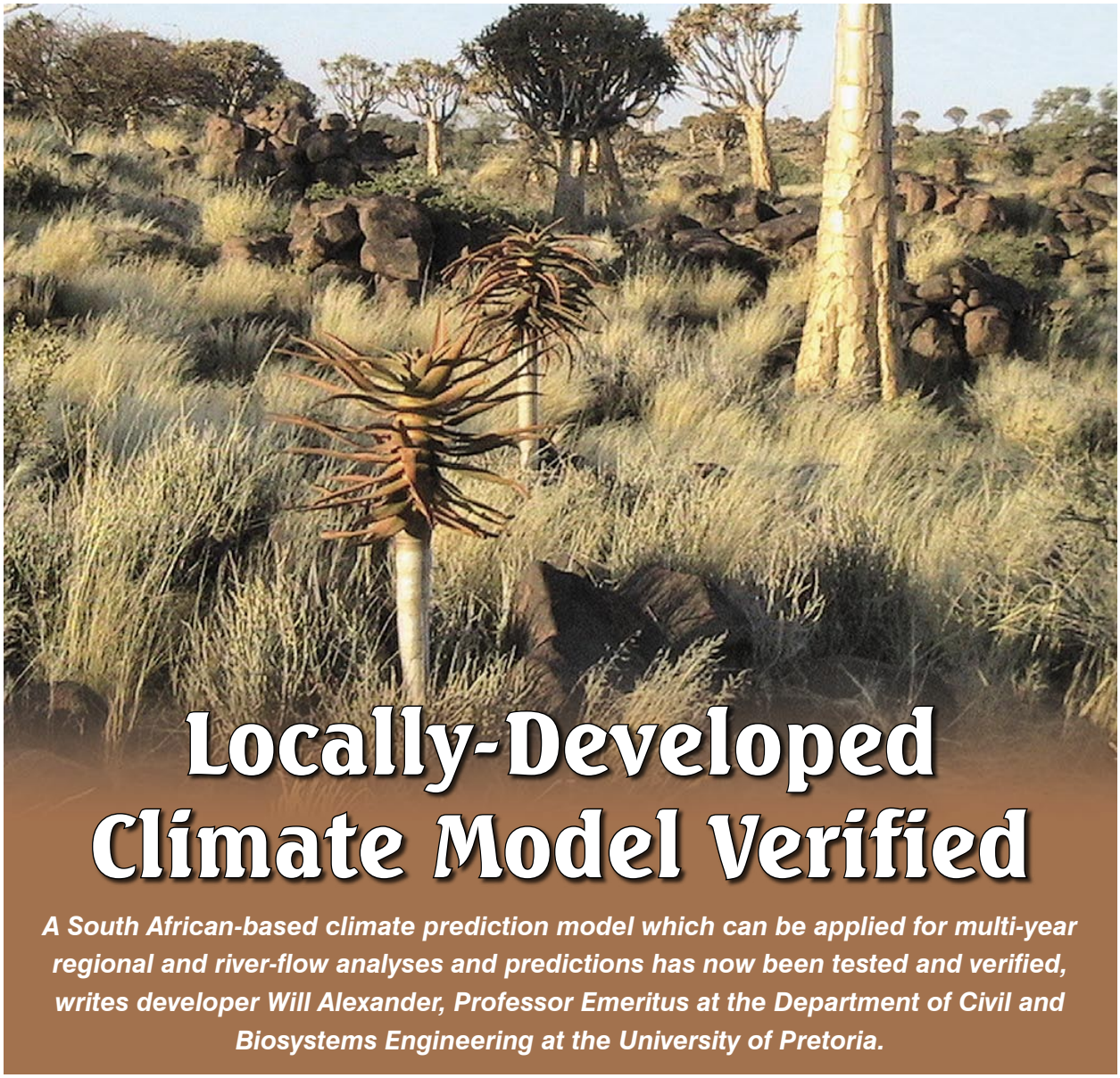


Locally-Developed Climate Model Verified

A South African-based climate prediction model which can be applied for multi-year regional and river-flow analyses and predictions has now been tested and verified, writes developer Will Alexander, Professor Emeritus at the Department of Civil and Biosystems Engineering at the University of Pretoria.

