



Geoclimatic Studies

Institute of Geoclimatic Studies,
Climatological Department,
Okinawa University, Okinawa
OK-184NJ, Japan

Journal of Geoclimatic Studies (2007) 13:3. 223-231

DOI:152.9967/r755100729-450172-00-4

Carbon dioxide production by benthic bacteria: the death of manmade global warming theory?

Daniel A Klein*, Mandeep J Gupta*, Philip Cooper**, Arne FR Jansson**.

*Department of Climatology, University of Arizona; **Department of Atmospheric Physics, Göteborgs Universitet (University of Gothenburg, Sweden.)

Received: 18 February 2007 / Accepted: 9th August 2007 / Published online: 3rd November 2007

©Inst Geoclimatic Studies 2007

Home
Editorial Board
Vol.23 No.3 contents
Recent issues
Contact details

Abstract

It is now well-established that rising global temperatures are largely the result of increasing concentrations of carbon dioxide in the atmosphere. The "consensus" position attributes the increase in atmospheric CO₂ to the combustion of fossil fuels by industrial processes. This is the mechanism which underpins the theory of manmade global warming.

Our data demonstrate that those who subscribe to the consensus theory have overlooked the primary source of carbon dioxide emissions. While a small part of the rise in emissions is attributable to industrial activity, it is greatly outweighed (by >300 times) by rising volumes of CO₂ produced by saprotrophic eubacteria living in the sediments of the continental shelves fringing the Atlantic and Pacific oceans. Moreover, the bacterial emissions, unlike industrial CO₂, precisely match the fluctuations in global temperature over the past 140 years.

This paper also posits a mechanism for the increase in bacterial CO₂ emissions. A series of natural algal blooms, beginning in the late 19th Century, have caused mass mortality among the bacteria's major predators: brachiopod molluscs of the genus *Tetrarhynchia*. These periods of algal bloom, as the palaeontological record shows, have been occurring for over three million years, and are always accompanied by a major increase in carbon dioxide emissions, as a result of the multiplication of bacteria when predator pressure is reduced. They generally last for 150-200 years. If the current episode is consistent with this record, we should expect carbon dioxide emissions to peak between now and mid-century, then return to background levels. Our data suggest that current concerns about manmade global warming are unfounded.

Keywords: global warming, carbon dioxide, eubacteria, *Tetrarhynchia*, benthic, numerical modelling.

Introduction

Manmade global warming theory could fairly be described as the dominant scientific concern of our age. A huge volume (>10,000) of papers and expert reports warns of impending catastrophe if the consumption of fossil fuels and the resultant emissions of carbon dioxide are not curbed. This theory now has a major influence on policy among most of the governments of the developed world, and an increasing number of governments in the developing world. The cost of current plans to combat this perceived problem is likely by the end of the 21st Century to outweigh the combined costs of global spending on transport and health (Amstel and Barnes, 2006).

The proposed mechanism for radiative forcing caused by carbon dioxide emissions is straightforward. Rising CO₂ concentrations in the atmosphere do not impede shortwave solar radiation from reaching the earth's surface, but they do prevent the reflection of some long-wave radiation from the earth's surface back into space. The net effect is atmospheric warming (positive radiative forcing), as incoming heat exceeds reflected heat.

This process is well-established. The question, however, centres on the source of the carbon dioxide emissions required to cause the current warming trend. The "consensus" theory suffers from a major and fundamental flaw: the volume of carbon dioxide required to cause the current increase in atmospheric concentrations and the resultant rise in global temperature (0.7°C over the pre-industrial mean) is two orders of magnitude greater than the total volume of manmade emissions (Wu, 2003).

