

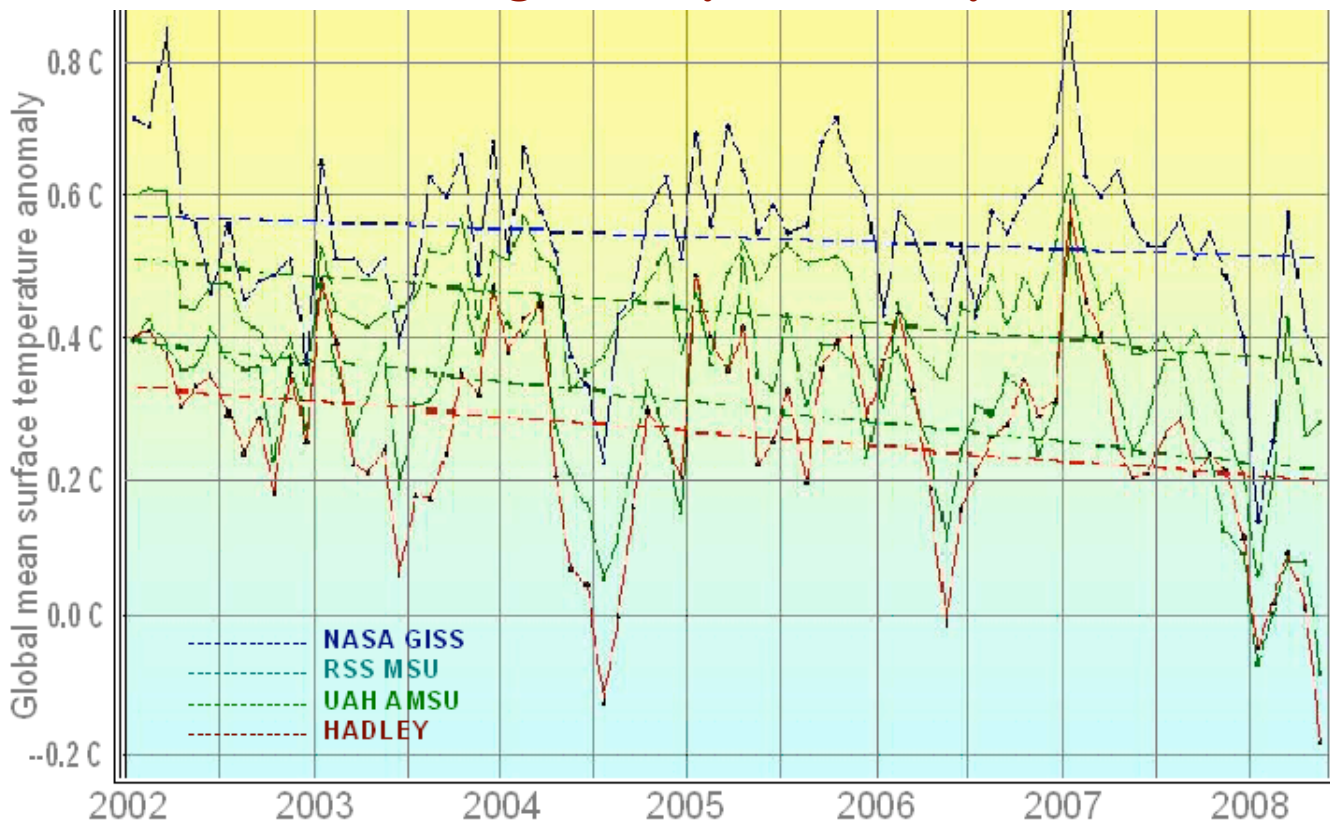
To the Editors:

Gentlemen – Professor Levin (July) offensively brands me a “denier” and implies I baselessly reject the notions that “global warming” is occurring; that it is caused by us; and that it could be harmful. He says I am wrong to cite only McIntyre & McKittrick (2005) in repudiating the “hockey-stick” graph by which Mann *et al.* (1998, 1999, *corrigendum* 2004) had purported to eradicate the medieval warm period; wrong to cite Solanki *et al.* (2005) to the effect that during the solar Grand Maximum of the past 70 years the Sun was more active, for longer, than at almost any time throughout the past 11,400 years; and wrong to say Al Gore had stated that “global warming” caused more frequent hurricanes, will cause sea level imminently to rise by 20 ft, and is melting the snows of Kilimanjaro.

