by a small, unrepresentative group of climatologists and environmentalists to vilify me and discredit my studies. What are they attempting to achieve? All that they needed to do was to produce scientifically believable evidence to the contrary.

Details of the sequence of events relating to the development of drought prediction methods in South Africa are described in the appendix to this report.

I must stress that the following is not a personal issue. I bear no grudges and have no chip on my shoulders. As far as I know this is the only example anywhere in the world where it is possible to study the application of two fundamentally different theories to a single, very important climate related problem. Please read it in that context.

It is fundamentally important to understand that engineers and stochastic hydrologists have been struggling for decades to understand and quantify the multiyear variations in the hydroclimatic data. There is not the slightest indication that climate change scientists are even aware of the existence of these anomalies let alone attempting to determine the relative magnitude of the postulated consequences of climate change against this background. These anomalies are clearly climate related. How will the postulated consequences of human activities compare with them in frequency and magnitude? Nobody knows. Their ignorance is unacceptable.

Water resource analyses

In the past, the universal approach to water resource development from rivers was along the following lines. If a long record was available at or near the site, and the expected demand for (say) the next 30 years was known, it was a simple exercise.

All that the analyst had to do was to assume that the dam was built at the beginning of the record and determine the minimum storage capacity required to maintain the demand without interruption throughout the period of record. It was called the assured yield.

It worked well. However, as the demands grew relative to the natural flows, the systems started failing. Restrictions had to be imposed as the storage in the dams decreased to unexpectedly low levels. The drought sequences were greater than those experienced during the historical record.

It was soon realised that it was the unusual **sequences** of below average river flow that were the cause of the problem. Instead of going back to the drawing board, stochastic hydrologists tried to quantify these sequences mathematically. They failed to appreciate that mathematics is poor exploratory tool. How can you define a drought mathematically?

For more than 40 years international hydrologists struggled with this problem. They called this anomaly the Joseph Effect. Unfortunately they did not follow Joseph's example. They should have searched for regular sequences in the data in the first instance. Only after they had identified them, should they have described them mathematically.

I have struggled with this problem ever since my technical report ***Long-range prediction of river flow*** was published by the Department of Water Affairs in 1978. I reported that there was a clear, synchronous relationship between the sunspot cycles and periodic changes in river flow. However, this was not strong enough for practical applications.

Years later, I carried out serial correlation analyses. To my surprise there was a statistically significant 21-year serial correlation but no 11-year or even a 1-year serial correlation. This meant that there is a stronger relationship between this year's river

flow and the river flow 21 years ago, than the relationship with last year's river flow! It also confirmed the linkage between river flow and the double sunspot cycle, and not the single sunspot cycle.

I was making progress.

There was still one hurdle to cross. The 21-year periodicity was well-established. But something was missing. For prediction purposes we need to know when the 21-year sequences begin.

Solar linkage

[At this stage the issue becomes technical. I provide details in Chapter 7 *Solar linkage and climate predictability* of my handbook on *Analytical methods for water resource development and management*. It has been sitting on the shelves of the Water Research Commission for the past six months awaiting approval. They do not agree with my dismissal of the climate change issues. This is very important as drought sequences have already commenced in several regions of South Africa. The WRC will lose its credibility as an independent scientific body. Future scientists and engineers will not be forgiving.]

The clash of theories

Evidence-based theory consists of visual interpretation of recorded observations followed by numerical descriptions. These are then applied in practice. Process-based theory consists of theoretical descriptions of natural processes that are incorporated in mathematical models. The outputs cannot be used in practical applications. These are fundamentally different approaches. Natural scientists are fond of theories. Engineers prefer experience-based evidence.

Evidence-based theory is widely used in the engineering sciences. We applied it to 11,804 years of data from 183 stations, and seven different hydroclimatic processes. The data were provided by the responsible authorities. This report summarises our principal conclusions. Much of it is new to science. Please take it seriously. It should not be too difficult to replicate our analyses given enough interest, time and patience.



Ponte Vecchio – photo by the author

The Ponte Vecchio across the Arno River in Florence is my favourite civil engineering structure in my favourite city. It was built by Taddo Gaddi in 1334 close to the site of the first Roman bridge which carried the road from Rome to Paris until 1218 when it was destroyed by a severe flood. The earliest recorded flood at this site occurred in 1177, over 800 years ago. Subsequent severe floods are well documented.

This is one of the many thousands of major bridges in the world built over the ages. Without exception, their designs were based on the application of evidence-based theory.

This is how Variarte described Florence. *We must dearly love Florence, for she is the mother of all those who live by thought.* It is a good point of departure for these comments.

I have studied, researched, published, practised and taught applied hydrology for more than 30 years. My first encounter with the climate change issue occurred in 1993. I informed a small study group that there was no hydrologically believable evidence of changes in the hydrometeorological data that could be ascribed to unnatural causes. That remains my view after diligent searches ever since then.