Over the past 140 years, atmospheric concentrations of CO₂ have risen from ~280ppmv to 379ppmv (Intergovernmental Panel on Climate Change, 2007a). Total emissions from the combustion of fossil fuels in this period can account for a rise of only 0.3-0.4ppmv - in other words, only one third of one per cent of the total increase (Wu, 2003). This inconvenient truth is well-known among climate scientists, and the simple arithmetic behind Wu's analysis has yet to be challenged, though four years have elapsed since it was first published. Instead, it is simply ignored or overlooked by all those who subscribe to the "consensus" position. A comprehensive analysis of the assessment reports published by the Intergovernmental Panel on Climate Change shows that this - the most fundamental problem with the manmade global warming model - has not been acknowledged by the panel, let alone addressed (Klein and Gupta, 2006). When we have challenged prominent climate scientists who subscribe to the climate change "consensus", our concerns are met with evasion and in some cases aggression. Discussion of this issue has been all but prohibited by the editors of peer-reviewed scientific journals. This journal is a courageous exception, but it too has come under great pressure not to raise the issue. There is, we conclude, simply too much at stake.

If carbon dioxide emissions from fossil fuels are far too small to have caused the current rise in atmospheric concentrations, there must be another, and much greater, source. Having examined all the possible terrestrial sources of atmospheric carbon dioxide, we found that only one had the potential to be commensurate with the volume of additions to atmospheric CO₂ required to account for a rise of 99ppmv.

The metabolic pathway of saprotrophic eubacteria is identical to that described by the Kattweizer-Gruhe Cycle for multicellular organisms (Rosetti and Hirsch, 1966). The principal respiratory product is carbon dioxide. But the total mass of benthic bacteria outweighs the mass of all other organisms using the Kattweizer-Gruhe Cycle by approximately 30:1 (Mitsui et al, 1998). Significant fluctuations in benthic eubacterial populations are therefore likely to cause far greater impacts on atmospheric carbon dioxide concentrations than all other ecosystem effects.

The palaeontological record shows that, from the early Pliocene onwards, benthic bacterial communities have undergone violent fluctuations in mass (Tibbold, 1996). The relationship with algal blooms, whose breakdown product (difluoroethylene sulphate) is toxic to the primary eubacterial predators - *Tetrarhynchia* brachiopods - is also well-known (Dillon, 1998; Wyn Jones and Torres, 2001). We set out to test the hypothesis that fluctuating volumes of carbon dioxide in the atmosphere result from fluctuating populations of benthic eubacteria. Not only did we discover that the volume of carbon dioxide produced by the bacteria over the

past 140 years precisely matches the increased concentration of CO₂ in the atmosphere, our data also show that trends in bacterial population precisely match changes in atmospheric concentrations over that period. We therefore propose the hypothesis that "manmade global warming" is actually the product of changing population patterns among benthic bacteria.

Methodology

Using the data on benthic bacterial populations produced by Parker (2003) and Parker and Birch (2005), we calculated the mean mass of bacteria per square metre of continental shelf between 61°S and 67°N (the primary zones of bacterial activity). Using the Bonner Index of oceanographic dimension (Katsu, 1986) we were then able to employ the LOYDENT4M three-dimensional modelling equation to produce a global estimate of benthic eubacterial mass. This is defined as:

$$Q^{3uct} + 3\Psi = XF^0 \times \Delta j_y \{ (\Sigma y.ct79 + \theta(q-1) - \lambda jc + 2) \}$$

$$\Delta^3 - 3/4 \Phi^2, \Omega_{13b}$$

Where *Q* is raw mass, *u* is area, *c* is osmotic conductivity, *Ψ* is the vertical (neo-Falkian) benthic discontinuity, *X* is concretised diachronic invariance (P-series), *F* is trans-dimensional flow structure and *j_y* is the non-rectilineal harmonic regressivity of the constant *Δ*.

The control run was defined as:

$$Q^{3uct}, j_y \Phi = \Sigma cy^{311}$$

using the relative standard error:

$$\Sigma \Psi \lambda \Delta_{23} = \theta_{2c}$$

This gives an outing variable of less than the value of *θ₁₄Ω*, which is corrected by the antedendoidal deterministic yield factor *j*.

The CGM values are located between 0 and 2.25% to account for inter-annual variability of the asynchronous (counterbifurcated) non-tardigrade log run.