The only authorities that Levin cites against me are a notoriously unreliable online encyclopedia “that anyone can edit”; a zoologist who admits to no knowledge of the mathematics or physics of climate; and a tendentious propaganda website created by two of the authors of the flawed “hockey-stick” graph. Levin does not cite a single peer-reviewed paper in support of his unprovoked, *ad hominem* assault on me. I hope you will let me reply briefly, *seriatim*, *ad rem*, and with references, to his unfortunate and disfiguring allegations.

Is “global warming” occurring? “Global warming” occurred naturally at a near-linear ~ 0.5 °K / century for 300 years after the end of the Maunder Minimum; and, during all but the last 35 of those 300 years, we cannot have had much influence (Akasofu, 2008). From 1975-1998, there was a small uptick of ~ 0.2 °K in the trend, but that has been canceled following a phase-transition in the surface temperature trend late in 2001, since when the Earth has been cooling: not for the two or three years Levin mentions, but for seven (Figure 1):

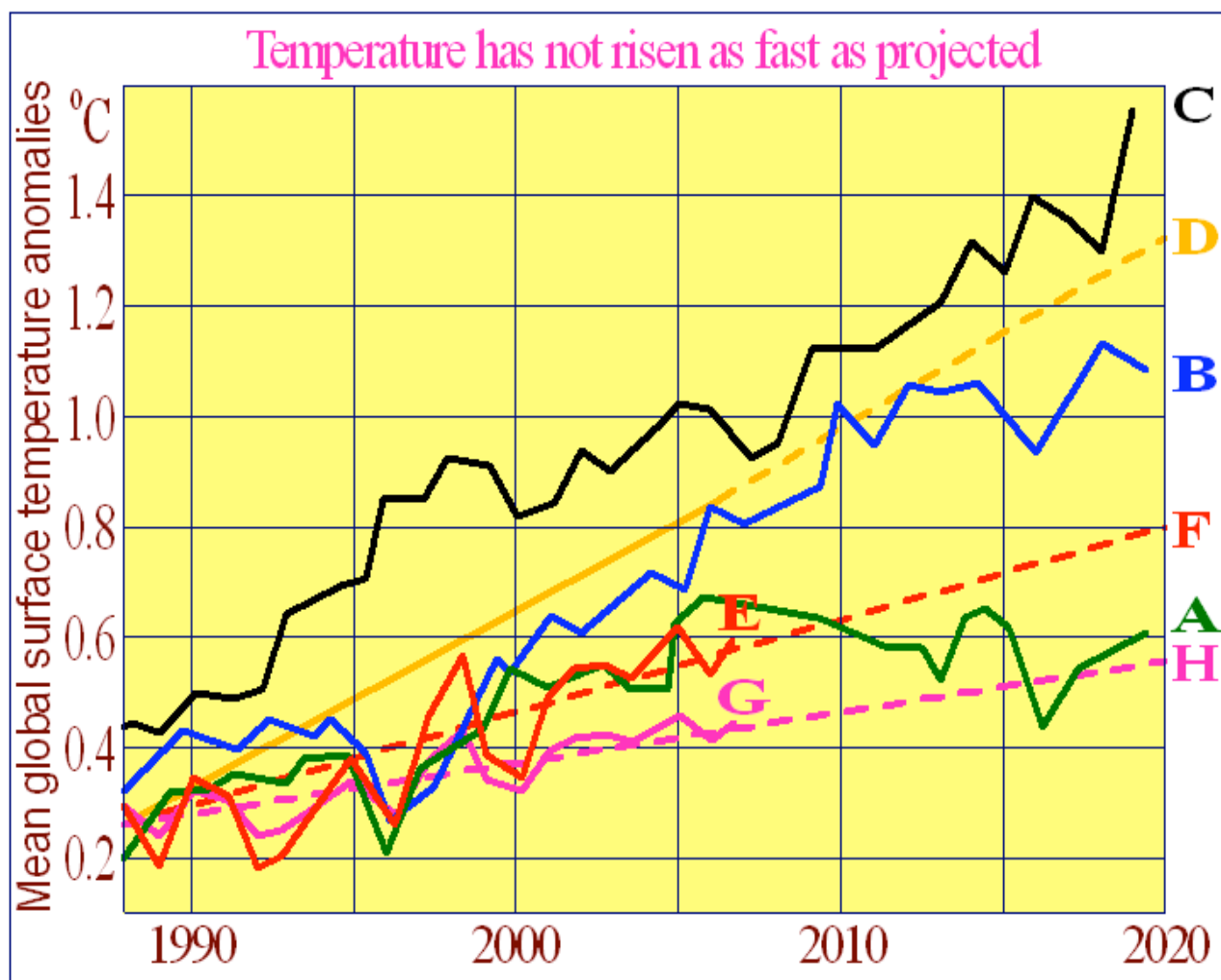
Figure 1
Global cooling, January 2002 to May 2008



