

## 70 YEARS IS PLENTY

Climate Change policy is driven by forecasts of temperatures over the next 100 years. But the computer models need to be checked against the actual temperature trends of the last 100 years. If back-casts are wrong, then fore-casts will also be wrong.

The NZ temperature record averages seven weather stations – Auckland, Masterton, Wellington, Nelson, Hokitika, Lincoln and Dunedin – through the twentieth century. But there are many gaps and flaws up to about 1930 and, apart from these seven, there are very few other records to use as benchmarks.

Auckland: Moved from the Museum to Albert Park in late 1909, and was affected by rapid tree growth and urbanisation during the next 20 years.

Masterton: Early unofficial records were maintained fitfully by various individuals, but the first visit by the MetService was in 1928. In his 1981 thesis dealing with the reliability of weather station data, Dr J Salinger describes the pre-1920 record as “only fair”, and “must be viewed with caution”.

Wellington: Moved from Bolton St to Buckle St (location uncertain) to Thorndon to Kelburn during 1906-1927, all with different aspects, exposures, elevations and urban heat island (UHI) effects. There were no nearby stations for comparisons.

Nelson: The station at the Vicarage 1907-1919 was “very much sheltered, practically under a hedge overgrown by large trees”, so readings were taken over by the Cawthron Institute. These were “not very good at first” but were approved in 1928, before the station moved out to Appleby in 1931.

Hokitika: Was noted for grossly inaccurate readings in 1912, as well as 1919 and 1926. The enclosure was twice criticised as too small and was greatly expanded in 1928.

Lincoln: Dr Salinger’s thesis warns: “The record from 1927 is reasonable for further climatic change analysis; the record prior to 1927 should be used with caution”.

Dunedin: Moved from Leith Valley to the Botanical Gardens in 1913. Dr Salinger noted that “these sites have widely varying thermal properties ... a complex pattern of local microclimates ... even though the move may be small in distance the homogeneity of the record will be quite dramatically disturbed.”

In most of these cases, the problem is just poor data, and nothing can be done about that a century later. The only potential remedy is to excise the flawed periods and replace them with intelligent guesses about what the readings **ought to** have shown. But a little bit of this goes a long way – too many guesses and the record becomes a hypothesis rather than empirical data.

So how would an analyst go about estimating the missing temperature data in, say, Masterton or Nelson? A technique described in Peterson et al (1998) – the main authority provided on NIWA’s website – would manipulate data from several neighbouring stations that are climatologically similar to the subject station. But in those early years, no such benchmark stations existed in the Wairarapa or the top of the South Island – or anywhere else in New Zealand for that matter.

## 70 YEARS IS PLENTY

In his paper “The NIWA Seven-station Temperature Series”, Dr B Mullan notes that 238 stations currently report temperatures to NIWA, but “prior to the 1930s, a lot fewer observations are available”.

In his peer-reviewed 1980 paper “Apparent Trends of Mean Temperature in New Zealand Since 1930”, JWD Hessel found that exposures of most New Zealand weather stations “have been affected by changes in shelter, screenage and/or urbanisation, all of which tend to increase the observed mean temperature. A systematic analysis ... reveals that no important change in annual mean temperature since 1930 has been found at those [few] stations where the above factors are negligible”.

Hessel notes that “many New Zealand climatological stations were established about 1930, there being only a few with unchanged sites and unbroken records before that date”. The clear implication is that data is just too scarce in the pre-1930 period.

The difficulty with early period records is further illustrated by NIWA’s Eleven-station Series. Although a representative sample would include at least six from the South Island, NIWA was unable to cobble together three until 1944 and had to wait until mid-1948 for a fourth. Then it was another six years until data from these was available for any two successive years.

Using some legerdemain known only to Government scientists, NIWA claims that the 11SS begins in 1931. The 7SS should begin at the same time.

So why does NIWA bother stretching the temperature record over this wasteland of missing and unreliable data, when all seven stations are isolated islands? What purpose is served by the extra decades? A time series commencing in 1930 would offer 70 years – more than sufficient to fine tune the computer models.

Other points in favour:

- The series would start in 1930. As this is one of the coldest years in the entire record, the start date should help the warming trend NIWA is seeking.
- The 7SS could coincide with the (alleged) 11SS
- All of the post-1975 years of alleged CO<sub>2</sub> effects on temperatures would still be included.
- The number of dodgy adjustments could be reduced from 49 to a mere 16.