Palaeoclimate records abound with step-wise changes in climate. Why then, is climatology dominated by simple trend analysis? The result is that future climate change is planned for as an incremental process. A step change in the maximum temperature of south-eastern Australia (SEA) in 1996 of 0.9°C at p<0.01 and decrease in March-July rainfall at p=0.05 has led to statistically significant step changes in water resources, fire danger, wine grape ripening and significant impacts in ecosystems with likely knock-on effects. The costs from extreme events linked to these changes are mounting into the billions of dollars. Further analysis shows the region underwent two periods of warming 1967–1972 and 1996–2001 with little change in between. Regional average temperature 24–44°S shows significant step changes (p<0.01) in 1936 (0.2°C), 1968 (0.4°C) and 1996 (0.2°C) and the southern Hemisphere in 1935, 1968 and 1996 with little trend in between. The 1996 step change of 0.3°C is globally significant at p<0.01. Hemispheric and zonal averages of mean temperature all exhibit step changes over the 20th century, culminating in the global shift in 1996. Maximum and minimum temperatures from a range of global climate model simulations for SEA all shift once in the late 20th century and undergo more step changes during the 21st century. If climate is likely to change in a series of abrupt changes, the implications for both adaptation and mitigation are significant. The paradigm of trend analysis that has dominated climatology for decades may have to shift.