Scientific theory requires proof. Proof of unnatural global climate change in the form of numerically verifiable evidence has not been forthcoming. Claims of increases in the hydrological extremes, floods and droughts, are demonstrably false. Sea levels are rising at a rate equivalent to the width of my thumbnail per decade. The volumes of Antarctic and Greenland ice that will have to melt to cause the claimed future increases in sea level are astronomical (many thousands of millions of cubic metres). Where will the energy come from to melt the ice? For this energy to reach the polar regions there has to be an increased energy gradient from the tropics towards the poles. This implies a build up of energy in the tropics. There is no evidence of this happening. Furthermore, the melted ice will have to reach the oceans via flowing rivers. But there are no rivers in Antarctica!

Science has made tremendous advancements in many fields. Why is it that the national and international scientific communities have allowed themselves to be misled on these and other elementary scientific requirements associated with unnatural climate change?

When I expressed my views in reports and publications my interpretations were vigorously challenged. I was personally vilified. Having an enquiring mind, I then became increasingly absorbed in trying to determine WHY climate change scientists were so sure of their position when all the physical evidence was to the contrary.

It is now clear, beyond reasonable doubt, that climate change scientists, the IPCC, Al Gore, the Stern Review, the Royal Society and others made, and continue to make, a fundamental error. They applied the wrong scientific theory to the issue. They followed the process theory route instead of the more appropriate, tried and tested evidence-based theory route. Their conclusions have no foundations in science.

Voyage of discovery

I will now take you on a voyage of discovery. Civil engineering is the oldest of all the professions being as old as civilisation itself. From the very beginning, accommodating floods and droughts was one of our major activities. As mentioned above these

problems date back to biblical times. The Noah event occurred about 2500 BC and the Joseph event about 1700 BC.

The Joseph phenomenon in particular has been an increasing worry as our water resources approach their limits of exploitation. Can we follow Joseph's example and predict the likelihood of the onset of a serious regional (or possibly global) drought? Should this occur it will have extremely serious consequences on the welfare of the people of this country and possibly elsewhere, particularly in the light of the current global economic recession. The last time that the world experienced this combination was during the Great Depression of the early 1930s. What is the likelihood that this can happen in the very near future?

Climate change science

An extremely serious situation has developed. This is a brief background.

It started with a genuine concern by senior scientists in Europe and the USA that if uncontrolled, increasing emissions of carbon dioxide and other gases into the atmosphere from burning fossil fuels, mainly coal, could have serious consequences. These were principally increases in global temperatures with consequent adverse changes in rainfall and river flow regimes. The tertiary effect would be undesirable changes in the natural environment and all life and activities that depend on it.

The point of departure in climate change analyses is that natural climatic processes are in some undefined constant condition. **As demonstrated above, this is fundamentally false.** There are many clearly evident anomalies in the hydrometeorological records. These are erroneously ignored in climate change models. This is why after 20 years of massive international effort (the overwhelming consensus), climate change scientists have still to produce **solid, verifiable evidence** of the consequences of human activities. They have been unable to proceed beyond claims that climate change will result in the 'intensification of the hydrological cycle' for which there is no scientifically believable evidence. This nonsensical statement demonstrates the claimants' complete lack of knowledge of basic hydrological processes.

The time and space resolutions of process model outputs are such that they are fundamentally incapable of providing information on time and space scales required by practitioners for flood and water resource analyses. For example, flood applications start with catchment areas as small as urban parking lots and durations measured in minutes. Climate models are fundamentally incapable of producing outputs on these scales.

Establishment of the IPCC

Studies began in earnest with the establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988 – more than twenty years ago. There has been a tremendous amount of research since then. The scientific disciplines involved are climatology and the environmental sciences. The principal analytical method is the application of process theory. Predictions of the consequences are carried out using computer-based global climate models.

It is very important to note that there is an alternative scientific route that could be followed to achieve the same objective of identifying the consequences of the increasing

emissions. The postulated adverse consequences are all within the realm of the engineering and other applied sciences. Change detection and quantification has always been a prime objective in these disciplines. The alternative route therefore involves the engineering and applied sciences. The principal analytical method is evidence-based theory. Predictions of the future conditions can be achieved by applying time series analysis computer models for the detection and extrapolation of trends in the data.

It is also very important to note that global climate models are unable to produce an output that is verifiable. In other words the output can neither be proved nor disproved. What grounds do those who use these models have to refute observations made by others to the effect that there is no believable evidence of the postulated dramatic adverse changes produced by the models?

Because of the extreme importance of the whole climate change issue, the ideal situation would be for authorities to encourage a combination of both approaches. Process-based theory could be used to identify possible outcomes. Evidence-based theory could be used to determine whether or not the predicted outcomes are actually occurring, and if so, their geographical locations and magnitudes. If there was strong evidence of undesirable changes, then the whole climate change issue would have been resolved years ago.