In particular, it is believed that the model can be used with greater assurance than current methods for multi-year simulations required for water resource development and management. In November 2005, during the then present drought, the first of four flood alerts were issued based on the model. Details of action for local authorities to limit the potential loss of life in informal settlements were included.

Three months later large regions of the African subcontinent were wetter and greener than at any time in human memory. Floods occurred in many rivers from Angola in the north through to the coastal rivers of the southern Cape. Dams filled over most of the region. The loss of life was minimal thanks to the emergency services in the areas.

The threatened succulent (Quiver tree) and fynbos species are now in a healthy condition throughout the region. This is in contrast to claims that global warming would result in threats to the region's water supplies, the destruction of these valuable plants, and large areas of southern Africa becoming a desert within the next 50 years.

VERIFICATION OF THE MODEL

The prediction model is based on the statistically significant (and therefore predictable) 21-year periodicity in South African hydrometeorological data. Two figures generated by Alwyn van der Merwe illustrates the application of the model following the first complete hydrological year after its publication.

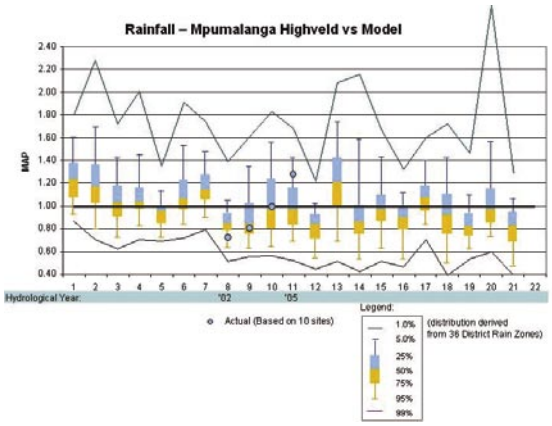


Figure 1: Annual rainfall for the Highveld region.

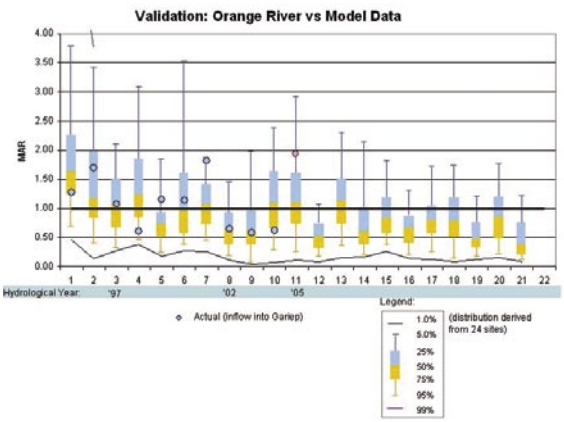


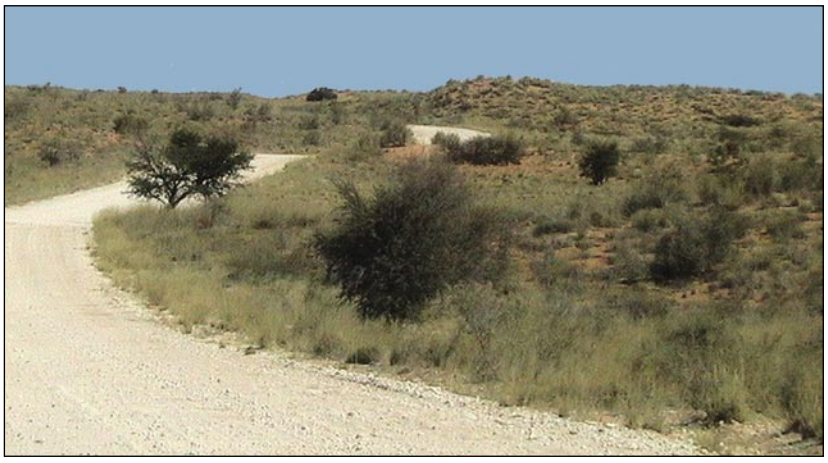
Figure 2: Annual river flow in the Orange River.

