Appendix

Review of the film *An Inconvenient Truth*

Al Gore's film *An Inconvenient Truth* has been widely hailed and to a lesser extent, criticized. The website

http://www.sourcewatch.org/index.php?title=An_Inconvenient_Truth

provides links to more than 50 reports and reviews of the film. In general, those on the political left (e.g., Arianna Huffington, Carl Pope) embrace Gore's findings, and those on the political right (e.g., Glenn Beck, Jonah Goldberg) reject them.

Lewis (2007) provided a very detailed and thorough rebuttal to Al Gore's film (and book) *An Inconvenient Truth* (AIT), although he presented a very one-sided view, just as Al Gore provided a very one-sided view from the opposite vantage point. In this Appendix, only the film is reviewed. Lewis' review was very helpful in preparing this Appendix.

Al Gore's film is full of innuendos and implications in which he occasionally flashes graphs and data, but by the time your eyes focus on them, they are gone from the screen. The film jumps around and flits from one point to another in a dizzying sequence of sound bites made for an audience with an attention span of 10 seconds or less. While it is all very impressive visually, the actual transfer of data to the audience is minimal. Occasionally, Al Gore leaves the topic of global warming for a moment and provides some introspection into his own life. The defeat for the presidency and the accident to his son stand out. In doing this, he provides a satisfying connection to Al Gore, the human being, as opposed to Al Gore the advocate.

Scene 1. The film opens with scenes of factories belching out black smoke. Such scenes recur several times in the film. But, as Marlo Lewis said:

> "The 'smoke' is probably steam, but it looks dark and ominous against the inferno colors of a fading sunset. Thus, film viewers are set up to believe they are literally seeing CO_2 spew out of smokestacks, even though CO_2 is as invisible

> as oxygen. Pictorially, AIT presents CO_2 as an air pollutant, anticipating Gore's later oft-repeated description of CO_2 as 'global warming pollution.' This iconic and rhetorical depiction of CO_2 as pollution is inaccurate and manipulative.''

I don't know why, but I am reminded of the opening scene of Charlie Chaplin's *Modern Times*. Charlie sees a truck laden with timber roar around the corner, which drops its red warning flag. He picks up the flag but the truck is gone. Just then, a communist throng swings around another corner, sweeping Charlie in the vanguard waving a red flag ...

Scene 2. The scene switches from belching smoke to a placid stream with trees and flowers and grass. The message is: you can either have nature or pollution; choose one! This was followed by pictures of the Earth from space, showing pollution filling up the atmosphere. As before, this is misleading because CO_2 is colorless and furthermore, since the recent emphasis on global warming, few people seem to worry about conventional pollution anymore.

Scene 3. Next, we see quick flashes of melting ice (which ice? where? when?) and hurricanes blowing. A graph is flashed but it cannot be read. No data are transferred, only fear is communicated.

Scene 4. Then Al Gore asserts (correctly) that we should not assume that humankind is too puny to impact the Earth.

Scene 5. Al Gore goes on to explain the greenhouse effect reasonably well, pointing out that it is a good thing that we have a greenhouse effect or we would be very cold. However, he again illustrates the argument improperly with belching black smoke, mixing metaphors of ''global warming'' and ''pollution''. For those who found this description too difficult to comprehend, he provides a cartoon of melting ice cream, but unfortunately he describes the greenhouse effect in terms of little green monsters that repel reflected sunlight from Earth, whereas the green monsters actually absorb IR radiant energy and re-emit it.

Scene 6. Next, he shows the jagged curve of rising CO_2 concentration, although the scene switches around so fast that all you get is a vague sense of a saw-tooth rising to the right. He provides a nice, concise explanation for why there is a yearly saw-tooth pattern.

Scene 7. The next topic is mountain glaciers. He begins with photos of Kilimanjaro before and after global warming. Unfortunately, as Cullen *et al.* (2006) showed, and Lewis discusses, the depletion of glaciers on Kilimanjaro has more to do with changing precipitation patterns than temperature change. However, Al Gore is correct that many mountain glaciers are retreating. The Earth is warming and there is no better example of its effect than the contracting mountain glaciers. Lewis makes the point that these retreats began prior to the major build-up of CO_2.

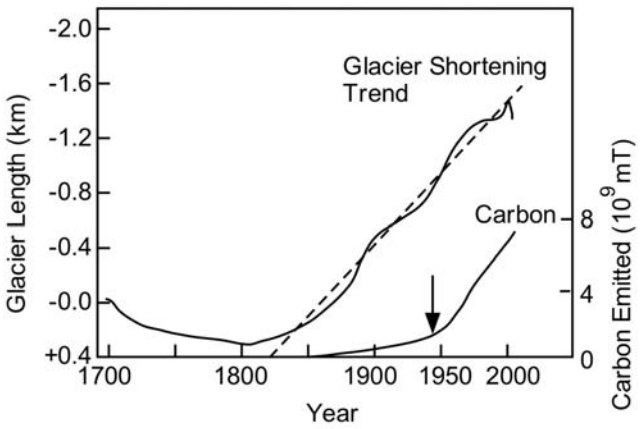

Figure A.1. Comparison of timing of retreat of glaciers with timing of carbon emissions. The glacier length is normalized against data for 169 world glaciers. The vertical arrow shows the transition point for more rapid carbon emission. Adapted from Robinson, Robinson, and Soon (2007).

The critical issue here is what is normal? The key mistake that Al Gore makes over and over again is that he uses the depths of the LIA as his baseline for comparison, and, of course, we have had significant warming since then. If we treat the LIA as the "normal" climate, then compared with this baseline we are undergoing significant warming. As Figure A.1 shows, the extreme expansion of mountain glaciers experienced during the LIA was followed by a retreat as the LIA waned at the end of the 19th century. Much of this occurred prior to the build-up of CO_2 concentrations in the atmosphere. Yes, we have had significant warming since the LIA, and this is evidenced in the retreat of mountain glaciers, but can we attribute this to a CO_2-induced greenhouse effect? Retreat of glaciers in the later stages might be partly due to a greenhouse gas effect, but the strong retreat prior to $\sim$1930 can hardly be due to greenhouse gases.

Robinson, Robinson, and Soon (2007) compared the timing of the retreat of glaciers with the timing of carbon emissions as shown in Figure A.1. It can be seen that the trend toward glacier shortening began in the mid-19th century, long before greenhouse gases had built up to high levels. In fact, 84% of greenhouse gas production took place after 1940. As Robinson, Robinson, and Soon (2007) point out, the melting of glaciers lags a temperature increase by perhaps 20 years, so the disparity between carbon emissions and warming is even greater.

Should we treat the climate of the LIA as "normal?" I hope not. Today's climate is far more temperate and pleasant for many people in the world, with occasional exceptions, than the climate of the LIA. I would rather think of the LIA as an aberration instead of a "normal" baseline.

Scene 8. Al Gore goes on to provide a very brief, sketchy sound bite on the history of Earth temperatures over the last millennium based on the work of his friend,

Lonnie Thompson and colleagues (Thompson *et al.*, 1998). As Chapter 2 of this book amply demonstrates, the history of Earth temperatures over the last millennium is a complex subject that has been studied by many investigators, and Thompson *et al.*'s work is just one element of this. Al Gore claims that the MWP did not exist, and he treats the LIA as a period of normalcy. He is a subscriber to the *hockey stick* that we have adequately disposed of in Section 2.2.3. As always, when the LIA is used as a baseline, temperatures do indeed rise during the 20th century. But Al Gore does not explain why temperatures rose early in the century prior to the main build-up of CO_2, and does not discuss the slip from 1940 to 1978, nor does he discuss the inadequacies of the temperature measurement network or the problems in defining a global average temperature.

Scene 9. Al Gore discusses the ice ages of the past 650,000 years, and shows a strong correlation of CO_2 with temperature. However, he does not discuss the phasing of these, and implies that rising temperature produces more CO_2, rather than *vice versa*. As we showed in Sections 1.2.4.3 and 6.1.3, the rise in CO_2 typically lagged the rise in temperature by about 1,000 years. As shown in Figure 7.4 (color section), ice core measurements across glacial–interglacial cycles suggest that the CO_2 concentration never exceeded $\sim$300 ppm during interglacials. However, there are some indications that this might not be so (see Figure 6.6).