Tragedy

The tragedy is that there is a world-wide policy in the opposite direction. Not only has the evidence-based theory route been avoided, but climate change scientists and their organisations have adopted a policy of deliberately denigrating all those who practise it. Why are they following this thoroughly unethical and unscientific procedure?

This has been my deep personal concern for many years. I have followed the evidence-based theory route. After a prolonged and diligent study of one of the largest and most comprehensive hydrometeorological databases in the world, I have been unable to detect the postulated changes in the hydrometeorological processes against the background of natural variability. If I found them I had a professional responsibility to report them. I had an equal responsibility to report it if they were not present.

I also have an extensive knowledge of natural environmental conditions in southern Africa in all its moods. I have been unable to detect any of the claims of desertification or damage to the indigenous plant or animal species claimed by climate change scientists.

Predictable periodicity

Over the years I have demonstrated the presence of predictable periodicity in hydrological processes and its synchronous linkage with sunspot activity. Together with four co-authors we have gone even further and related these linkages to the sun's wobble under the influence of the orbiting planets as it moves along its trajectory through galactic space.

This movement results in changes in the earth to the sun distance and corresponding variations in received solar energy. We were able to demonstrate that these variations in

received solar energy were considerably larger than the variations due to greenhouse gas emissions.

Not only do our studies completely negate the claims made by climate change scientists, but we can demonstrate with a high degree of assurance that all the proposed measures to limit greenhouse gas emissions will be an exercise in futility. There is no way whatsoever that the costly mitigation measures will have a meaningful effect on the world's climate.

Climate change scientists have vigorously and erroneously maintained that there is no usable predictable periodicity in the data. In doing so they ignored, either deliberately or in ignorance, decades of studies on this subject by many applied hydrologists.

Face saving

As I see it, there is only one face-saving route that the South African authorities can take to extricate themselves from the looming crisis. My strong recommendation is that the authorities should appoint a high level, multi-disciplinary commission of enquiry to receive evidence and report on this whole climate change issue and its consequences on the welfare of this country and its people. As a minimum, the commission should include representative members of the climatological, environmental, civil engineering, agricultural, applied mathematical, physical, and astronomical sciences.

In this report I provide examples of the unbridgeable gap between the application of the two theories to solve a fundamentally important problem. The problem is the development of a drought prediction model. Following the evidence-based theory route I have developed and verified a prediction model suitable for practical applications.

Environmental consequences

For nearly 20 years from 1950 through to 1970, we lived, worked and raised our family while building dams, tunnels and water supply projects in arid regions of South Africa. Subsequently, we spent our summer holidays caravanning through the southern African countryside. We travelled from Plettenburg Bay in the south, northwards through to the stretch of the Zambezi River valley from Victoria Falls in the east to Mana Pools near the Mozambique border in the west, and many areas in between.

In the 1990s I was involved as an expert adviser in an international boundary dispute along the Chobe River in the Caprivi. I presented evidence to the 16 judges of the International Court of Justice in The Hague. There were many inspections of the region by land, canoe and helicopter. I am thoroughly familiar with the environment of sub-continental Africa in all its moods.

In 2006, armed with my digital camera and my GPS, together with three elderly family members (our combined age was more than 300 years) we toured through the region once more. We travelled along the side roads searching for evidence of the claimed damage to the unique flora and fauna of the region. We started at the Aughrabies Falls and travelled northwards along the edge of the Namib Desert through to Henties Bay on the Skeleton Coast north of Walvis Bay.

We visited the famous Kokerboom (Quiver Tree) forest at Keetmanshoop. This tree is Namibia's national emblem. Climate change scientists claim that its extinction is

imminent due to climate change. We travelled along the whole length of the Trans-Kgalagadi Highway through Botswana. We toured through the Kgalagadi National Park searching for evidence of desertification and threats to our indigenous animal species.

If there was any evidence at all of desertification, environmental damage, or loss of indigenous plant or animal species that could be attributed to climate change, I had a professional responsibility to report it. But there was none.

I have a unique collection of digital photographs and their geographical coordinates to support my conclusions. I offered to make them available to anybody with an interest in the subject, including our National Biodiversity Institute. There were no responses. The reasons were obvious.

Climate change and water resources

Introduction

The post-war introduction of electronic computers facilitated the storage, retrieval and processing of large volumes of hydrological and meteorological data. It also coincided with the realisation that many countries of the world with dry climates, including South Africa, faced increasing water shortages within the normal planning horizon of 30 to 50 years.

This resulted in large, co-ordinated research programmes and frequent national and international symposia. A characteristic of the research was its multidisciplinary nature and strong desire to solve nationally and internationally important problems in the water field. This extended into other environmental concerns. Our CSIR operated a very successful National Programme of Environmental Sciences. I chaired its Inland Waters Ecosystems Committee.

Things have changed. These coordinated programmes no longer exist. The scientific disciplines jealously defend their own territories. It has been described as grain silo science. The situation has deteriorated even further.