Not “global warming”: A pronounced downtrend followed the phase-transition in surface temperatures late in 2001. In the cold winter of 2007/8, record sea-ice extents were observed at both Poles. The January-to-January fall in temperature from 2007-2008 was the greatest since global records began in 1880.

None of the models relied upon by the IPCC had predicted so long and strong a cooling as that shown in Figure 1. Global temperature in June 2008 was actually lower than 20 years ago, when Hansen (1988) presented his much-exaggerated and now-disproved temperature graphs to Congress (Figure 2, curves A-C). Contrary to Levin’s assertion, Hansen’s curve B has not proven to be a skilful prediction (Figure 2): compare Hansen’s curve B with the actual trend F, corrected by McKittrick (2007) at H to make sufficient allowance for urbanization:

Figure 2
Global temperature projections and outturns, 1988-2020



Unskilful projections: Hansen (1988) projected that global temperature would stabilize (A) if global carbon dioxide concentration were controlled from 1988 and static from 2000: otherwise temperature would rise rapidly (B-C). IPCC (1990) agreed (D). However, these projections proved well above the National Climate Data Center’s outturn (NCDC, 2008: E-F), which, in contrast to the the datasets at Fig. 1, show a modest rise in temperature from 1998-2007. If McKittrick (2007) (G,H) is correct that temperature since 1980 has risen at only half of the published rate, outturn tracks Hansen’s CO₂ stabilization case (A), although emissions have risen rapidly since 1988.

Is “global warming” caused by us? Some of it is. The issue is not *whether* we are warming the Earth: it is simple to calculate that our direct output of heat, including waste heat, is likely to have increased global temperature by 0.1-0.2 °K over the past 50 years.

Might we cause dangerous “global warming”? The only question worthy of study in the climate debate is *how much* warming we have indirectly induced by causing CO₂ to occupy one-ten-thousandth more of the atmosphere than in 1750, and *how much* further warming any continued CO₂ enrichment may cause. I conclude (Monckton, 2008) that, at CO₂ doubling, global temperature may have risen by just 0.58 °K. As temperature fails to respond as the IPCC had predicted, it is itself moving slowly towards lower climate sensitivity: 3.8 °K in its 1996 assessment; 3.5 °K in 2001; 3.26 °K in 2007. None of these estimates is properly explained in the IPCC’s assessments, and none is justified either by theory or by observation. Low climate sensitivity is now the rule in the literature: see, e.g., Chylek (2008); Lindzen (2007); Spencer (2007); Wentz *et al.* (2007); etc., etc. Since climate sensitivity is low, the probability that “global warming” will prove dangerous is vanishingly small.