Palaeodata were drawn from Tibbold (1996) and Tibbold and Rawsthorne (1998), using the living bacterial mass : fossil ratio developed by Hering et al (1977) and refined by Xang (2000), then fed into the same LOYDENT4M three-dimensional modelling equation, using control run:

$$Q^{2uct}, y\Phi^2 = \Sigma cy^{342}$$

Quantified preparations of *Polybacter spp* were then cultivated in laboratory conditions at a constant temperature of 6°C and a constant pressure of 41 atmospheres and an oxygen content of 2.3% to simulate averaged conditions in the benthic environment (Ragnsdottir 2003). The carbon dioxide released was collected in a Willetts inverter and passed through a zinc-loaded demi-osmotic membrane before being subject to the standard Smithian analysis using the C33 marker.

Carbon dioxide production from the *Polybacter* sample was calculated as:

$$4\delta_{161} \times \lambda \mathcal{K} \eta_{5,6,1,8} \Phi - 4 = \{ (\Sigma \Psi^2 H_{yt} - 14 \mathcal{P} \rho) \times 49 \}$$

$$2\beta \times 3/8 kxgt - \mathcal{S}$$

Where *δ* is bacterial mass, *λ* is substrate volume, *η* is the square root of the constant *Ψ* and *H_{yt}* is the polychromatic "coffee-ground" Schumann factor for semi-particulate distribution.

The relative standard error was:

$$\delta^2 \Phi - 3hrthb$$

All analyses were conducted with P software.

Results

Bacterial mass was found to fluctuate between 4.3 x 10⁻²¹g/m² and 7.1 x 10⁻³²g/m² in a regular cycle, with a periodicity of 450,000 years, across the past 3my, as described by Figure 1.

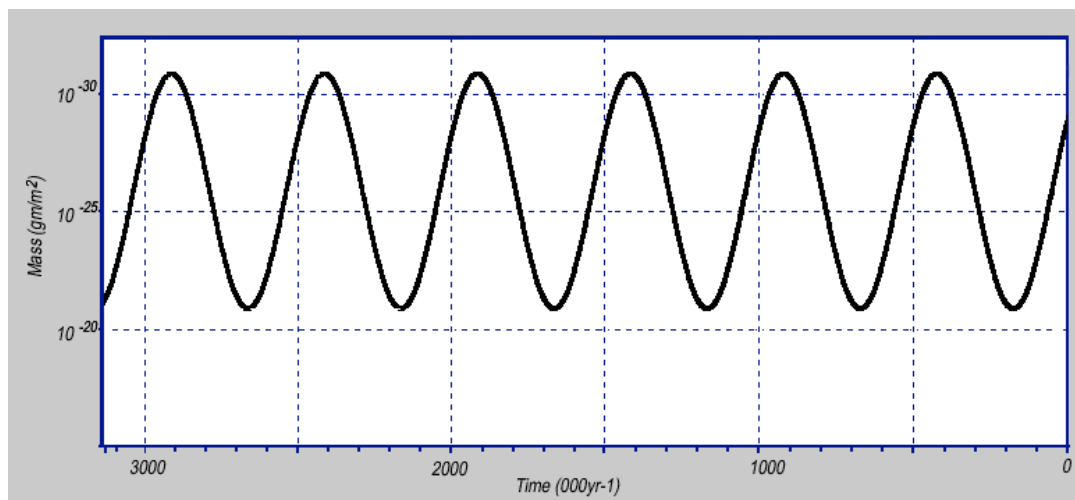


Figure 1: Mean mass fluctuations of benthic eubacteria on the Pacific and Atlantic continental shelves since the early Pliocene.

Bacterial mass has been rising over the past 140 years and is currently approaching its periodical peak, as described by Figure 2.