This whole climate change issue is driven by the combination of two scientific disciplines – climatology and the environmental sciences. Multidisciplinary approaches to this difficult problem are not only ignored, but these scientists have resorted to unethical and unscientific practices of publicly humiliating those who differ from them. Sadly, there is no scientific body that has either the interest or the power to intervene.

Water resources

Until now, the basic assumptions in the analyses of annual rainfall, river flow and flood peak maxima are that the annual data are (1) independent, (2) identically distributed, and that (3) the series are stationary in time. All three assumptions are wrong. The annual values are sequentially independent but not serially independent. The sequential values are not identically distributed as both their mean values as well as their distribution about the mean values change from year to year in 21-year sequences. The series are not stationary in time because of the presence of statistically significant 21-year serial correlation. All these properties are related to a synchronous linkage with

solar activity. This linkage was observed and reported in South Africa by Hutchins more than 100 years ago but nobody listened.

On this climate change issue we could not be further apart. I firmly believe and can prove that there is no meaningful linkage between climate change and South Africa's water resources.

Where do we go from here?

The South African authorities have initiated economically and socially costly measures to control undesirable greenhouse gas emissions. The South African public have been encouraged by irresponsible scientists in the natural sciences to believe that if we adopt these measures this will reduce the risk of increasing floods, droughts and environmental damage here in South Africa. Our scientific community know very well that this is impossible. **By their silence they become parties to the deception.** The basic principles of scientific enquiry are set out in the 1999 UNESCO / ICSU *Declaration on Science and the Use of Scientific Knowledge*. These requirements are totally ignored by climate change scientists. But our scientific community remains silent.

The future?

We now go into the future with two fundamentally different approaches to the climate change issue. In this situation the normal procedure is for governments to appoint multi-disciplinary commissions of enquiry. Not only have the South African authorities including the Water Research Commission failed to do this, they have completely ignored and even denigrated all research conducted by those of us in the engineering and other applied sciences. This approach is antagonising those in the applied sciences whose co-operation is essential to solve the natural climate-related problems that face the peoples of South Africa, and even more importantly, the scientifically defenceless countries to the north of us.

FINALLY

The following notes summarise my four principal conclusions that together completely undermine current climate change theory. They are based on many years of study together with my co-authors, colleagues, research assistants, students and others, plus a wealth of publications cluttering up my garage.

Africa south of the Zambezi River has a greater range of climatic conditions than any other subcontinental region in the world. It is also within the zone of maximum poleward transport of received solar energy. South Africa has one of the world's most comprehensive hydrological and meteorological databases. Together these allow us to use the much more powerful and convincing evidence-based theory instead of the largely hypothetical and numerically unverifiable process-based theory, when studying the effects of climate change. I have produced several gigabytes of written material on the subject. I have attached references to some of them.

These are my principal conclusions. Others who have sufficient knowledge, experience and patience should have little difficulty in replicating the analyses. The database used in the analyses is in the public domain.

1. Claims that the climate of South Africa will become warmer and drier have no foundation. Our studies demonstrate a sustained INCREASE in rainfall during the past century despite increases in global temperatures in this period. This is fundamental to the whole climate change issue. It completely negates the claim that climate change will increase droughts and pose threats to water supplies for which there is no believable evidence.
2. Variations in global climate are driven by multiyear variations in the receipt and poleward redistribution of solar energy via the global atmospheric and oceanic systems and not global temperature changes. It is variations in energy, not temperature that drive the global climatic processes. This renders current climate change models valueless.
3. South African rainfall and river flow exhibit a near 21-year, statistically significant (95%), predictable periodicity that is closely synchronous with the double sunspot cycle. The physical causes remain elusive in the scientific literature. Our studies in this field are a world first. This undermines climate change science where it is steadfastly maintained that South African climate has no multiyear variability other than that caused by human activities. I have published several successful regional flood and drought warnings from 1983 onwards. We have yet to see any similar warnings based on global climate models.
4. There is no scientifically believable evidence of the claimed widespread damage to South Africa's plant and animal species that can be linked to unnatural climate change. It must be appreciated that climate is a regional phenomenon and not a point phenomenon. Observations of damage to single species on their own cannot be attributed to climate change. There has to be EVIDENCE of damage to multiple species within a large climatic region plus the associated changes in the climatic processes. This has not been forthcoming. I am thoroughly familiar with the behaviour of the natural environment of southern Africa from 1950 through to the present and from Plettenburg Bay through to the Zambezi River.

Together, these issues completely undermine the alarmist claims based on climate change theory, which in my opinion is no more than an unverified belief without a proven scientific foundation. There are many South Africans who share my view.

The extremists have gone too far. Their dire predictions are not being fulfilled. It is only a matter of time before their activities fade into history.