As we discussed in Section 6.1.4, there are quantitative problems in understanding the effects of CO_2 concentration on temperature (and *vice versa*). If the difference between an ice age and an interglacial is a change in CO_2 concentration from $\sim$200 ppm to $\sim$280 ppm, why isn't the Earth burning up at 383 ppm?

Nevertheless, Al Gore is right that the present CO_2 concentration of $\sim$380 ppm is alarmingly high, and provides cause for concern. While Lewis and other naysayers seem to be unconcerned about this CO_2 level, and have even suggested it may be beneficial to plant growth, sober reflection suggests that it is important to understand the effects of this rise (and future increases) in CO_2.

Scene 10. Al Gore deplores the lack of action in Congress in the late 1980s, and then goes on to describe his own personal agony when his son was hit by a car in 1989. This made him more conscious of the possibility of losing what is precious, and he then transfers this thought to the environment.

Scene 11. At this point, Al Gore goes into a diatribe about recent hot years setting "all-time records". Indeed, we have set some records when compared with the LIA as a baseline. In a period of warming after the LIA, it is only natural that with continued warming, some records will be set. However, that does not prove that prior to the LIA (such as during the MWP, or earlier in the Holocene) temperatures were not higher than they are today. It all depends on how far back you want to look. There is one glaring error in the Gore presentation. The European heat wave of 2003 that was so devastating is portrayed by Al Gore as a product of global warming, whereas as Lewis points out (with several references to various detailed studies), this was an unusual fluctuation in air mass circulation, unrelated to global warming.

However, it is true that global warming seems to have accelerated after 1976, and some have attributed this rise in temperatures to a change in the Pacific Ocean with warm surface waters prevailing (see Section 5.2.11).

Scene 12. The contention is made that warmer temperatures produce more fierce storms such as Katrina. The screen is aglow with whistling winds, flooded cities, and people in despair from storm damage. In fact, Al Gore specifically claims that globally warmed Gulf waters were responsible for the increase in Katrina's strength after it left Florida. The implication of the film is that the Earth is besieged by waves of storms of unprecedented intensity. Lewis discussed this issue in some detail. Webster *et al*. (2005) found a doubling of the number of Category 4 and 5 hurricanes in the 15-year period 1990–2004, as compared with 1975–1989. However, this article pointed out that they

> "... deliberately limited this study to the satellite era because of the known biases before this period, which means that a comprehensive analysis of longer-period oscillations and trends has not been attempted. There is evidence of a minimum of intense cyclones occurring in the 1970s, which could indicate that our observed trend toward more intense cyclones is a reflection of a long-period oscillation."

Klotzbach (2006) found only a 10% growth in global Category 4 and 5 hurricanes from 1986–1995 to 1996–2005, of which most were in the Southern Hemisphere. In another publication, Klotzbach said:

> "These findings indicate that there has been very little trend in global tropical cyclone activity over the past twenty years, and therefore, that a large portion of the dramatic increasing trend found by Webster *et al*. and Emanuel is likely due to the diminished quality of the datasets before the middle 1980s. One would expect that if the results of Webster *et al*. and Emanuel were accurate reflections of what is going on in the climate system, then a similar trend would be found over the past twenty years, especially since SSTs have warmed considerably (about 0.2°C–0.4°C) during this time period."

Lewis refers to a website produced by Patrick Michaels[1] that argues that production of strong hurricanes is cyclic and was also high in the 1950s, and that no attribution of storm intensity to global warming can properly be made.

Robinson, Robinson, and Soon (2007) present data that show that the number of tornados in the U.S. has been on a downward trend from 1950 to 2005. They also show that there has been no statistical increase in the annual number of Atlantic hurricanes that make landfall from 1900 to 2005. The period after 1998 has been relatively high, but there is no evidence yet that this is any more than a fluctuation of the same magnitude as has occurred previously. Similarly, the annual number of violent Atlantic hurricanes shows no statistical trend from 1945 to 2005, although the period since 1995 has been above average. It is impossible to tell whether this is just a

[1] *http://www.capmag.com/article.asp?ID=4418*

fluctuation of the same magnitude as has occurred previously, or whether it is the early emergence of a new trend.

These are issues that require further study. But Al Gore is sure he has the answers.

Scene 13. In a personal note, Al Gore describes his disappointment at losing the presidency, but mentions that this led him to re-devote himself to environmental issues.

Scene 14. In the next scene, all the vagaries of climate fluctuation such as heavy rains and drought in any and all regions were blamed on global warming. This section begins with a bar chart, but it was not clear what is plotted. Floods in India and China and desertification in Africa, you name it, were all attributed to CO_2. Striking photos of Lake Chad in Africa (before and after) show boats lined up at the shore of a dry lake. Lewis concluded that "Lake Chad's decline probably has nothing to do with global warming" based on a scientific study that attributed the Lake's condition to "a combination of regional climate variability and societal factors such as population increase and overgrazing."

Scene 15. Al Gore returned to the scenes of his youth, his double life in a Washington apartment, and a Midwest farm. He describes his idyllic life on the farm in a climate that "was unchanged since the last ice age." This, of course, is misleading, when one considers the LIA, the MWP, and the various fluctuations in the Holocene (see Sections 1.3 and 2.1).

Scene 16. Next, he discusses the Arctic. He conveys the impression that the entire Arctic is warming uniformly, whereas the warming is variable as we showed in Section 3.2.3. There is evidence of a significant reduction in the Arctic ice pack, but as we pointed out in Section 7.3, wind patterns and other factors than temperature may be playing a significant role in this regard.

Scene 17. He presents a likely explanation for some of the sudden climate changes experienced at the transition from the last ice age to the Holocene. However, he states this as a firm fact, rather than the speculation that it is.

Scene 18. We see Ronald Reagan, George Bush Sr., and Senator Imhof making idiotic statements arguing against protection of the environment, although global warming and conventional pollution seem not to be distinguishable here. The conclusion Gore reaches is that the public (and its leaders) are not yet convinced.

Scene 19. Here, Al Gore blames most of the afflictions of humankind (beetles, mosquitoes, vermin, flu, tuberculosis, West Nile virus, etc.) on global warming.

Scene 20. The devastation of coral reefs is presented. Lewis discusses this issue is some detail. Arguments can be made on either side.

Scene 21. Al Gore makes it seem as if the entire Antarctica Ice Sheet is almost ready to disintegrate. He repeats the phrase: "Scientists were astonished!" However, as we showed in Sections 3.2.3.1 and 7.3, most of the endangered part of Antarctica is the Peninsula, and the East Antarctic Ice Sheet is actually growing faster than the West Antarctic Ice Sheet is diminishing. He shows "moulins" in Greenland (see Figure 7.4, color section). He then discusses sea level rise and describes the effects of flooding from a putative 20 to 40-foot rise in sea level. China, India, Holland, and New York would be inundated.

Sea level rise is discussed in Section 7.3. Sea level rise is the most credible potential impact of global warming, and future reductions in the Greenland Ice Sheet are of greatest concern. Fortunately, there is some evidence that as losses occur at the margins of this ice sheet, more ice is being added (via snow) to the center. Nevertheless, this needs careful monitoring. While the effect of future global warming on the Greenland Ice Sheet is a legitimate concern, the connection of this warming to the CO_2 greenhouse effect remains uncertain. Figure A.2 shows that the current trend in sea level rise has persisted for 150 years, and began long before the rise in CO_2 emissions. As we mentioned previously, 84% of greenhouse gas production took place after 1940. This trend has not been affected by the great increase in CO_2 emissions after 1940 (Robinson, Robinson, and Soon, 2007).