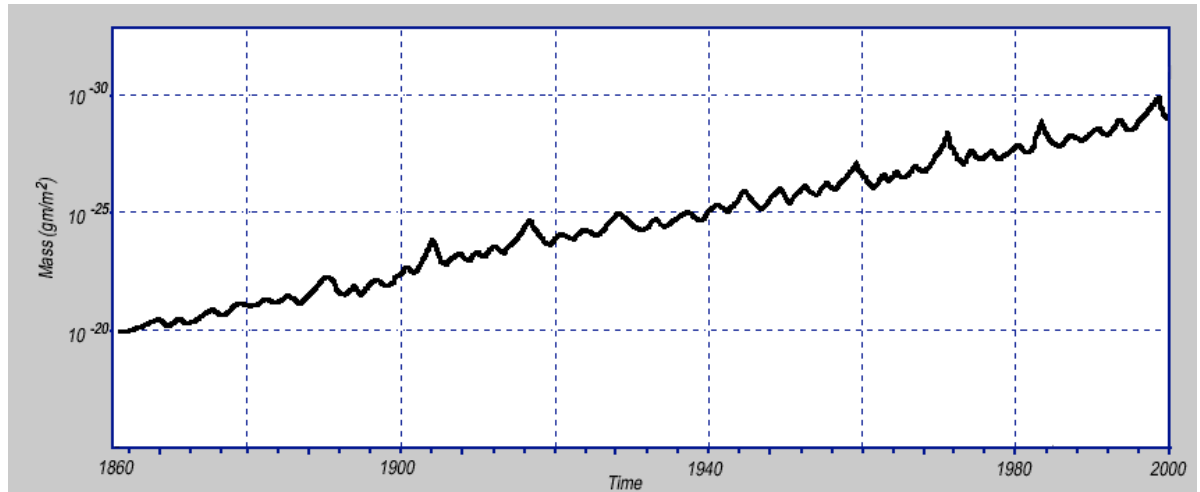


Figure 2: Mean mass fluctuations of benthic eubacteria on the Pacific and Atlantic continental shelves since 1860.

Total carbon dioxide emissions from benthic eubacteria were found to fluctuate, in line with the periodicity of bacterial mass fluctuations, from 2.1 GtC yr^{-1} to 8.8 GtC yr^{-1} . These were plotted against known changes in atmospheric carbon dioxide concentrations (Intergovernmental Panel on Climate Change 2007b) over the past 3my, as shown in Figure 3:

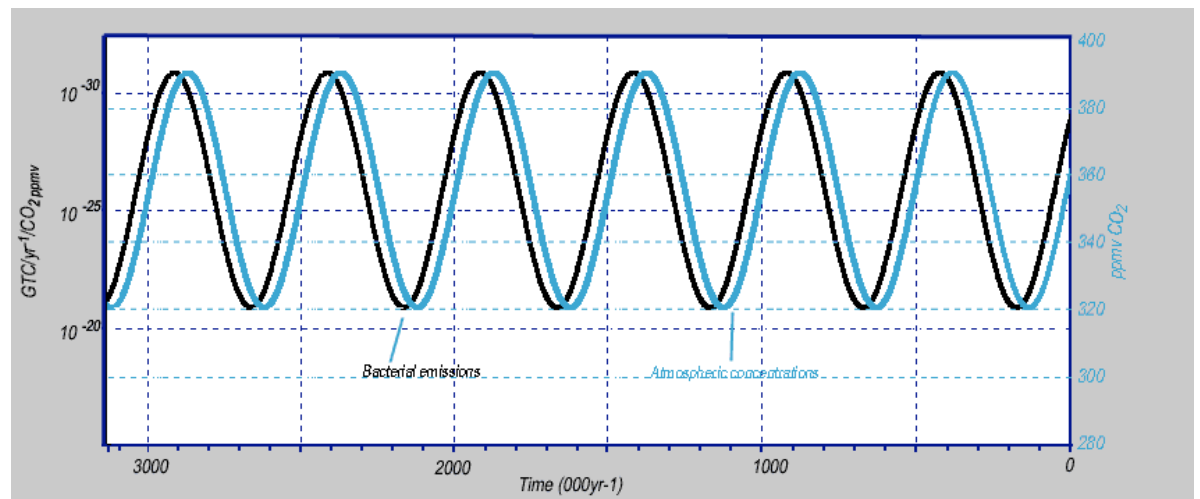


Figure 3: Temporal evolution of carbon dioxide emissions from benthic eubacteria on the Pacific and Atlantic continental shelves since the early Pliocene, plotted against known changes in atmospheric carbon dioxide concentrations.