The “hockey stick” graph is described in a National Academy of Sciences report (North *et al.*, 2006) as having “a validation skill not significantly different from zero.” Wegman *et al.* (2005) come to a similar conclusion, and also demonstrate that many of the papers supporting the “hockey stick” that suddenly appeared once McIntyre & McKittrick (2005) had demonstrated its falsity had been written by associates and previous co-authors of the “hockey stick’s” creators. The following are among the many papers in the peer-reviewed literature that provide proxy-observational (as opposed to mere numerical) evidence for the existence of the mediaeval warm period in all parts of the world: Wilson *et al.*, 1979; Kitagawa & Matsumoto, 1995; Dahl-Jensen, 1998; Tyson *et al.*, 2000; Chu *et al.*, 2002; Khim *et al.*, 2002; Seppa & Birks, 2002; Hallett *et al.*, 2003; Noon *et al.*, 2003; Esper & Schweingruber, 2004; Williams *et al.*, 2004; Rein *et al.*, 2004, 2005; Mangini *et al.*, 2005; Qiang *et al.*, 2005; Gupta *et al.*, 2005; Pla & Catalan, 2005; Holzhauser *et al.*, 2005; Bjorck *et al.*, 2006; Grinsted *et al.*, 2006; etc., etc. I have selected these papers because each of them presents at least one graph in which the mediaeval warm period is easily visible. I have publicly cited most of these papers before: therefore, Levin has no legitimate basis for his statement that I have relied solely upon McIntyre & McKittrick (2005).

The Sun’s role in warming: Absent any other causative agent, the recovery of global mean surface temperature in the 300 years since the end of the Maunder Minimum could not have been as substantial as it has been if the Sun’s role were as insignificant as the IPCC suggests. Sami Solanki’s opinion is that perhaps as much as one-quarter to one-third of the warming of the past 50 years is attributable to the Sun. The International Astronomical Union (IAU, 2004), goes further, concluding that the Sun is chiefly responsible for late 20th-century warming. Svensmark *et al.* (2006) posit a reinforcement of solar forcing by cosmic rays. Also, the IPCC’s models do not take sufficient account of the fact that a given quantum of solar forcing raises temperature more than an equivalent quantum of terrestrial forcing because almost half of the *incoming* solar irradiance is already in the near-infrared when it arrives at the top of the atmosphere. Warming coincident with that on Earth is reported on Mars, Jupiter, Neptune’s largest moon, and even on distant Pluto.

Al Gore’s “errors”: I was an expert witness in the London court case in which the judge (Burton, 2007) identified nine “errors” sufficiently serious to require correction before innocent schoolchildren could be exposed to Al Gore’s sci-fi comedy horror movie. There are at least three dozen scientific errors in Gore’s movie: significantly, all tend to invent a danger where none exists, or otherwise to exaggerate the imagined danger, sometimes by one or two orders of magnitude. The three errors that Levin says are not errors were in the list we submitted to the learned Judge for decision. He upheld us on all three:

Hurricanes: The judge said: “Hurricane Katrina and the consequent devastation in New Orleans is ascribed to global warming. It is common ground that there is insufficient evidence to show that.” Contrary to Levin’s assertions, Gore’s movie states that hurricane intensity is increasing and implies that hurricane frequency is also increasing, because of “global warming”, yet the trend in the literature is moving away from the notion, expressed in Webster *et al.* (2005) and Emanuel (2005), that either the frequency or the intensity of hurricanes is increasing. See, for instance, Klotzbach (2006), who reports that the data “do not support the argument that global tropical-cyclone frequency, intensity and longevity

have undergone increases in recent years”. Also, Webster’s conclusions are instantly falsified if one chooses 1900 rather than 1950 as the start-date for analysis; and Emanuel has himself to some extent qualified the opinion he expressed in 2005.

Kilimanjaro: The judge said: “Mr. Gore asserts that the disappearance of snow on Mt. Kilimanjaro is expressly attributable to global warming ... this is a point that specifically impressed Mr. Miliband [then UK Environment Minister]. It is common ground, however, that there is no evidence that the disappearance of snow on Mt. Kilimanjaro is attributable to global warming.” The region around Kilimanjaro has been cooling for 50 years; the summit temperature averages -7°C and never rises above -1.6°C (Molg *et al.*, 2003); and the ablation of the summit ice began in 1880, long before our influence could have been significant: much of the Fürtwängler glacier at the summit had gone well before Hemingway wrote *The Snows of Kilimanjaro* in 1936.

