COMPELLING NEW RESEARCH SHOWS NATURE RULES CLIMATE

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A study by three Australasian researchers published 23 July 2009 in the highly regarded 'Journal of Geophysical Research' shows that most of the late 20th century global warming and cooling can be attributed to natural climate processes.

The research, by Chris de Freitas (University of Auckland, New Zealand), John McLean (Melbourne) and Bob Carter (James Cook University, Australia), finds that the Southern Oscillation is a key indicator of global atmospheric temperatures seven months later.

Climate researchers have long been aware that El Niño-Southern Oscillation (ENSO) events influence global temperature, such as causing a high temperature spike in 1998 and a subsequent fall as conditions moved to La Niña. According to the three researchers, ENSO-related warming during El Niño conditions is caused by a stronger Hadley Cell circulation moving warm tropical air into the mid-latitudes. During La Niña conditions the Pacific Ocean is cooler and the Walker circulation, west to east in the upper atmosphere along the equator, dominates. It is also well known that volcanic activity has a cooling influence.

The new paper draws these two strands of climate control together and shows a very strong relationship between the Southern Oscillation and lower-atmospheric temperature. This means that ENSO has been a major temperature influence since continuous measurement of lower atmospheric temperature first began in 1958 and can account for at least 70 per cent of the observed global climate variation over the past half-century.

When climate models failed to reproduce historical temperatures a human influence was added to the models. This paper shows that the missing component is, at least in part, El Niño-Southern Oscillation. The difference in output when using these two factors is that one predicts a continuing rise in temperature and the other predicts fluctuations according to the ENSO. The data particularly over the last 10 years indicates that the latter is correct.

The paper has significant consequences for public climate policy. The close relationship between the Southern Oscillation and mean global temperature (MGT), as described in the paper, suggests future global temperatures will continue to change primarily in response to ENSO cycling, volcanic activity and solar changes. This contradicts the claims based on climate models. It should be noted that the IPCC acknowledges in its 4th Assessment Report that ENSO conditions cannot be predicted more than about 12 months ahead. It follows that predictions of global temperatures more than 18 months ahead cannot be relied on.

The paper also confirms what many scientists already know: which is that no scientific justification exists for emissions regulation, and that, irrespective of the severity of the cuts proposed, an emissions trading scheme will exert no measurable effect on future climate.

Technical Note

Not surprisingly, a storm has broken out over research saying human activities are not the main factor behind climate change. In an attempt to denigrate the work, claims have been made that the research fails to effectively detect trends in MGT. This is misleading and causes confusion, especially among those people who have not read the paper.

The paper by McLean et al does not analyse trends in MGT; rather, it examines the extent to which ENSO accounts for variation in MGT. The research concludes that MGT has for the last 50

years fallen and risen in close accord with the SOI of 5-7 months earlier and shows the potential of natural mechanisms to account for most of the temperature variation.

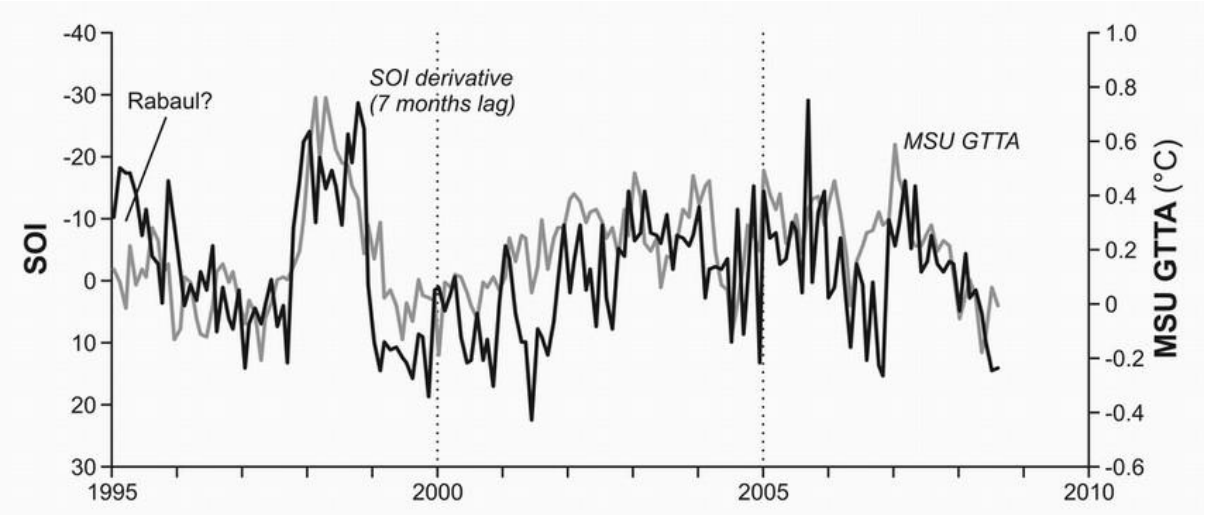
It is evident in this paper that ENSO (ocean-atmosphere heat exchange) is the primary driver of MGT (i.e. El Niños cause global warming and La Niñas cause global cooling). All other mechanisms are small in comparison. The reason may be due to Hadley circulation which is itself linked to changes in sea surface temperature (ocean heat supply) and the Walker Circulation, that is, ENSO. Hadley circulation is the main mechanism for moving the surplus of energy at near the equator to high latitudes and plays a key role in the general circulation of the atmosphere. Changes in Hadley circulation affects convection and thus atmospheric moisture content and cloud cover which may in turn affect net solar heating as well as the transfer of heat from Earth to space.