Fluctuations in carbon dioxide emissions from benthic eubacteria were then plotted in finer detail against known changes in atmospheric carbon dioxide concentrations (Intergovernmental Panel on Climate Change 2007b) over the past 140 years, as Figure 4 shows:

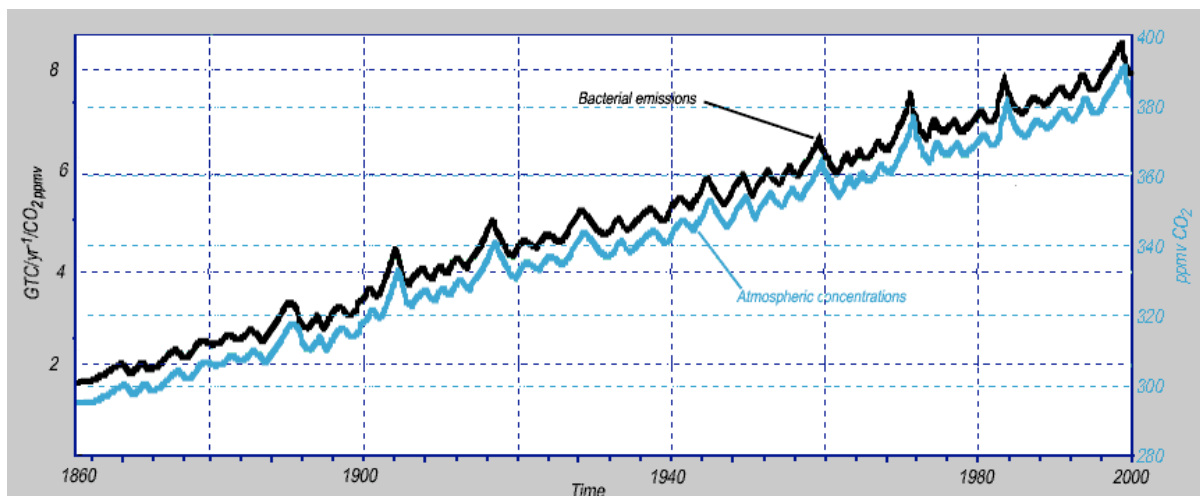


Figure 4: Temporal evolution of carbon dioxide emissions from benthic eubacteria on the Pacific and Atlantic continental shelves since 1860, plotted against known changes in atmospheric carbon dioxide concentrations.

Known averaged global temperature records over the past 140 years (Intergovernmental Panel on Climate Change 2007c) were then run against fluctuations in carbon dioxide emissions from benthic eubacteria, as Figure 5 demonstrates:

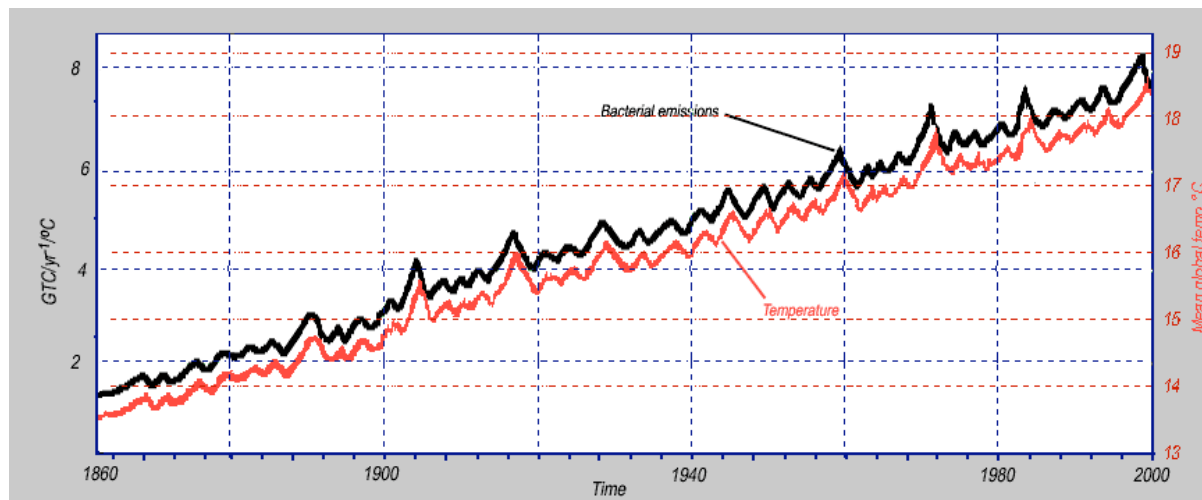


Figure 5: Known temperature changes since 1860, plotted against temporal evolution of carbon dioxide emissions from benthic eubacteria.