Attached:

1. List of my principal publications on this subject.
2. Sequence of events relating to drought prediction methods.

Principal publications by the writer on this subject. 1978-2010

1. **Long range prediction of river flow - a preliminary assessment.** June 1978. Dept Water Affairs. Technical Report TR 80. Govt Printer, 47 pp, (F).
2. **The hydrology of southern hemisphere land masses.** July 1984. Limnological Society of SA, National Environmental Sciences symposium. Wilderness. Symposium paper, 52 pp, (E).
3. **Dimensionality, uncertainty and scale in water resources research.** November 1988. National Inst Water Research, CSIR, Stander Memorial Lecture. Pretoria. Guest audio-visual presentation, 4 pp + slides, (F).
4. **Computer models for the detection of environmental changes.** May 1990. SAICE Computer Divn. Midrand. Article in SAICE magazine, 5 pp, (D).
5. **Determination of the risk of widespread interruption of communications due to floods.** June 1991. Department of Transport. Research report RDAC 90/16. Three volumes. (Alexander and van Heerden).
6. **Properties of widespread, severe floods.** March 1994. British Hydraulics Research Association, second international conference on river flood hydraulics. York, United Kingdom. Chapter in book, ed. White & Watts, John Wiley & sons, 9 pp, (B).
7. **Anomalies in the stochastic properties of river flow and their effect on reservoir yield.** December 1994. South Africa - Taiwan bilateral conference on water resources. Taipei, Taiwan. Conference paper, 12 pp, (E).
8. **Floods, droughts and climate change.** August 1995. SA Journal of Science. Refereed paper, 6 pp, (C).
9. **Variations in annual river flow as indicators of climate variability.** April 1997. 5th International conference on southern hemisphere meteorology and oceanography. Invited guest audio-visual presentation, 15 pp, (E).
10. **Risk and Society - an African perspective.** July 1999. United Nations IDNDR commissioned study. Geneva, Switzerland. Report published by the United Nations, 39 pp, (A).
11. **Flood risk reduction measures.** Handbook. Revised edition, April 2000. Dept Civil Engg, UP. 560 pp. (A).
12. **Statistical analysis of extreme floods.** 2002. SAICE Journal. Volume 44. Number 1. 2002. Refereed paper, 6 pp. (C)
13. **Climate change – the missing links.** September 2002. Science in Africa. General interest article. 8 pp. (D)
14. **Development of a multi-year climate prediction model.** April 2005. Water SA, Vol 31, No2. April 2005, 209-217. Refereed paper (C).
15. **Linkages between solar activity and climatic responses.** May 2005. Energy & Environment, Vol 16 No2 2005. Multi-science Publishing Co Ltd UK. 239-253 (C).
16. **An assessment of the likely consequences of global warming on the climate of South Africa.** November 2005. Extended summary 92 pp. Submitted to the Stern Review.

17. **Water resources and climate change.** June 2007. Civil Engineering. General interest article. (G).
18. **Linkages between solar activity, climate predictability and water resource development.** June 2007. Journal of the South African Institution of Civil Engineering. Vol 49 Nr 2. Refereed paper. (Alexander, Bailey, Bredenkamp, van der Merwe, and Willemse.)
19. **The likelihood of a global drought in 2009-2016.** June 2008. Civil Engineering. General interest article. (G).
20. **Analytical methods for water resource development and management.** 2010 Handbook in preparation, 520 pp.

[See sequence of events on drought prediction below.]

Sequence of events relating to drought prediction

The following is the sequence of events relating to the development of my drought prediction model and the responses of the climate change community. This is for the record as well as for future historical reports on the rise and fall of climate alarmism.

1810. British astronomers reported the linkage between famines in India and sunspot activity.

1893. D.E. Hutchins, conservators of forests, Knysna published a book. ***'Cycles of drought and good seasons in South Africa.'*** Hutchins previously served in the Colonial Office in India during the drought in 1876 when 1.5 million people out of a population of 5 million in the state starved to death during a severe drought. In his book he showed that there was a close correspondence between sunspots and temperatures recorded at the Royal Observatory in Cape Town since 1842. He produced a prediction model based on extensive studies of available data in South Africa and sunspot activity. Note the use of the word 'cycles' in the title of his book.

1925. Department of Agriculture. ***The Great Drought Problem of South Africa.*** Government Printer. Refers to **periodic droughts** in South Africa.

1948. D.F. Kokot. ***An investigation into the evidence bearing on the recent climatic changes over southern Africa.*** Irrigation Department Memoir. Discounts carbon dioxide theory. No evidence of changes in rainfall.

1970. ***Report of the Commission of Enquiry into Water Matters.*** Recommends development of a prediction model for water resources and an investigation into the possible linkage with sunspot activity.

1978. Alexander. ***Long-range prediction of river flow: a preliminary assessment.*** Department of Water Affairs Technical Report TR80. Demonstrates periodicity in river flow and synchronous linkage with solar activity. Relationships not sufficient for predictions at that stage.