Those who claim correlation using derivatives (differences) removes a linear trend miss the point. McLean et al use this method to construct Figures 5 and 6. It should be noted that detrended data was used purely to establish the time lag between the Southern Oscillation Index (SOI) and MGT in Figures 5 and 6. This time lag was then used in Figure 7 to show that close correlation between trends in temperature and changes in the Southern Oscillation Index seven months previously.

Figure 7 presents the data in its original form; namely, data that is not detrended, but with the time shift in SOI obtained from the detrended data. If an underlying trend existed, it would have shown up in Figure 7. One would see the temperature line rising away from the SOI line if, for example, rising atmospheric carbon dioxide concentrations had a significant influence. There is little or no sign of this.

The results in Figure 7 clearly show that the SOI related variability in MGT is the major contribution to any trends that might exist, although the McLean et al study did not look for this. The key conclusion of the paper, therefore, is that MGT is determined in most part by atmospheric processes related to the Southern Oscillation.

For more on trends, recent work by Compo and Sardeshmukh (Climate Dynamics, 32:33-342, 2009) is illuminating. The abstract includes the statement: "Evidence is presented that the recent worldwide land warming has occurred largely in response to a worldwide warming of the oceans rather than as a direct response to increasing greenhouse gases (GHGs) over land."



This figure from the McLean et al (2009) research shows that mean monthly global temperature (MSU GTTA) corresponds in general terms with the Southern Oscillation Index (SOI) of seven months earlier. The SOI is a rough indicator of general atmospheric circulation and thus global climate change. The possible influence of the Rabaul volcanic eruption is shown.

The influence of the Southern Oscillation on tropospheric temperature

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Abstract

Time series for the Southern Oscillation Index (SOI) and global tropospheric temperature anomalies (GTTA) are compared for the 1958 to 2008 period. GTTA are represented by data from satellite microwave sensing units (MSU) for the period 1980-2008 and from radiosondes (RATPAC) for 1958-2008. After the removal from the dataset of short periods of temperature perturbation that relate to near-equator volcanic eruption, we use derivatives to document the presence of a 5-7 month delayed close relationship between SOI and GTTA. Change in SOI accounts for 72 percent of the variance in GTTA for the 29-year long MSU record and 68 percent of the variance in GTTA for the longer 50-year RATPAC record. Because ENSO is known to exercise a particularly strong influence in the tropics, we also compared the SOI with tropical temperature anomalies between 20°S and 20°N. The results showed that SOI accounted for 81 percent of the variance in tropospheric temperature anomalies in the tropics. Overall the results suggest that the Southern Oscillation exercises a consistently dominant influence on mean global temperature, with a maximum effect in the tropics, except for periods when equatorial volcanism causes ad hoc cooling. That mean global tropospheric temperature has for the last 50 years fallen and risen in close accord with the SOI of 5-7 months earlier shows the potential of natural forcing mechanisms to account for most of the temperature variation.

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