It is clear that a precise match has been obtained, with an average timelag of 12.2 years, as standard atmospheric chemistry would predict (Crutzen and Lelieveld 2001).

The same could not be said of the relationship between temperatures and industrial (manmade) carbon dioxide emissions, as Figure 6 shows:

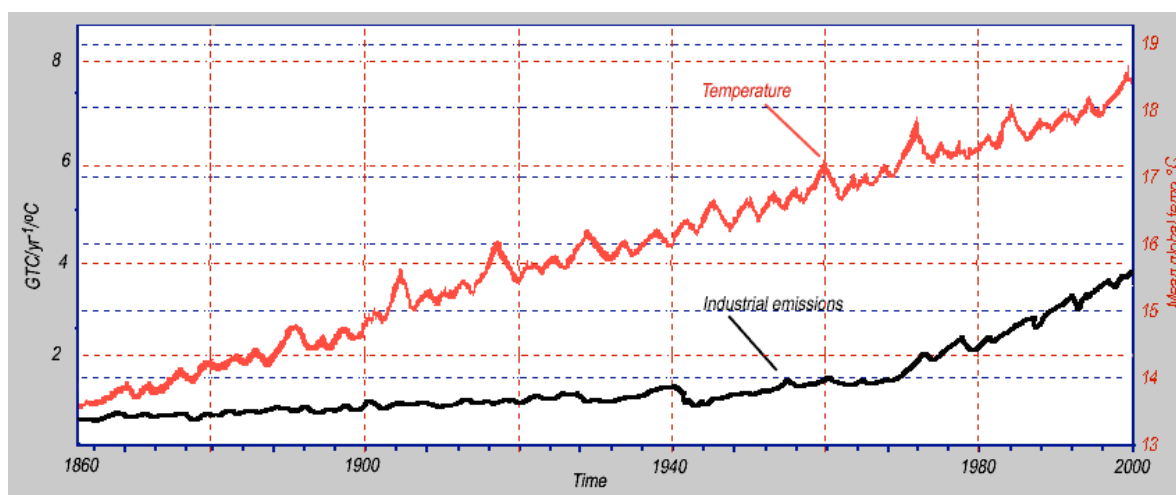


Figure 6: Known temperature changes since 1860, plotted against known temporal evolution of carbon dioxide emissions from fossil fuel combustion.

Discussion

It was not our intention in researching this issue to disprove manmade global warming theory. We have received no funds, directly or indirectly, from fossil fuel companies and have no personal interest in the outcome of the debate. We simply noticed an anomaly in the figures used by those who accept the "consensus" position on climate change and sought to investigate it. But the findings presented in this paper could not be more damaging to manmade global warming theory or to the thousands of climate scientists who have overlooked - sometimes, we fear, deliberately - the anomaly. We have found a near-perfect match between the levels of carbon dioxide produced by benthic eubacteria and recent global temperature records. By contrast we note what must be obvious to all those who have studied the figures with an open mind: a very poor match between carbon dioxide produced by burning fossil fuels and recent global temperature records.

Moreover we note that there is no possible mechanism by which industrial emissions could have caused the recent temperature increase, as they are two orders of magnitude too small to have exerted an effect of this size. We have no choice but to conclude that the recent increase in global temperatures, which has caused so much disquiet among policy makers, bears no relation to industrial emissions, but is in fact a natural phenomenon.