Scene 22. Al Gore then visits China with its "huge coal resources". He points out that China is rapidly becoming a leading CO_2 generator. In the process, he once again shows black smoke billowing from Chinese power plants, which as we have shown previously, is not CO_2. One must wonder why Al Gore supports Kyoto, which absolves China from any controls on CO_2 emissions. Al Gore tries to mitigate the Chinese emissions by presenting them on a per capita basis but in less than 10

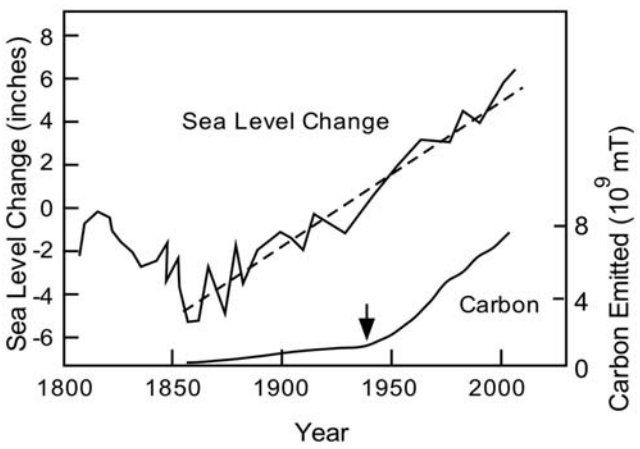

Figure A.2. Comparison of timing of sea level rise with timing of carbon emissions. The vertical arrow shows the transition point for more rapid carbon emission. Adapted from Robinson, Robinson, and Soon (2007).

years, China will be the world's worst CO_2 emitter. In addition, China is the world leader in conventional pollution.[2]

Scene 23. Al Gore traces the growth of world population during his lifetime from 2 billion to 6.6 billion with the prospect of it reaching 9 billion by the time he dies. He rightly emphasizes that this population growth has strained the Earth's capacity to provide food, water, and natural resources to the people of the world. However, he makes no proposal to place international constraints on family size, which is likely to be a critical need in mitigating future global warming.

Scene 24. Here, Al Gore diverts to the subject of tobacco, and his sister's untimely death from lung cancer. He uses this as an illustration of the fact that human nature often requires a long time to deal with a problem, but in the case of global warming, he asserts that we don't have time.

Scene 25. Al Gore asserts that essentially the entire science community agrees with his precepts regarding global warming as evidenced by a survey of 928 scientific articles. This argument is like: "30,000,000 Frenchmen Can't Be Wrong." While there are a number of contrary references, Al Gore is correct that the overwhelming majority of climatologists are concerned about global warming, and most of them believe the CO_2-induced greenhouse effect as a major factor. Solar physicists are less prone to endorse CO_2 and tend to lean toward solar variations as at least a contributor to climate change. Some climatologists have emphasized changes in the oceans as a major factor in climate change. However, climate modelers have been fairly unanimous in emphasizing temperature growth since the LIA and the role of the greenhouse effect in producing this warming.

Al Gore points out that the oil and gas lobby opposes all efforts to reduce carbon emissions and mentions an egregious case of a Bush appointee in "cahoots" with the oil and gas lobby. He also points out the actions of NASA and EPA Administrators in changing publications by scientists to conform to Republican political prejudices. In this, he is certainly correct. In fact, it is most strange that the far right in American politics seems to uniformly disbelieve global warming, but the connection to their other agenda (Christianization of America, anti-abortion, and low taxes for the wealthy) is difficult to understand.

However, Al Gore does not mention that

(i) Climatologists need funding for their work and they are unlikely to obtain funding if they don't identify a major problem facing humanity.
(ii) Like earthquake analysts who are always predicting the "big one is coming",

[2] With the current emphasis on greenhouse gases, we seem to have forgotten about conventional pollution (nitrogen and sulfur oxides, soot, ozone depletion, etc.). The satellite picture of Chinese pollution at *http://visibleearth.nasa.gov/view_rec.php?id=1036* demonstrates the extent of conventional pollution from China. In Graham Greene's book *Our Man in Havana*, the War Office is delighted to find a new super-weapon because "it will make the atomic bomb a conventional weapon," and "nobody worries about conventional weapons."

climatologists tend to be alarmists to call attention to the importance of their work.

(iii) The climatologists who use proxies to infer historical temperatures and derive global average temperatures are close-knit and have often co-published with one another. This *paleo-climatological group* has prevented valid criticism of their work from being published (see Section 2.2.3.7).

(iv) Those who generate global climate models use the world's biggest computers for which funding can only be justified to investigate a crisis.

(v) Most of the criticism of global-warming alarmism appears on Internet "blogs" which is ignored by the elite climatological science community. Yet, some of this criticism is valid.

(vi) Finally, the validity of a scientific theory is not a matter of voting (Foster, 2001).

Scene 26. We are treated to a view of more billowing black smoke. This is followed by a picture of scales with gold bars on one side, and the Earth on the other side. We are asked to choose between making money and saving the Earth. However, we are also assured that by saving the Earth we will also create wealth, although the details seem muddled.

He then suggests approaches to reduce emissions by increasing the efficiency of vehicles, buildings, appliances, etc., carbon sequestration, expansion of renewable energy. He points out the terrible disparity of mileage requirements for American cars vs. Europe and Asia. In this respect, he is right. American gasoline is too cheap, and cars are too big and heavy and too powerful. Even if you don't believe in global warming, the balance of payments and America's dependence on OPEC dictate that the U.S. needs to downsize vehicles and raise the price of gasoline. Increasing the efficiency of systems and renewable energy is vital and requires expanded tax incentives. Carbon sequestration needs further study. All of these steps are good for America and the world. Here, Al Gore is on target, independently of greenhouse gases.

Unfortunately, Al Gore concludes this scene with a strong endorsement of the Kyoto accords, which as we show in Chapter 8, is ill-conceived, impractical, and grossly unfair.

Scene 27. Al Gore closes with a pep talk. He mentions all of the crises that have faced the U.S., including the revolutionary war in 1776, the Civil War, women's suffrage, World War II, going to the Moon, conquering polio, and restoring the ozone layer. He says that if we put our minds and hearts to it, we can deal with global warming. However, in all the examples given, there was a clear-cut problem of known dimensions, whereas in global warming everything is much more nebulous.

References

Adams, Jonathan (2002), *A Quick Background to the Last Ice Age*, online at *http://www.esd.ornl.gov/projects/qen/nerc130k.html*

Adams, Jonathan; Mark Maslin; and Ellen Thomas (1999), "Sudden climate transitions during the Quaternary," *Progress in Physical Geography* **23**(1), 1–36.

Ahn, Jinho; and Edward J. Brook (2007), "Atmospheric CO_2 and climate from 65 to 30 ka B.P.," *Geophysical Research Letters* **34**, L10703.

Alley, Richard B.; Peter U. Clark; Philippe Huybrechts; and Ian Joughin (2005), "Ice-sheet and sea-level changes," *Science* **310**, 456.

Ammann, Caspar M.; Fortunat Joos; David S. Schimel; Bette L. Otto-Bliesner; and Robert A. Tomas (2007), "Solar influence on climate during the past millennium: Results from transient simulations with the NCAR Climate System Model," *Proceedings of the National Academy of Science* **104**, 3713–3718.

Anderson, Theodore L.; Robert J. Charlson; Stephen E. Schwartz; Reto Knutti; Olivier Boucher; Henning Rodhe; and Jost Heintzenberg (2003), "Climate forcing by aerosols: A hazy picture," *Science* **300**, 1103–1104.

Andrews, J. T.; and R. G. Barry (1978), "Glacial inception and disintegration during the last glaciation," *Ann. Rev. Earth Planet. Sci.* **6**, 205–228.

Anon. (A), *Satellite Finds Warming Relative to Humidity*, Goddard Earth Science and Technology Center, NASA press release: 04-090, online at *http://gest.umbc.edu/science_hilt/highlights.html*

Anon. (B), "Correcting temperature data sets," Comments by several groups, *Science* **310**, 972–973 (2005).

Anon. (C), *Holocene Temperature Variations* (2006), online at *http://www.globalwarming art.com/wiki/Image:Holocene_Temperature_Variations_Rev_png*

Anon. (D), *Ice over the Poles*, online at *http://earthobservatory.nasa.gov/Library/PolarIce/*

Anon. (E), *Solar Influences on Global Climate Change*, National Academy Press, Washington, D.C. (1994).