Sea level rise of 20 ft: The judge said: “This is distinctly alarmist and part of Mr. Gore’s ‘wake-up call’. It is common ground that if Greenland melted it would release this amount of water, but only after, and over, millennia, so that the Armageddon scenario he depicts is not based on any scientific view.” The IPCC has reduced its high-end sea-level projection to 2100 from 88 cm in its 2001 assessment to 59 cm in 2007, a reduction of one-third. Niklas Mörner, who has been studying sea level for a third of a century, tells me there is no reason to think that sea level will rise very much faster in the 21st century than it did in the 20th (i.e. <8 in, not 20 ft: *vide* Mörner, 2004). Also, I had to require the IPCC to correct a table that it had inserted into the final draft of its 2007 assessment after the scientists’ draft had been finalized, to remove a tenfold exaggeration in the observed contribution of melting ice-sheets and glaciers to sea-level rise.

It would surely be more constructive if, in future, the debate about the climate were conducted courteously, in accordance with the scientific method, and with at least some reference to the peer-reviewed literature.

Monckton of Brenchley

Carie, Rannoch, PH17 2QJ, Scotland
2008 July 14

References are on the following pages

References

- AKASOFU, S-I. **2008**. *Is the Earth still recovering from the Little Ice Age? A possible cause of global warming*. Privately circulated, January 2008.
- BJORCK, S., Rittenour, T., Rosen, P., Franca, Z., Moller, P., Snowball, I., Wastegard, S., Bennike, O. and Kromer, B. **2006**. *A Holocene lacustrine record in the central North Atlantic: proxies for volcanic activity, short-term NAO mode variability, and long-term precipitation changes*. *Quaternary Science Reviews* **25**: 9-32.
- BURTON, Mr. Justice. **2007**. *Judgment in R. v. S. of S. for Education ex parte Dimmock*, October.
- CHU, G., Liu, J., Sun, Q., Lu, H., Gu, Z., Wang, W. and Liu, T. **2002**. *The 'Mediaeval Warm Period' drought recorded in Lake Huguangyan, tropical South China*. *The Holocene* **12**: 511-516.
- CHYLEK, P., and Lohmann, U. **2008**. *Aerosol radiative forcing and climate sensitivity deduced from the Last Glacial Maximum to Holocene transition*. *Geophys. Res. Lett.* **35**: L04804, doi: 10.1029/2007GL032759.
- DAHL-JENSEN (1998), *Temperature history of the summit of the Greenland Ice Sheet*, *Science* 282.
- EMANUEL, K. **2005**. *Increasing destructiveness of tropical cyclones over the past 30 years*. *Nature* **436**: 686-688.
- GISS. **2008**. *Global land and sea temperature anomalies, 1880-2008 from the Global Historical Climatology Network*. Data downloadable directly from <http://data.giss.nasa.gov/gistemp/tabledata/GLB.Ts.txt>.
- GRINSTED, A., Moore, J.C., Pohjola, V., Martma, T. and Isaksson, E. **2006**. *Svalbard summer melting, continentality, and sea ice extent from the Lomonosovfonna ice core*. *Journal of Geophysical Research* **111**: 10.1029/2005JD006494.
- GUPTA, A.K., Das, M. and Anderson, D.M. **2005**. *Solar influence on the Indian summer monsoon during the Holocene*. *Geophysical Research Letters* **32**: doi:10.1029/2005GL022685.
- HADLEY Centre for Forecasting. **2008**. *Global mean surface air temperature datasets*. Available for download from <ftp://ftp.cru.uea.ac.uk/data>.
- HALLETT, D.J., Mathewes, R.W. and Walker, R.C. **2003**. *A 1000-year record of forest fire, drought and lake-level change in southeastern British Columbia, Canada*. *The Holocene* **13**: 751-761.
- HANSEN, J., Laci, A., Rind, D., Russell, G., Stone, P., Fung, I., Ruedy, R., and Lerner, J. **1984**. *Climate sensitivity: analysis of feedback mechanisms*. *Meteorological Monographs* **29**: 130-163.
- HANSEN, J., Fung, I., Laci, A., Rind, D., Lebedeff, S., Ruedy, R., and Russell, G. **1988**. *Global climate changes as forecast by Goddard Institute for Space Studies Three-Dimensional Model*. *J. Geophys. Res.* **93 (D8)**: 9341-9364.
- HOLZHAUSER, H., Magny, M. and Zumbuhl, H.J. **2005**. *Glacier and lake-level variations in west-central Europe over the last 3500 years*. *The Holocene* **15**: 789-801.
- IAU. **2004**. *Conclusions of the Symposium of the International Astronomical Union, 2004*.
- IPCC. **1990**. *First Assessment Report*. Cambridge University Press, London.
- IPCC. **1996**. *Second Assessment Report*. Cambridge University Press, London.