These findings place us in a difficult position. We feel an obligation to publish, both in the cause of scientific objectivity and to prevent a terrible mistake - with extremely costly implications - from being made by the world's governments. But we recognise that in doing so, we lay our careers on the line. As we have found in seeking to broach this issue gently with colleagues, and in attempting to publish these findings in other peer-reviewed journals, the "consensus" on climate change is enforced not by fact but by fear. We have been warned, collectively and individually, that in bringing our findings to public attention we are not only likely to be deprived of all future sources of funding, but that we also jeopardise the funding of the departments for which we work.

We believe that academic intimidation of this kind contradicts the spirit of open enquiry in which scientific investigations should be conducted. We deplore the aggressive responses we encountered before our findings were published, and fear the reaction this paper might provoke. But dangerous as these findings are, we feel we have no choice but to publish.

References

- Amstel, TN and G Barnes (2006). Whole-life costing of a 40% carbon cut: an econometric analysis. *Ecological Economics*, 15:6. 227-241.
- Crutzen, PJ and J Lelieveld (2001). Human impacts on atmospheric chemistry. *Annual Review of Earth and Planetary Sciences*, 29. 17-45.
- Dillon, NRI (1998). Ecological implications of algal blooms in the eastern Pacific. *Journal of Ocean Biochemistry*, 36:1. 1146-1159.
- Hering, J, HR Nissan, ML Hill, S Byers, LT Cummins-Pearce (1977). Stoichiometric estimations of palaeomass of benthic eubacteria from fossil records. *Nature*, 187:9. 2137-

2261.

Intergovernmental Panel on Climate Change (2007a). Climate Change 2007: The Physical Science Basis Summary for Policymakers. <http://www.ipcc.ch/SPM2feb07.pdf>

Intergovernmental Panel on Climate Change (2007b). Technical Summary - Working Group I. http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_TS.pdf

Intergovernmental Panel on Climate Change (2007c). Observations: Surface and Atmospheric Climate Change. http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch03.pdf

Katsu KI (1986). 3-dimensional sediment analysis using the Bonner Index of oceanographic dimension. *Journal of Applied Oceanography*, 14:4. 632-641.

Klein, DA and M Gupta (2006). The carbon gap: analysis of IPCC reports shows no acknowledgement of scale problem. *Journal of Geoclimatic Studies* 22:3. 199-206.

Mitsui, L., JK Hitaharo, S Sato, O Atamari (1998). Estimation of benthic bacterial mass using cauterised quadrant analysis: a global figure. *Annals of the Benthic Zoological Society* 15:1. 44-71.

Parker, R (2003). Ocean Floor Sampling Programme (Benthic Eubacteria 3): Results from Geostat Probe VI. *Science* 445:17. 4786-4794.

Parker, R and Birch, SM (2005). Sample invariants from diachronically sectioned quadrants in the western Atlantic: towards a pneumatic equation for bacterial mass. *Annual Review of Ocean Biology*, 13. 78-90.

Ragnsdottir, B (2003). Bench-level replication of meso-benthic conditions. *Experimental Biology*, 6:17. 93-101.

Rosetti, CG and EW Hirsch (1966). Linear reciprocity of the Kattweizel-Grube Cycle in multi- and unicellular eukaryotes. *Nature* 166:11. 1523-1547.

Tibbold, WR (1996). Variations in benthic eubacterial mass on mid-latitude continental shelves: a record of change. *Journal of Submarine Research* 16:7. 334-336.

Tibbold, WR and JD Rawsthorne (1998). Miocene, Pliocene and Plasticine fossil records for eukaryotic mass on the West African continental shelf. *Journal of Submarine Research* 18:5. 196-203.

Wu, X (2003). Atmospheric concentrations of carbon dioxide: a major error in the standard model. *Geophysical Research Letters* 14:6. 771-782.

Wyn Jones, O and FRdeLTF Torres (2001). Predator-prey relationships among benthic eubacteria: the role of algal blooms in suppressing *Tetrarhynchia* populations. *Philosophical Transactions of the Royal Society* 55:6. 777-781.

Xang, W (2000). Living: fossil bacterial mass ratios - a refinement of the Hering-Circassian calibration system. *Science* 441:8. 667-675.