Anon. (F), *The Greenhouse Effect and Climate Change*, Australian Government Department of Meteorology, online at *http://www.bom.gov.au/info/GreenhouseEffectAndClimate Change.pdf*

Anon. (G), "What causes ice ages?" Physics Forums (2007), online at *http://www.physicsforums.com/archive/index.php/t-159038.html*

Anon. (H), *Climate Change and the Greenhouse Effect*, Hadley Center, U.K. Dept. of Meteorology, online at *http://www.reefrelief.org/scientificstudies/climate_greenhouse.pdf*

Anon. (I), online at *http://en.wikipedia.org/wiki/Kyoto_Protocol*

Anon. (J), Published e-letter responses to Hoffert *et al*. (2002), online at *http://intl.sciencemag.org/cgi/eletters/298/5595/981?ck=nck—676*

Anon. (K), *Stern Review on the Economics of Climate Change*, HM Treasury, about 600 pp, online at *http://www.hm-treasury.gov.uk./independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm*

Anon. (L), *U.S. Climate Change Science Program*, April (2006), online at *http://www.climatescience.gov/Library/sap/sap1-1/finalreport/sap1-1-final-all.pdf*

Anon. (M), *Windows to the Universe*, online at *http://www.windows.ucar.edu/*

Anon. (N) *Surface Temperature Reconstructions for the Last 2,000 Years*, Committee on Surface Temperature Reconstructions for the Last 2,000 Years, National Research Council (2006), onliine at *http://www.nap.edu/catalog/11676.html*

Ball, Tim (2007), *The Science Isn't Settled: The Limitations of Global Climate Models*, Marshall Institute, online at *http://www.marshall.org/article.php?id=524*

Balling, R. C. Jr.; R. S. Vose; and Gerd-Rainer Weber (1998), "Analysis of long-term European temperature records: 1751–1995," *Climate Research* **10**, 193–200.

Bard, E.; Raisbeck, G.; Yiou, F; and Jouzel, J. (2000), "Solar irradiance during the last 1200 years based on cosmogenic nuclides," *Tellus* **B52**, 985–992.

Barnett, T. P.; D. W. Pierce; K. M. AchutaRao; P. J. Gleckler; B. D. Santer; J. M. Gregory; and W. M. Washington (2005), "Penetration of human-induced warming into the world's oceans," *Science* **309**, 284–287.

Bartlett, Albert (2002), "Slowing Population Growth", *Science*, April 24, 2003, e-letter response to Hoffert *et al*. (2002).

Bauer, Eva; Martin Claussen; and Victor Brovkin (2003), "Assessing climate forcings of the Earth system for the past millennium," *Geophysical Research Letters* **30**, 1276.

Beckman, John E.; and Terence J. Mahoney (1998), "The Maunder Minimum and climate change: Have historical records aided current research?" *Library and Information Services in Astronomy III ASP Conference Series* **153**.

Beer, J.; W. Mende; and R. Stellmacher (2000), "The role of the sun in climate forcing," *Quaternary Science Reviews* **19**, 403–415.

Beltrami, Hugo (2002), "Climate from borehole data: Energy fluxes and temperatures since 1500," *Geophysical Research Letters* **29**, 2111.

Beltrami, Hugo; C. Gosselin; and J. C. Mareschal (2003), (A) "Ground surface temperatures in Canada: Spatial and temporal variability," *Geophysical Research Letters* **30**, 1499.

Beltrami, Hugo; Jason E. Smerdon; Henry N. Pollack; and Shaopeng Huang (2002), "Continental heat gain in the global climate system," *Geophysical Research Letters* **29**, 1167.

Berger, A.; and M. F. Loutre (2002), "An exceptionally long interglacial ahead?" *Science* **297**, 1287–1288.

Bianchi, Giancarlo G.; and I. Nicholas McCave (1999), "Holocene periodicity in North Atlantic climate and deep ocean flows south of Iceland," *Nature* **397**, 515–517.

Bielefeld, Britta (1997), "Investigation into albedo-controlled energy loss during the last glaciation," *Geojournal* **42**, 329–336.

Bindschadler, R. (2006), "Hitting the ice Sheets where it hurts," *Science* **311**, 1720–1721.

Bonan, Gordon B. (1997), "Effects of land use on the climate of the United States," *Climatic Change* **37**, 449–486, online at *http://sheridan.geog.kent.edu/geog41066/bonan.pdf*

Bonan, Gordon B. (2002), *Ecological Climatology*, First Edition, online at *http://www.cgd.ucar.edu/tss/aboutus/staff/bonan/ecoclim/index.htm*

Bond, Gerard; William Showers; Maziet Cheseby; Rusty Lotti; Peter Almasi; Peter deMenocal; Paul Priore; Heidi Cullen; Irka Hajdas; and Georges Bonani (1997), "A pervasive millennial-scale cycle in North Atlantic Holocene and glacial climates," *Science* **278**, 1257.

Bond, Gerard; Bernd Kromer; Juerg Beer; Raimund Muscheler; Michael N. Evans; William Showers; Sharon Hoffmann; Rusty Lotti-Bond; Irka Hajdas; and Georges Bonani (2001), "Persistent solar influence on North Atlantic climate during the Holocene," *Science* **294**, 2130–2136.

Bony, Sandrine; Robert Colman; Vladimir M. Kattsov; Richard P. Allan; Christopher S. Bretherton; Jean-Louis Dufresne; Alex Hall; Stephane Hallegatte; Marika M. Holland; William Ingram *et al.* (2006), "How well do we understand and evaluate climate change feedback processes?" *Journal of Climate* **19**, 3446–3483.

Bounoua, L.; G. J. Collatz; S. O. Los; P. J. Sellers; D. A. Dazlich; C. J. Tucker; and D. A. Randall (2000), "Sensitivity of climate to changes in NDVI," *Journal of Climate* **13**, 2277–2292.

Briffa, K. R.; Osborn, T. J.; Schweingruber, F. H.; Harris, I. C.; Jones, P. D.; Shiyatov, S. G.; and Vaganov, E. A. (2001), "Low-frequency temperature variations from a northern tree-ring-density network," *Journal of Geophysical Research* **106**, 2929–2941.

Briner, J. P.; N. Michelutti; D. R. Francis; G. H. Miller; Y. Axford, Y.; M. J. Wooller; and A. P. Wolfe (2006), "A multi-proxy lacustrine record of Holocene climate change on Northeastern Baffin Island, Arctic Canada," *Quaternary Research* **65**, 431–442.

Broecker, W. S. (1995), "Chaotic climate," *Scientific American*, November.

Brohan, P.; J. J. Kennedy; I. Harris; S. F. B. Tett; and P. D. Jones (2006), "Uncertainty estimates in regional and global observed temperature changes: A new dataset from 1850," *J. Geophys. Res.* **111**, D12106–D12140.

Brovkin, V.; M. Claussen; E. Driesschaert; T. Fichefet; D. Kicklighter; M. F. Loutre; H. D. Matthews; N. Ramankutty; M. Schaeffer; and A. Sokolov (2006), "Biogeophysical effects of historical land cover changes simulated by six Earth system models of intermediate complexity," *Climate Dynamics* **26**, 587–600.

Bürger, Gerd; and Ulrich Cubasch (2005), "Are multiproxy climate reconstructions robust?" *Geophysical Research Letters* **32**, L23711.

Caillon, Nicolas; Jeffrey P. Severinghaus; Jean Jouzel; Jean-Marc Barnola; Jiancheng Kang; and Volodya Y. Lipenkov (2003), "Timing of atmospheric CO_2 and Antarctic temperature changes across Termination III," *Science* **299**, 1728–1747.

Cane, Mark A., "Oceanographic events During El Niño," *Science* **222**, 1189–1195 (1983).

Cappelen, John; and Edward Hanna (2003), *Recent Climate of Southern Greenland*, online at *http://www.dmi.dk/dmi/greenland.pdf*

Caseldine, C. J.; Langdon, P. G.; and Holmes, N. (2006), "Early Holocene climate variability and the timing and extent of the Holocene thermal maximum (HTM) in northern Iceland," *Quaternary Science Reviews* **25**(17–18), 2314–2331.

CCSP (2005), *Temperature Trends in the Lower Atmosphere*, U.S. Government Climate Change Science Program, November 17, 2005, online at *http://www.climatescience.gov/Library/sap/sap1-1/ public-review-draft/sap1-1prd-all.pdf*

CCSP (2007), *CCSP Synthesis and Assessment Report 3.1, Climate Models: An Assessment of Strengths and Limitations for User Applications*, Public Review Draft, U.S. Government Climate Change Science Program, May 15, online at *http://www.climatescience.gov/Library/sap/sap3-1/public-review-draft/sap3-1prd-cover.pdf*

Charbit, S.; C. Ritz; G. Philippon; V. Peyaud; and M. Kageyama (2007), "Numerical reconstructions of the Northern Hemisphere ice sheets through the last glacial–interglacial cycle," *Clim. Past* **3**, 15–37.

Charlson, Robert; J. Francisco; P. J. Valero; and John H. Seinfeld (2005), "In search of balance," *Science* **308**, 806–807.