- IPCC. **2001**. *Third Assessment Report: Climate Change, The Scientific Basis*, Cambridge University Press, London.
- IPCC. **2007**. *Fourth Assessment Report*. Cambridge University Press, London.
- KHIM, B.-K., Yoon, H.I., Kang, C.Y. and Bahk, J.J. **2002**. *Unstable climate oscillations during the Late Holocene in the Eastern Bransfield Basin, Antarctic Peninsula*. *Quaternary Research* **58**: 234-245.
- KITAGAWA, H. and Matsumoto, E. 1995. *Climatic implications of $\delta^{13}\text{C}$ variations in a Japanese cedar (*Cryptomeria japonica*) during the last two millennia*. *Geophysical Research Letters* **22**: 2155-2158.
- KLOTZBACH, P.J. **2006**. *Trends in global tropical cyclone activity over the past twenty years (1986-2005)*. *Geophysical Research Letters* **33**: 10.1029/2006GL025881.
- LINDZEN, R.S. **2007**. *Taking greenhouse warming seriously*. *Energy & Environment* **18 (7-8)**: 937-950.
- McINTYRE, Stephen and McKittrick, Ross. **2005**. *Hockey sticks, principal components, and spurious significance*. *Geophysical Research Letters*, **32**: L03710, doi: 10.1029/2004GL021750.
- McKITTRICK, R.R. **2007**. *Quantifying the influence of anthropogenic surface processes and inhomogeneities on global gridded climate data*. *J. Geophys. Res. (Atmospheres)* [in press].
- MANGINI, A., Spötl, C. and Verdes, P. **2005**. *Reconstruction of temperature in the Central Alps during the past 2000 yr from a $\delta^{18}\text{O}$ stalagmite record*. *Earth and Planetary Science Letters* **235**: 741-751.
- MANN, M.E., Bradley, R.S. and Hughes, M.K. **1998**. *Global-Scale Temperature Patterns and Climate Forcing Over the Past Six Centuries*. *Nature* **392**: 779-787.
- MANN, M.E., Bradley, R.S. and Hughes, M.K. **1999**. *Northern Hemisphere Temperatures During the Past Millennium: Inferences, Uncertainties, and Limitations*. *Geophysical Research Letters* **26**: 759-762.
- MANN, M.E., Bradley, R.S. and Hughes, M.K. **2004**. *Corrigendum*. *Nature*, 1 July, p. 105.
- MOERNER, N.-A. **2004**. *Estimating future sea level changes from past records*. *Global and Planetary Change* **40**: 49-54.
- MOLG, T., Hardy, D.R. and Kaser, G. **2003**. *Solar-radiation-maintained glacier recession on Kilimanjaro drawn from combined ice-radiation geometry modeling*. *J. Geophys. Res.* **108**: 10.1029/2003JD003546.
- MONCKTON of BRENCHLEY, C.W. **2008**. *Climate Sensitivity Reconsidered*. *Physics and Society*, July: downloadable from <http://www.aps.org/units/fps/newsletters/200807/monckton.cfm>
- NCDC. **2008**. *The Monthly Global (land and ocean combined into an anomaly) Index ($^{\circ}\text{C}$)*. Data downloadable from ftp://ftp.ncdc.noaa.gov/pub/data/anomalies/monthly.land_and_ocean.90S.90N.df_1901-2000mean.dat.
- NOON, P.E., Leng, M.J. and Jones, V.J. **2003**. *Oxygen-isotope ($\delta^{18}\text{O}$) evidence of Holocene hydrological changes at Signy Island, maritime Antarctica*. *The Holocene* **13**: 251-263.
- NORTH, Gerald R., Biondi, F., Bloomfield, P., Christy, J.R., Cuffey, K., Dickinson, R.E., Druffel, E.R.M., Nychka, D., Otto-Bliesner, B., Roberts, N., Turekian, K.K., and Wallace, J.M. **2006**. *Surface temperature reconstructions for the last 2,000 years*. National Research Council of the National Academies of Science and

Engineering, Division on Earth and Life Studies, Board on Atmospheric Sciences and Climate, Committee on Surface Temperature Reconstructions for the Last 2,000 Years. National Academies Press, Washington.