1983, January. Alexander. ***Are we entering a drought cycle?*** Department of Water Affairs internal report. *'There is no doubt that the rainfall over the past 12 years has followed the general periodic pattern. The present period of abnormally low runoff is also in agreement with the periodic runoff pattern that I found in the runoff data for the Vaal River prior to 1978, although the onset of the period is earlier than expected. There is therefore increasing evidence of rainfall periodicity and a link with sunspot activity.'*

1983, September. Alexander. ***The current drought - a challenge to hydrologists.*** Publication of the South African National Hydrological Symposium. *'From a water resources point of view the current drought is the most severe drought in the Vaal River system since records commenced in 1906. During the hydrological year that will end in three weeks time, the river flow in the Vaal Dam and Grootdraai Dam catchments will be less than 200 million cubic metres which is less than half the minimum recorded prior to 1978, and only 10% of the average annual flow of the river at Vaal Dam.'*

1987. P.D. Tyson the doyen of South African climatologists devoted a chapter in his book ***Climatic change and variability in Southern Africa*** (1987) to the period of

meteorological record in which he dealt with the occurrence of wet and dry sequences in some detail. Tyson noted that notwithstanding possible doubts that may attach to the statistical significance of a quasi-18 year oscillation, **evidence to support its physical reality is considerable**, (my emphasis). He provided details. [Sadly, his well-documented findings are completely ignored by climate change climatologists.]

1990 October. Alexander. ***Computer models for the detection of environmental changes***. The Civil Engineer in South Africa, October 1990. ‘*Computer models are indispensable for the detection of environmental changes because of the large datasets and the complexity of the environmental processes. Unfortunately many of the processes related to the water environment cannot be modelled successfully but computer-generated graphical presentations can provide a valuable insight.*’

1992. Alexander and van Heerden. ***An assessment of the severity of the current drought***. Technical report. Comparison with historical droughts.

1999. The world’s two highest international scientific bodies, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and the International Council for Science (ICSU), held a world conference in Budapest on science for the twenty-first century. The conference produced a ***Declaration on Science and the Use of Scientific Knowledge***. The following are passages from the declaration that are directly relevant to the climate change issue. The emphases are mine.

We seek active collaboration across all the fields of scientific endeavour, i.e. the natural sciences such as the physical, earth and biological sciences, the biomedical and engineering sciences, and the social and human sciences.

Today, there is need for a vigorous and informed democratic debate on the production and use of scientific knowledge... Greater interdisciplinary efforts, involving both natural and social sciences, are a prerequisite for dealing with ethical, social, cultural, environmental, gender, economic and health issues.

Scientists have a special responsibility for seeking to avert applications of science, which are ethically wrong or have adverse impact.

The practice of scientific research and the use of knowledge from that research should always aim at the welfare of humankind.

The social responsibility of scientists requires that they maintain high standards of scientific integrity and quality control, share their knowledge, communicate with the public and educate the younger generation.

Climate change scientists and their institutions have deliberately flouted these requirements.

1995 Alexander. ***Floods, droughts and climate change***. Refereed paper in the South African Journal of Science Vol 91, August 1995. ‘*Observations of apparent cyclicity of climate extremes – droughts and floods – are as old as civilisation itself. As all climatological processes are driven by the redistribution of solar energy, it is natural to search for explanations of the observed anomalies in solar radiation. In this presentation it is shown that there is an uncanny correspondence between cumulative deviations from the mean annual river flow for most river systems in South Africa and the cumulative deviations from the mean annual sunspot numbers.*’

1997. Alexander. ***Predictability of widespread, severe droughts, and their effect on water resource development and management***. Technical report. April 1997. ‘*The*

periodicity of these sudden changes in South African river flow and the consequent frequent imposition of water restrictions, have been known for the past 25 years. The difficulty was the lack of conclusive proof of the cyclicity due to the shortness of the available records of river flow. An analysis of the inflow records for Vaal Dam has at last provided conclusive proof of statistically significant 21-year periodicity which is no longer in doubt.'

By 1997 the 21-year periodicity in river flow and its synchronous linkage with sunspot activity was no longer in doubt.

In 2003, the IPCC's third assessment report was brought to my attention. Claims were made in the report that conflicted with my studies of the South African hydrological data. I then started writing my reports again.

2004, January. Alexander. ***Climate change, there is no need for concern***. Short note published in WaterWheel. There was a vigorous co-ordinated response. I was not aware at the time that the WRC had already committed itself to this whole climate change issue.

2004, May. WaterWheel published two letters to the editor endorsed by 13 scientists, and two articles endorsed by four scientists. I had obviously raised a sensitive issue. Our views were miles apart. The responses were reasoned rebuttals of my views and further discussions were recommended. But the Water Research Commission would have none of it. The editor stated that these letters and articles concluded the debate on climate change. My reasoned response was rejected.