Chen, J. L.; C. R. Wilson; D. D. Blankenship; and B. D. Tapely (2006), "Antarctic mass rates from GRACE," *Geophysical Research Letters* **33**, L11502.

Christy, John R. (1995), "Temperature above the surface layer," *Climatic Change* **31**, 455–474.

Christy, John R.; Roy W. Spencer; and William D. Braswell (2000), "MSU tropospheric temperatures: Dataset construction and radiosonde comparisons," *Journal of Atmospheric and Ocean Technology* **17**, 1153–1170.

Christy, John R.; William B. Norris; Roy W. Spencer; and Justin J. Hnilo (2007), "Tropospheric temperature change since 1979 from tropical radiosonde and satellite measurements," *Journal of Geophysical Research* **112**, D06102.

Church, John A.; Neil J. White; and John R. Hunter (2006), "Sea-level rise at tropical Pacific and Indian Ocean islands," *Global and Planetary Change* **53**, 155–168, online at *http://timesonline.typepad.com/times_tokyo_weblog/files/john_church_document.pdf*

Church, J.; and N. White (2006), "A 20th century acceleration in global sea-level rise," *Geophysical Research Letters* **33**, L01602.

Chylek, P.; J. E. Box; and G. Lesins (2004), "Global warming and the Greenland ice sheet," *Climatic Change* **63**, 201–221.

Chylek, P.; M. K. Dubey; and G. Lesins (2006), "Greenland warming of 1920–1930 and 1995–2005," *Geophysical Research Letters* **33**, L11707.

Comiso, Josefino C. (2000), "Variability and trends in Antarctic surface temperatures from in situ and satellite infrared measurements," *Journal of Climate* **13**, 1674–1697.

Conway, H.; B. L. Hall; G. H. Denton; A. M. Gades; and E. D. Waddington (1999), "Past and future grounding-line retreat of the West Antarctic Ice Sheet," *Science* **286**, 280–283.

Crowley, Thomas J. (2002), "Cycles, cycles everywhere," *Science* **295**, 1473–1474.

Crowley, Thomas J.; and Thomas S. Lowery (2000), "How warm was the Medieval Warm Period?" *Ambio* **29**, 51–54.

Cubasch, Ulrich; E. Zorita; F. Gonzales-Rouco; H. von Storch; and I. Fast (2002), "Cool stars, the sun and climate variability: Is there a connection?", online at *http://www.hs.uni-hamburg.de/cs13/day1/02_Cubasch.ppt*

Cullen, N. J.; T. Mölg; T. G. Kaser; K. Hussein; K. Steffen; and D. R. Hardy (2006), "Kilimanjaro glaciers: Recent areal extent from satellite data and new interpretation of observed 20th century retreat rates," *Geophysical Research Letters* **33**, L16502.

Darby, D.; J. Bischof; G. Cutter; A. de Vernal; C. Hillaire-Marcel; G. Dwyer; J. McManus; L. Osterman; L. Polyak; and R. Poore (2001), "New record shows pronounced changes in Arctic Ocean circulation and climate," *EOS Transactions American Geophysical Union* **82**, 601–607.

Dasgupta, Susmita; Benoit Laplante; Craig Meisner; David Wheeler; and Jianping Yan (2007), "The impact of sea level rise on developing countries: A comparative analysis," *World Bank Policy Research Working Paper 4136*, February, online at *http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2007/02/09/000016406_20070209161430/Rendered/PDF/wps4136.pdf*

Davey, Christopher A.; and Roger A. Pielke Sr. (2005), "Microclimate exposures of surface-based weather stations implications for the assessment of long-term temperature trends," *Bulletin of the American Meteorological Society* **86**, 497–506.

Davis, B. A. S.; S. Brewer; A. C. Stevenson; J. Guiot; and Data Contributors (2003), "The temperature of Europe during the Holocene reconstructed from pollen data," *Quaternary Science Reviews* **22**, 1701–1716.

Davis, C. H.; Y. Li; J. R. McConnell; M. M. Frey; and E. Hanna (2005), "Snowfall-driven growth in East Antarctic ice sheet mitigates recent sea-level rise," *Science* **308**, 1898–1901.

Dawson, J. W. (1893), *The Canadian Ice Age*, online at *http://books.google.com/books?id=8QAKAAAAIAAJ&pg=PA1&dq=the+Canadian+Ice+Age+dawson*

de Blij, Harm (2005), *Why Geography Matters*, Oxford University Press.

de Laat, A. T. J.; and A. N. Maurellis (2004), "Industrial CO_2 emissions as a proxy for anthropogenic influence on lower tropospheric temperature trends," *Geophysical Research Letters* **31**, L05204.

de Laat, A. T. J.; and A. N. Maurellis (2006), "Evidence for influence of anthropogenic surface processes on lower tropospheric and surface temperature trends," *International Journal of Climatology* **26**, 897–913.

de Silva, Shanaka L. (2003), "Volcanic eruptions and their impact on the earth's climate," online at *http://www.space.edu/papers/Volcanoclimate.pdf*

Debret, M.; V. Bout-Roumazeilles; F. Grousset; M. Desmet; J. F. McManus; N. Massei; D. Sebag; J.-R. Petit; Y. Copard; and A. Trentesaux (2007), "The origin of the 1500-year climate cycles in Holocene North-Atlantic records," *Clim. Past Discussions* **3**, 679–692, online at *http://www.clim-past-discuss.net/3/679/2007/*

Deffeyes, K. S. (2001), *Hubbert's Peak: The Impending World Oil Shortage*, Princeton University Press.

Degaetano, Arthur T.; and Robert J. Allen (2002), "Trends in twentieth-century temperature extremes across the United States," *Journal of Climate* **15**, 3188–3206.

deMenocal, P.; J. Ortiz; T. Guilderson; and M. Sarnthein (2000), "Coherent high- and low-latitude climate variability during the Holocene warm period," *Science* **288**, 2198–2202.

Desler, Clara; Michael A. Alexander; and Michael S. Timlin (1996), "Upper-ocean thermal variations in the North Pacific during 1970–1991," *Journal of Climate* **9**, 1840–1855.

DiLorenzo, E.; N. Schneider; K. M. Cobb; P. J. S. Franks; K. Chhak; A. J. Miller; J. C. McWilliams; S. J. Bograd; H. Arango; E. Curchitser *et al.* (2007), "North Pacific Gyre Oscillation links ocean climate and ecosystem change," *Geophysical Research Letters*, submitted.

Divine, D. V.; and C. Dick (2006), "Historical variability of sea ice edge position in the nordic seas," *Journal of Geophysical Research* **111**, C01001.

Doran, Peter T.; John C. Priscu; W. Berry Lyons; John E. Walsh; Andrew G. Fountain; Diane M. McKnight; Daryl L. Moorhead; Ross A. Virginia; Diana H. Wall; Gary D. Clow *et al.* (2002), "Antarctic climate cooling and terrestrial ecosystem response," *Nature* **415**, 517–520.

Douglas, B. C.; and W. R. Peltier (2002), "The puzzle of global sea-level rise," *Physics Today*, March, online at *http://www.aip.org/web2/aiphome/pt/vol-55/iss-3/p35.html*

Douglass, D. H.; and R. S. Knox (2005), "Climate forcing by the volcanic eruption of Mount Pinatubo," *Geophys. Res. Lett.* **32**, L05710.

Dyke, A. S.; J. T. Andrews; P. U. Clark; J. H. England; G. H. Miller; J. Shaw; and J. J. Veillette (2002), "The Laurentide and Innuitian ice sheets during the Last Glacial Maximum," *Quaternary Science Reviews* **21**, 9–31.

Eddy, John (1976), "The Maunder Minimum," *Science* **192**, 1189–1202.

Ehrelinger, J. R.; T. E. Cerling; and M. D. Dearing (2005), *A History of Atmospheric CO_2 and Its Effects on Plants, Animals and Ecosystems*, Springer-Verlag.

Elkibbi, Maya; and José A. Rial (2001), "An outsider's review of the astronomical theory of the climate: Is the eccentricity-driven insolation the main driver of the ice ages?" *Earth Science Reviews* **56**, 161–177.

Emanuel, Kerry (2005), "Environmental Influences on Tropical Cyclone Variability and Trends", *http://ams.confex.com/ams/pdfpapers/107575.pdf*

Esper, Jan; Edward R. Cook; and Fritz H. Schweingruber (2002), "Low-frequency signals in long tree-ring chronologies for reconstructing past temperature variability," *Science* **295**, 2249–2252.