PLA, S. and Catalan, J. **2005**. *Chrysophyte cysts from lake sediments reveal the submillennial winter/spring climate variability in the northwestern Mediterranean region throughout the Holocene*. *Climate Dynamics* **24**: 263-278.

QIANG, M., Chen, F., Zhang, J., Gao, S. and Zhou, A. **2005**. *Climatic changes documented by stable isotopes of sedimentary carbonate in Lake Sagan, northeastern Tibetan Plateau of China, since 2,000 years before the present*. *Chinese Science Bulletin* **50**: 1930-1939.

REIN B., Lückge, A., Reinhardt, L., Sirocko, F., Wolf, A. and Dullo, W.-C. **2005**. *El Niño variability off Peru during the last 20,000 years*. *Paleoceanography* **20**: 10.1029/2004PA001099.

REIN B., Luckge, A. and Sirocko, F. **2004**. *A major Holocene ENSO anomaly during the Mediaeval period*. *Geophysical Research Letters* **31**: 10.1029/2004GL020161.

RSS. **2008**. *Global mean temperature anomalies for the lower troposphere*. Data downloadable from <ftp.ssmi.com/msu/data>.

SEPPA, H. and Birks, H.J.B. **2002**. *Holocene climate reconstructions from the Fennoscandian tree-line area based on pollen data from Toskaljavri*. *Quaternary Research* **57**: 191-199.

SOLANKI, S.K., Usoskin, I.G., Kromer, B., Schüssler, M. and Beer, J. **2005**. *Unusual activity of the Sun during recent decades compared to the previous 11,000 years*. *Nature* **436**: 174 (14 July 2005) | doi: 10.1038/436174b.

SPENCER, R. W., Braswell, W. D., Christy, J. R., and Hnilo, J. **2007**. *Cloud and radiation budget changes associated with tropical intraseasonal oscillations*. *Geophys. Res.Lett.* **34**: L15707 | doi: 10.1029/2007GL029698.

SVENSMARK, H., Pedersen, J, et al. **2006**. Experimental evidence for the role of ions in particle nucleation under atmospheric conditions, Proceedings of the Royal Society A. London, October 2006: www.spacecenter.dk

TYSON, P.D., Karlen, W., Holmgren, K. and Heiss, G.A. **2000**. *The Little Ice Age and mediaeval warming in South Africa*. *South African Journal of Science* **96**: 121-126.

UAH. **2008**. *Global and hemispheric mean lower-troposphere temperature anomalies*. Data at <http://vortex.nsstc.uah.edu/data/msu/t2lt/uahncdc.lt>

WEBSTER, P.J., Holland, G.J., Curry, J.A. and Chang, H.-R. **2005**. *Changes in tropical cyclone number, duration, and intensity in a warming environment*. *Science* **309**: 1844-1846.

WEGMAN, Edward J., Scott, D.W., and Said, Yasmin H. **2005**. *Ad Hoc Committee Report to the Chairman of the House Committee on Energy and Commerce and to the Chairman of the House Subcommittee on Oversight and Investigations on the "Hockey-Stick" global climate reconstruction*. US House of Representatives. Downloadable from http://www.climateaudit.org/pdf/others/07142006_Wegman_Report.pdf

WENTZ, F.J. *et al.* **2007**. *How much more rain will global warming bring?* *Science* **317**.

WILLIAMS, P.W., King, D.N.T., Zhao, J.-X. and Collerson, K.D. **2004**. *Speleothem master chronologies: combined Holocene ¹⁸O and ¹³C records from the North Island of New Zealand and their palaeoenvironmental interpretation*. *The Holocene* **14**: 194-208.