2004, June. Alexander. ***Floods, droughts, sunspots and wheat prices - the development of a drought prediction model***. Civil Engineering June 2004. *'In 1970, the Commission of Enquiry into Water Matters reported that long-range weather forecasts, even though approximate, would be of tremendous benefit in the management of water resources. A method that meets these requirements is reported here for the first time, but why has it taken so long to achieve it?'* I described the development of the model.

2005, April. Alexander. ***Development of a multi-year climate prediction model***. Refereed paper published in WaterSA Vol 31 No 2, April 2005. There were no comments on the paper at the time.

2005, June. Midgley et al. ***A status quo, vulnerability and adaptation assessment of the physical and socio-economic effects of climate change in the Western Cape***. Report published by CSIR Environmentek, Stellenbosch. This report was by fifteen scientists from seven institutions. The alarmist predictions were all based on the output of computer models that predicted that the climate in the region would become warmer and drier. Regrettably, the report contains a number of demonstrably false statements. For example, it is stated that the world is now warmer than at any time during the past 1000 years. There is no evidence in the literature to support this alarmist statement. It was further predicted that in the Western Cape there is a drying trend from west to east. Analyses of the district rainfall data demonstrate the opposite.

It is further stated that the impacts of climate change manifested by a warmer and drier climate are likely to be a progressive impoverishment its species richness in the internationally recognized biodiversity hotspots, the famous Fynbos (Protea species)

and the Succulent Karoo Biomes (including the famous Kokerbooms). These are national emblems which is why they were emphasised.

Another alarmist conclusion was that economic sectors such as insurance, banks, transport and communication infrastructure and construction may be affected to some degree by climate change. This is nonsensical.

Most objectionable of all was the dismissal of the linkage between climate variability and solar activity. The report completely ignored the wealth of reports and data on the subject summarised in the publications listed above. They then carried on to quote an overseas author. He called this hypothesis into question, citing the small variation of solar output that can be attributed to the sunspot cycle. No attempts were made to explain the well-documented linkage.

All in all, this is a thoroughly unscientific document.

2005, September. Alexander. *Linkages between solar activity and climatic responses*. Refereed paper published in the UK Journal Energy and Environment Vol 16 No 2, 2005. I confirmed the presence of statistically significant 21-year periodicity that is present concurrently in South African annual rainfall, river flow, flood peak maxima, groundwater levels, lake levels and the Southern Oscillation Index. This is directly related to the double sunspot cycle.

2005, November. Alexander. *An assessment of the likely consequences of global warming on the climate of South Africa*. Technical report submitted to the Stern Review in response to calls for comments. It consisted of 92 pages, 15 figures, 13 tables, and 50 references. It was completely ignored!

2006, February. Alexander. *Climate change in the Southern and Western Cape. A critical assessment*. Technical report. I demonstrated that the claims in the Midgley et al report were without substance. An analysis of the rainfall records in the region showed that the rainfall had increased, not decreased. I questioned their rejection of the influence of solar activity on climate for which there is evidence going back to Hutchins' 1893 publication.

I was approached by landowners in the Oudtshoorn area who were concerned about the predicted damage to the valuable Protea species. I was invited to address a meeting on the subject at Oudtshoorn. It was cancelled as a result of pressures from Cape Town. This was the first of many unpleasant occurrences from this source that I was to encounter in the years that followed.

2006, June. Alexander. *Climate change and its consequences – an African perspective*. This technical report is the most comprehensive study on the climate change issue undertaken in South Africa. It detailed the results of a four-year study of the largest and most comprehensive hydrometeorological database assembled for this purpose anywhere in the world. The study was based on career-long professional experiences and research in these fields. It was driven by a deep concern for the welfare of the disadvantaged communities of South Africa and the slowly developing nations of the African continent. The report had 474 pages, 11 chapters, 51 tables, 38 figures, and 218 references. The conclusions were unequivocal. I found no substantiation for any of the many alarmist claims. It also became clear during my studies that science in this important field was being manipulated for political and research funding purposes. I

reported that the reputation of science as an independent, honourable profession was at risk.

2007, January. Alexander. ***'Locally-Developed Climate Model Verified'***. WaterWheel. I demonstrated the verification of my model described in my Water SA 2004 paper ***'Development of a multi-year climate prediction model'***. I also demonstrated the absence of evidence of environmental damage.

2007, February. Anonymous article published in Noseweek. ***'What, me worry?'*** There is a cartoon of me holding a placard reading 'The end is NOT nigh' These are some amusing extracts. *'Even so, it's a rectum-tightening courageous, or pitifully stupid, person who steps up onto the debating podium, looks directly into the unidirectional storm of thousands of scientists and peer-reviewed journal papers to tell the world that climate change isn't worth worrying about.'*

This is the final paragraph.

'The importance of the issue demands that he be exposed for what he is – inadequate to the task he has set himself, and dangerously irresponsible. What matters today is that we take responsible, sensible – and, dare we say it, moral – steps to prevent our planet becoming unliveable. That means listening to the warnings of thousands of scientists from the world's major academies of science, not legacy-seeking has-beens with a disregard for basic facts.'