Esper, Jan; Fritz H. Schweingruber; and Matthias Winiger (2002), "1300 years of climatic history for Western Central Asia inferred from tree-rings," *The Holocene* **12**, 267–277.

Esper, Jan; Robert J. S. Wilson; David C. Frank; Anders Moberg; Heinz Wanner; and Jürg Luterbacher (2005), "Climate: Past ranges and future changes," *Quaternary Science Reviews* **24**, 2164–2166.

Essex, Christopher; Ross McKitrick; and Bjarne Andresen (2007), "Does a global temperature exist?" *J. Non-Equilib. Thermodyn.* **32**, 1–27.

Etheridge, D. M.; L. P. Steele; R. I. Langenfels; R. J. Francey; J. M. Barnola; and V. I. Morgan (1996), "Natural and anthropogenic changes in atmospheric CO_2 over the last 1000 years from air in Antarctic ice and firn," *Journal of Geophysical Research* **101**, 4115–4128.

Fagan, Brian (2000), *The Little Ice Age*, Basic Books.

Falkowski, P.; R. J. Scholes; E. Boyle; J. Canadell; D. Canfield; J. Elser; N. Gruber; K. Hibbard; P. Hogberg; S. Linder *et al.* (2000), "The global carbon cycle: A test of our knowledge of Earth as a system," *Science* **290**, 291–296.

Fischer, H.; Wahlen, M.; Smith, J.; Mastroianni, D.; and Deck, B. (1999), "Ice core records of atmospheric CO_2 around the last three glacial terminations," *Science* **283**, 1712–1714.

Fligge, M.; S. K. Solanki; Y. C. Unruh; C. Fröhlich; and C. Wehrli (1998), "A model of solar total and spectral irradiance variations," *Astron. Astrophys.* **335**, 709–718.

Fligge, M.; S. Solanki; N. Meunier; and Y. Unruh (2000), "Solar surface magnetism and the increase of solar irradiance between activity minimum and maximum," *Proceedings of the First Solar and Space Weather Euroconference, September 25–29, 2000, Santa Cruz de Tenerife, Tenerife, Spain.*

Flückiger, Jacqueline; Eric Monnin; Bernhard Stauffer; Jakob Schwander; Thomas F. Stocker; Jerome Chappellaz; Dominique Raynaud; and Jean-Marc Barnola (2002), "High-resolution Holocene N_2O ice core record and its relationship with CH_4 and CO_2," *J. Geophys. Res.* **16**, 1010, online at *http://www.ncdc.noaa.gov/paleo/pubs/ flueckiger2002/flueckiger2002.html*

Foster, Bob (2001), *IPCC's Third Assessment Report: Too Much Imagination Block*, online at *http://lavoisier.com.au/papers/submissions/Foster3(2001).pdf*

Foukal, P.; and J. Lean (1990), "An empirical model of TSI variation between 1874 and 1988," *Science* **247**, 556–559.

Foukal, Peter; Gerald North; and Tom Wigley (2004), "A stellar view on solar variations and climate," *Science* **306**, 68–69.

Foukal, P.; C. Frohlich; H. Spruit; and T. M. L. Wigley (2006), "Variations in solar luminosity and their effect on the Earth's climate," *Nature* **443**, 161–166.

Friedli, H.; H. Lotscher; H. Oeschger; U. Siegenthaler; and B. Stauffer (1986), "Ice core record of the $^{13}C/^{12}C$ ratio of atmospheric CO_2 in the past two centuries," *Nature* **324**, 237–238.

Friis-Christensen, E.; and K. Lassen (1991), "Length of the Solar Cycle: An indicator of solar activity closely associated with climate," *Nature* **254**, 698–700.

Geikie, James (1882), *The Great Ice Age and Its Relation to the Antiquity of Man*, online at *http://books.google.com/books?id=UN8PAAAAIAAJ&pg=RA1-PA724&dq=the+Canadian+Ice+Age+dawson*

Gerard J. C.; and D. A. Hauglustaine (1991), "Transient climate response to solar irradiance: Reconstruction for the last 120 years," *Climate Research* **1**, 161–167.

Gerlich, Gerhard; and Ralf D. Tscheuschner (2007), "Falsification of the atmospheric CO_2 greenhouse effects within the frame of physics," Version 2.0 (July 24), online at *http://arxiv.org/pdf/0707.1161*" *http://arxiv.org/pdf/0707.1161*

Ghan, Steven J.; and Stephen E. Schwartz (2007), "Aerosol properties and processes: A path from field and laboratory measurements to global climate," *Bull. Amer. Meteorological Soc.* **88**, 1059–1083.

GISS (2007), *GISS Surface Temperature Analysis*, online at *http://data.giss. nasa.gov/gistemp/graphs/*

Goosse, Hugues; Hans Renssen; Axel Timmermann; and Raymond S. Bradley (2005), "Internal and forced climate variability during the last millennium: A model–data comparison using ensemble simulations," *Quaternary Science Reviews* **24**, 1345–1360.

Goosse, Hughes; O. Arzel; J. Luterbacher; M. E. Mann; H. Renssen; N. Riedwyl; A. Timmermann; E. Xoplaki; and H. Wanner (2006), "The origin of the European Medieval Warm Period," *Clim. Past* **2**, 99–113.

Gorodetskaya, Irina V.; Mark A. Cane; L.-Bruno Tremblay; and Alexey Kaplan (2006), "The effects of sea-ice and land-snow concentrations on planetary albedo from the Earth Radiation Budget Experiment," *Atmosphere–Ocean* **44**, 195–205.

Gregory, Jonathan (2004), "Review of concepts and methods relating to climate sensitivity," *IPCC Workshop in Paris on Climate Sensitivity*, July, *http://www. met.reading.ac.uk/~jonathan/talks/paris0407.pdf*

Gregory, J. M.; W. J. Ingram; M. A. Palmer; G. S. Jones; P. A. Stott; R. B. Thorpe; J. A. Lowe; T. C. Johns; and K. D. Williams (2004), "A new method for diagnosing radiative forcing and climate sensitivity," *Geophysical Research Letters* **31**, L03205.

Grove, J. M. (2001), "The initiation of the 'Little Ice Age' in regions around the North Atlantic," *Climatic Change* **48**, 53–82.

Guilderson, Thomas P.; and Daniel P. Schrag (1998), "Abrupt shift in subsurface temperatures in the tropical Pacific associated with changes in El Niño," *Science* **281**, 240–243.

Hale, Robert C.; Kevin P. Gallo; Timothy W. Owen; and Thomas R. Loveland (2006), "Land use/land cover change effects on temperature trends at U.S. Climate Normals Stations," *Geophysical Research Letters* **33**, L11703.

Hall, Alex; and Syukuro Manabe (1999), "The role of water vapor feedback in unperturbed climate variability and global warming," *Journal of Climate* **12**, 2327–2346.

Hanna, Edward; and John Cappelen (2003), "Recent cooling in coastal southern Greenland and relation with the North Atlantic Oscillation," *Geophysical Research Letters* **30**, 1132.

Hansen, James E. (2004), "Defusing the global warming time bomb," *Scientific American*, 69–77, March.

Hansen, James E. (2005), "A slippery slope: How much global warming constitutes 'dangerous anthropogenic interference'?: An editorial essay," *Climatic Change* **68**, 269–279, online at *http://www.columbia.edu/~jeh1/hansen_slippery.pdf*

Hansen, James E.; Makiko Sato; Jay Glascoe; and Reto Ruedy (1998), "A common-sense climate index: Is climate changing noticeably?" *Proc. Natl. Acad. Sci.* **95**, 4113–4120.

Hansen, James E.; R. Ruedy; J. Glascoe; and M. Sato (1999), "GISS analysis of surface temperature change," *J. Geophys. Res.* **104**, 30997–31022.

Hansen, James E.; R. Ruedy; M. Sato; M. Imhoff; W. Lawrence; D. Easterling; T. Peterson; and T. Karl (2001), "A closer look at United States and global surface temperature change," *Journal of Geophysical Research* **106**, 23947–23964.

Hansen, James E.; M. Sato; L. Nazarenko; R. Ruedy; A. Lacis; D. Koch; I. Tegen; T. Hall; D. Shindell; B. Santer *et al.* (2002), "Climate forcings in Goddard Institute for Space Studies SI2000 simulations," *Journal of Geophysical Research* **107**, 4347–4383.