Figure 1 shows the annual rainfall for the Highveld region where the interest is in the availability of water for cooling at the coal-fired power stations. Figure 2 shows the annual river flow in the Orange River where the interest is in hydropower generation at the Gariep and Van der Kloof dams.

The figures show box and whisker probability plots derived directly from recorded data within the regions of interest. The outer thin lines show the observed maximum and minimum values. The upper values are off the sheet in the Gariep Dam figure. Current simulation models used for water resource analyses assume that all the boxes are in the same vertical position, i.e. there is no year-to-year variability in the probability distributions.

The next ten years will be critical for water resource development and operation. This has nothing to do with global warming.

While not the purpose of the analyses, besides confirming the validity of the model, they highlight the serious shortcomings in present climate change science. The model is based on the observed 21-year periodicity in the data. Although not included in the model, the synchronous linkage with sunspot activity is beyond all doubt.



The stabilised fossil sand dunes in the Kgalagadi National Park. They show no signs of being rejuvenated as a result of global warming.

This negates the fundamental view of national and international climate change scientists that solar activity is not the cause of climatic variations. From this it was erroneously maintained that all multi-year changes are the result of the discharge of undesirable greenhouse gases into the atmosphere from industrial and other activities.

Note the increase in rainfall relative to the mean values during the four years in Figure 1. This is contrary to publications of climate change scientists in which it was maintained that global warming would result in a decrease in rainfall within this region.

Also note that the observed annual rainfall and river flow during the past years were nowhere near the historical maxima and minima. This is contrary to claims in the climate change literature that global warming will result in an intensification of the hydrological cycle with increases in the magnitude of floods and droughts.

Most importantly, refer to Figure 2 and note that, with the sole exception of year 13 (2007/08), the mean values of the predictions for the next ten years are all less than the long-term mean annual runoff (MAR). The predictions for the present hydrological year in both regions are below average rainfall and river flow.

The next climate reversal from drought to flood conditions based on the analysis of historical data is only expected to occur in 2016. This confirms the linkage with the double sunspot cycle. The next ten years will be critical for water resource development and operation. This has nothing to do with global warming.

WATER RESOURCE DEVELOPMENT IN THE DECADE AHEAD

It is extremely important that all those involved with water resource studies should appreciate that there are fundamental flaws in present global climate models used for climate change applications. These models fail to accommodate the statistically significant, multi-year periodicity in the rainfall and river flow data observed and reported by South African scientists and engineers for the past 100 years. They also failed to predict the recent climate reversal based on the Alexander climate prediction model.

Those who have expressed concerns regarding the environmental consequences associated with water resource development should appreciate that the provision of water to meet rising demands is essential for the prosperity of any nation. South Africa does not have the luxury of abundant water supplies.

Courtesy of Lutz Ebrecht

Rejuvenation of the vegetation in the Namib Desert after the widespread rains of January-February 2006.

The provision of water and conservation of the water environment are non-commensurate objectives in that one cannot be met without sacrificing the other. Reasoned compromises will have to be made. This can only happen if all parties have a sound knowledge of the multiyear properties of rainfall and river flow. The Alexander climate prediction model goes a long way towards meeting this requirement.

Further reading:

- www.wrc.org.za/downloads/watersa/2005/Apr-05/1788.pdf
- *Climate Change and Its Consequences – An African Perspective,* available from Prof WJR Alexander, Tel: (012) 991-3151; E-mail: alexwjr@iafrica.com

The Kalahari dessert countryside completely grass covered with a prolific scattering of seed along the desert roads.