It was not difficult to trace the source of this anonymous and cowardly article. There was a time in my life when cowardice in the face of the enemy could end up by the perpetrator facing a firing squad! [As a matter of interest a firing squad consisted of six soldiers. One of the rifles had a blank cartridge while the other five were live.]

2007, March. Midgley and Underhill of the National Biodiversity Institute. ***'Is climate prediction model flawed?'*** This vitriolic article should never have been published in a respectable publication. I responded with calm comments under the heading ***Confrontation or cooperation?*** The other side continued with the former approach.

2007, June. Alexander et al. ***'Linkages between solar activity, climate predictability and water resource development.'*** Refereed paper published in the Journal of the South African Institution of Civil Engineering Volume 49 Number 2 June 2007. Details described above. This time there were no responses to our paper.

2007, October. Alexander. ***'Climate change – the failure of science.'*** UK journal Energy and Environment Volume 18 Number 7, October 2007. Early in August 2007 I distributed an e-mail to 71 senior South African scientists and editors of scientific publications requesting advice on the way ahead on the rapidly degenerating climate change issue. I attached the printer's proof of my short article which summarised our studies. It was about to be published in the overseas journal Energy and Environment. A well known person not on my distribution list obtained a copy of my e-mail, ignored my request for confidentiality, and sent an e-mail to the editor of the journal demanding that my article not be published. The editor ignored the request. This is the level to which science has sunk. The reason for the totally unethical behaviour is obvious. There could be no stronger proof of the fact that these people realise that the whole IPCC edifice is about to collapse for scientific, economic and international political reasons.

2008, June. Alexander. '*The likelihood of a global drought in 2009 – 2016*', published in Civil Engineering, June 2008. My prediction was based entirely on observed, predictable periodicity in the data and advanced time series analyses. Again, there were no comments on the paper.

2009, June. Alexander. '*Mathematics versus pattern recognition in water resource studies*'. June 2009. Civil Engineering. General interest article. (G).

2010, June, Alexander. '*Climate change in the Western Cape. Fact or fiction?* General interest report.

More to follow. I will not be silenced!

NB. The above do not include the many progress memoranda that I distributed to my e-mail climate lists during the period 2002 to date.

Memo 12 /12. Climate predictability

Will Alexander alexwjr@iafrica.com.

Monday 15 October 2012

Article in UK Mail Online:

Global warming stopped 16 years ago, reveals Met Office report quietly released... and here is the chart to prove it

The figures reveal that from the beginning of 1997 until August 2012 there was no discernible rise in aggregate global temperatures

This means that the 'pause' in global warming has now lasted for about the same time as the previous period when temperatures rose, 1980 to 1996.

- <http://www.dailymail.co.uk/sciencetech/article-2217286/Global-warming-stopped-16-years-ago-reveals-Met-Office-report-quietly-released-chart-prove-it.html?openGraphAuthor=%2Fhome%2Fsearch.html%3Fs%3D%26authornamef%3DDavid%2BRose>

This report is causing consternation among climate change scientists. My repeated statements that climate change theory has no foundation in science have now been confirmed.

The following summary is from my November 2005, 92-page response submitted to the high level Stern Review appointed by representatives of the G8 nations.

“Global warming will NOT

- ☐ Pose a threat to water supplies
- ☐ Adversely affect agricultural production
- ☐ Increase the risk of floods and droughts
- ☐ Increase the spread of malaria
- ☐ Increase soil erosion
- ☐ Result in the loss of natural plant and animal species
- ☐ Result in desertification

It would be most unwise for South African authorities to force the implementation of costly measures based on unverifiable global climate models and abstract theory for which there is no believable evidence.”

Unproven linkage

My research on the unproven linkage between climate change and water resources increased over the years. It was motivated by the realisation that our water resources are approaching depletion. In 2010 I distributed my detailed technical report on **Climate predictability** in which I demonstrated the false premises on which climate change theory is based. I have attached a copy. It will soon be available on my website now being developed.

My studies in this field continued. Two months ago I completed my technical report on the **Development of a sub-continental scale drought prediction method**. It is a world first. I will describe it in a later memo. Last week the South African Weather Service issued a notice stating that La Nina conditions are developing, and that the coming months are likely to be colder and drier than normal. This confirms my prediction.

I repeat the conclusions listed in my 2005 report. It would be most unwise for the South African authorities and the civil engineers in this field in particular, to implement any measures based on the unverified and unverifiable climate change theory. This is especially in the light of our increasing socio-economic disturbances that are worsened by shortcomings in our water supply infrastructure. **Civil engineers are doing themselves, their profession and the public a disservice by assuming that a linkage exists between climate change and the management of our scarce water resources.**

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Cover photo of a well at Kom Umbu on the banks of the Nile River was provided by Will Alexander.



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