Hansen, James E.; L. Nazarenko; R. Ruedy; M. Sato; J. Willis; A. Del Genio; D. Koch; A. Lacis; K. Lo; S. Menon *et al.* (2005), "Earth's energy imbalance: Confirmation and implications," *Science* **308**, 1431–1434.

Hare, Steven R.; and Nathan J. Mantua, "Empirical evidence for North Pacific regime shifts in 1977 and 1989," *Progress in Oceanography* **47**, 103–145 (2000).

Hathaway, David H.; Robert M. Wilson; and Edwin J. Reichmann (2002), "Group Sunspot Numbers: Sunspot cycle characteristics," *Solar Physics* **211**: 357–370.

Held, Isaac M.; and Brian J. Soden (2000), "Water vapor feedback and global warming," *Annual Rev. Energy Environ.* **25**, 441–475.

Hoffert, Martin I.; Ken Caldeira; Atul K. Jain; Erik F. Haites; L. D. Danny Harvey; Seth D. Potter; Michael E. Schlesinger; Stephen H. Schneider; Robert G. Watts; Tom M. L. Wigley *et al.* (1998), "Energy implications of future stabilization of atmospheric CO_2 content," *Nature* **395**, 881–884.

Hoffert, Martin I.; Ken Caldeira; Gregory Benford; David R. Criswell; Christopher Green; Howard Herzog; Atul K. Jain; Haroon S. Kheshgi; Klaus S. Lackner; John S. Lewis *et al.* (2002), "Advanced technology paths to global climate stability: Energy for a greenhouse planet," *Science* **298**, 981.

Hoffman, John S. (1984), *Estimates of Future Sea Level Rise*, online at *http://www.epa.gov/climatechange/effects/coastal/SLRChallenge.html*

Holgate, S. J. (2007), "On the decadal rates of sea level change during the twentieth century," *Geophysical Research Letters* **34**, L01602-5.

Holgate, S. J.; and P. L. Woodworth (2004), "Evidence for enhanced coastal sea level rise during the 1990s," *Geophysical Research Letters* **31**, L07305-9.

Houghton, John (2004), *Global Warming*, Third Edition, Cambridge University Press.

Howat, I. M.; Joughin, I.; and Scambos, T. A. (2007), "Rapid changes in ice discharge from Greenland outlet glaciers," *Science* **315**, 1559–1561.

Hoyt, Douglas (2006), *A Critical Examination of Climate Change*, online at *http://www.warwickhughes.com/hoyt/climate-change.htm*

Hoyt, D. V.; and K. H. Schatten (1993), "A discussion of plausible solar irradiance variations 1700–1992," *J. Geophys. Res.* **98**, 18895–18906.

Hoyt, D. V.; and K. H. Schatten (1998), "Group Sunspot Numbers: A new solar activity reconstruction," *Solar Phys.* **179**, 189–219. Reprinted with figures in *Solar Phys.* **181**, 491 (1998).

Huang, Shaopeng; Henry N. Pollack; and Po Yu Shen (1997), "Late Quaternary temperature changes seen in worldwide continental heat flow measurements," *Geophysical Research Letters* **24**, 1947–1950.

Huybrechts, Philippe (2002), "Sea-level changes at the LGM from ice-dynamic reconstructions of the Greenland and Antarctic ice sheets during the glacial cycles," *Quaternary Science Reviews* **21**, 203–231.

Idso, Sherwood B.; and Craig D. Idso (2007), *Carbon Dioxide and Global Change: Separating Scientific Fact from Personal Opinion*, a critique of the April 26, 2007 testimony of James E. Hansen made to the Select Committee of Energy Independence and Global Warming of the United States House of Representatives entitled "Dangerous Human-Made Inter-

ference with Climate," Center for the Study of Carbon Dioxide and Global Change, June 6, online at *http://www.co2science.org*

Idso, Sherwood B.; Craig D. Idso; and Keith E. Idso (2003), *The Specter of Species Extinction*, online at *http://www.co2science.org*

Imbrie, John; and Katherine Palmer Imbrie (1979), *Ice Ages: Solving the Mystery*, Harvard University Press.

IPCC (2001), *Third Assessment Report*, Intergovernmental Panel on Climate Change.

Jaworowski, Zbigniew (2006), *Another Global Warming Fraud Exposed: Ice Core Data Show No Carbon Dioxide Increase*, online at *http://www.21stcenturysciencetech.com/2006_articles/IceCoreSprg97.pdf*

Jaworowski, Zbigniew (2007), *CO_2: The Greatest Scientific Scandal of Our Time*, EIR Science, online at *http://www.21stcenturysciencetech.com/Articles 2007/20_1-2_CO_2_ Scandal.pdf*

Jevrejeva, S.; Grinsted, A.; Moore, J. C.; and Holgate, S. (2006), "Nonlinear trends and multiyear cycles in sea level records," *Journal of Geophysical Research* **111**, C09012-22.

Joerin, U. E.; T. F. Stocker; and C. Schluchter (2006), "Multicentury glacier fluctuations in the Swiss Alps during the Holocene," *The Holocene* **16**, 697–704.

Jones, P. D.; T. J. Osborn; and K. R. Briffa (2001), "Evolution of climate over the last millennium," *Science* **292**, 662–668.

Jones, P. D.; K. R. Briffa; T. P. Barnett; and S. F. B. Tett (1998), "High-resolution palaeoclimatic records for the last millennium: Interpretation, integration and comparison with General Circulation Model control-run temperatures," *The Holocene* **8**, 455–471.

Juckes, M. N.; M. R. Allen; K. R. Briffa; J. Esper; G. C. Hegerl; A. Moberg; T. J. Osborn; S. L. Weber; and E. Zorita (2006), "Millennial temperature reconstruction intercomparison and evaluation," *Clim. Past Discussions* **2**, 1001–1049.

Kalnay, E.; and M. Cai (2003), "Impact of urbanization and land-use change on climate," *Nature* **423**, 528–531.

Keeling, Ralph F., "Comment on 'The Ocean Sink for Anthropogenic CO_2'," *Science* **308**, 1743 (2005). Response by C. Sabine and N. Gruber, same issue.

Keigwin, L. D. (1996), "The Little Ice Age and Medieval Warm Period in the Sargasso Sea," *Science* **274**, 1503–1508.

Keigwin, L. D.; and E. A. Boyle (2000), "Detecting Holocene changes in thermohaline circulation," *Proceedings of the National Academy of Science* **97**, 1343–1346.

Khalil, M. A. K.; C. L. Butenhoff; and R. A. Rasmussen (2007), "Atmospheric methane: Trends and cycles of sources and sinks," *Environmental Science and Technology* **41**, 2131–2137.

Kiehl, J. T.; and Kevin E. Trenberth (1997), "Earth's annual global mean energy budget," *Bull. Amer. Meteorological Soc.* **78**, 197–208.

Kilty, Kevin T. (1997), *Past Climate and Borehole Temperatures*, online at *http://www.kilty.com/pdfs/t-d.pdf*

Kilty, Kevin T. (1999), *Circular Logic*, online at *http://www.kilty.com/circular.htm*

Kirkby, J.; A. Mangini; and R. A. Muller (2004), *The Glacial Cycles and Cosmic Rays*, online at *http://arxiv.org/pdf/physics/0407005*

Klotzbach, P. J. (2006), "Trends in global tropical cyclone activity over the past twenty years (1986–2005)," *Geophysical Research Letters* **33**, L010805.

Knaack, R.; M. Fligge; S. K. Solanki; and Y. C. Unruh (2001), "The influence of an inclined rotation axis on solar irradiance variations," *Astronomy and Astrophysics* **376**, 1080–1089.

Knutson, T. R.; and R. E. Tuleya (2004), "Impact of CO_2-induced warming on simulated hurricane intensity and precipitation: Sensitivity to the choice of climate model and convective parameterization," *Journal of Climate* **17**, 3477–3493.

Koberle, C.; and R. Gerdes (2003), "Mechanisms determining the variability of Arctic sea ice conditions and export," *Journal of Climate* **16**, 2843–2858.

Kouwenberg, Lenny; and Liesbeth Ria (2005), "Application of conifer needles in the reconstruction of Holocene CO_2 levels," Ph.D. thesis, University of Utrecht, the Netherlands.

Kouwenberg, Lenny; Rike Wagner; Wolfram Kurschner; and Henk Visscher (2005), "Atmospheric CO_2 fluctuations during the last millennium reconstructed by stomatal frequency analysis of *Tsuga heterophylla* needles," *Geology* **33**, 33–36.

Lean, J. (2000), "Short term, direct indices of solar variability," *Space Sci. Rev.*, **94**, 39–51.

Lean, J., J. Beer, and R. Bradley (1995), "Reconstruction of solar irradiance since 1610: Implications for climate change," *Geophys. Res. Lett.* **22**, 3195–3198.

Lean, J.; and P. Foukal (1988), "A model of solar luminosity modulation by magnetic activity between 1954 and 1984," *Science* **240**, 906.

Lean, J.; A. Skumanich; and O. White (1992), "Estimating the sun's radiative output during the Maunder Minimum," *Geophys. Res. Lett.* **19**, 1595–1598.

Lean, J. L.; Y.-M. Wang; and N. R. Sheeley Jr. (2002), "The effect of increasing solar activity on the Sun's total and open magnetic flux during multiple cycles: Implications for solar forcing of climate," *Geophysical Research Letters* **29**, 2224–2227.

Lean, J.; G. J. Rottman; H. L. Kyle; T. N. Woods; J. R. Hickey; and L. C. Puga (1997), "Detection and parameterization of variations in solar mid- and near-ultraviolet radiation (200–400 nm)," *J. Geophys. Res.* **102**, 29939–29956.

Lean, J. L.; J. Cook; W. Marquette; and A. Johannesson (1998), "Magnetic sources of the solar irradiance cycle," *Astrophys. J.* **492**, 390–401.

Leathers, Daniel J.; Michael A. Palecki; David A. Robinson; and Kenneth F. Dewey (1998), "Climatology of the daily temperature range annual cycle in the United States," *Climate Research* **9**, 197–211.

Lefohn, Allen S.; Janja D. Husar; and Rudolf B. Husar (1999), "Estimating historical anthropogenic global sulfur emission patterns for the period 1850–1990," *Atmospheric Environment* **33**, 3435–3444.

Leroux, Marcel (2005), *Global Warming: Myth or Reality*, Springer/Praxis.

Levitus, S.; J. Antonov; and T. Boyer (2005), "Warming of the world ocean, 1955–2003," *Geophysical Research Letters* **32**, L02604.

Lewis, Marlo (2007), *A Skeptic's Guide to "An Inconvenient Truth"*, online at *http://www.CEI.org*

Lightfoot, H. Douglas; and Christopher Green (2002), *Energy Intensity Decline Implications for Stabilization of Atmospheric CO_2 Content*, Dept. of Economics, McGill University, McGill Center for Climate and Global Change Research (C2GCR) Report No. 2001-7, October 2001 (January 2002), online at *http://people.mcgill.ca/files/christopher.green/energyintensity decline.pdf*

Lim, Young-Kwon; Ming Cai; Eugenia Kalnay; and Liming Zhou (2005), "Observational evidence of sensitivity of surface climate changes to land types and urbanization," *Geophysical Research Letters* **32**, L22712.

Lindsay, R. W.; and J. Zhang (2005), "The thinning of Arctic sea ice, 1988–2003: Have we passed a tipping point?" *Journal of Climate* **18**, 4879–4894.

Liu, Jian; Hans von Storch; Eduardo Zorita; Xing Chen; and Sumin Wang (2005), "Simulated and reconstructed temperature in China since 1550 AD," *History of Meteorology* **2**, 87–104.

Lockwood, G. W.; Brian A. Skiff; and Richard R. Radick (1997), "The photometric variability of Sun-like stars: Observations and results, 1984–1995," *Astrophysical Journal* **485**, 789–811.

Lockwood, G. W.; Brian A. Skiff; G. W. Henry; and R. R. Radick (1997), *Patterns of Photometric and Chromospheric Variation among Sun-like Stars: A 20 Year Perspective*, online at *http://arxiv.org/pdf/astro-ph/0703408*

Lockwood, M. (2002), "An evaluation of the correlation between open solar flux and total solar irradiance," *Astronomy and Astrophysics* **382**, 678–687.

Lockwood, M.; and R. Stamper (1999), "Long-term drift in the coronal source magnetic flux and the total solar irradiance," *Geophys. Res. Letters* **26**, 2461–2465.

Lombard, A.; Cazenave, A.; Le Traon, P.-Y.; and Ishii, M. (2005), "Contribution of thermal expansion to present-day sea-level change revisited," *Global and Planetary Change* **47**, 1–16.

Loulergue, L.; F. Parrenin; T. Blunier; J.-M. Barnola; R. Spahni; A. Schilt; G. Raisbeck; and J. Chappellaz (2007), "New constraints on the gas age–ice age difference along the EPICA ice cores, 0–50 kyr," *Clim. Past Discussions* **3**, 435–467.

Lyman, John M.; Josh K. Willis; and Gregory C. Johnson (2007), "Recent cooling of the upper ocean," *Geophysical Research Letters* **33**, L18604 (2006). Correction: *Geophysical Research Letters* **34**, L16601.

Macdougall, Doug (2004), *Frozen Earth: The Once and Future Story of Ice Ages*, University of California Press.

Mann, Michael E.; Raymond S. Bradley; and Malcolm K. Hughes (1998), "Global-scale temperature patterns and climate forcing over the past six centuries," *Nature* **392**, 779–807.

Mann, M. E.; R. S. Bradley; and M. K. Hughes (1999), "Northern Hemisphere temperatures during the past millennium: Inferences, uncertainties, and limitations," *Geophys. Res. Letters* **26**, 759–762.

Mann, Michael E.; R. S. Bradley; and M. K. Hughes (2004), "Corrigendum: Global-scale temperature patterns and climate forcing over the past six centuries," *Nature* **430**, 105.

Mann, Michael E.; and Philip D. Jones (2003), "Global surface temperatures over the past two millennia," *Geophysical Research Letters* **30**, 1820.

Mann, Michael E.; Scott Rutherford; Eugene Wahl; and Caspar Ammann (2005), "Testing the fidelity of methods used in proxy-based reconstructions of past climate," *Journal of Climate* **18**, 4097–4107.

Mann, Michael E.; Scott Rutherford; Eugene Wahl; and Caspar Ammann (2007), "Robustness of proxy-based climate field reconstruction methods," *Journal of Geophysical Research* **112**, D12109.

Marsh, Gerald E. (2001), *Climate Change 2001: A Critique*, National Center for Public Policy Research, online at *http://www.nationalcenter.org/NPA452.pdf*

Marsh, Gerald E. (2002), *Global Warming Primer*, National Center for Public Policy Research, Report No. 420 (July), online at *http://www.nationalcenter.org/NPA420.pdf*

Marshall, John; Yochanan Kushnir; David Battisti; Ping Chang; Arnaud Czaja; Robert Dickson; James Hurrell; Michael Mccartney; R. Saravanan; and Martin Visbeck (2001), "North Atlantic climate variability: Phenomena, impacts and mechanisms," *Int. J. Climatol.* **21**, 1863–1898.

Matthews, H. D.; A. J. Weaver; K. J. Meissner; N. P. Gillett; and M. Eby (2004), "Natural and anthropogenic climate change: Incorporating historical land cover change, vegetation dynamics and the global carbon cycle," *Climate Dynamics* **22**, 461–479.

Matthews, John A.; and Keith R. Briffa (2005), "The 'Little Ice Age': Re-evaluation of an evolving concept," *Geografiska Annaler* **87A**, 17–36.

Maunder, E. J (1922), "The prolonged sunspot minimum 1645–1715," *Jour. Br. Astron. Assoc.* **32**, 140.

McIntyre, S. (2007), Climate Audit Website, online at *http://www.climateaudit.org*

McIntyre, S.; and R. McKitrick (2003), "Corrections to the Mann *et al.* (1998) 'Proxy data based and Northern Hemispheric average temperature series'," *Energy and Environment* **14**, 751–771.

McIntyre, S.; and R. McKitrick (2005), *Hockey Sticks, Principal Components and Spurious Significance*, Informal Report, online at *http://www.uoguelph.ca/~rmckitri/research/trc.html*

McIntyre, S.; and R. McKitrick (2006), *Surface Temperature Reconstructions for the Past 1,000–2,000 Years*, presentation to the National Academy of Sciences Expert Panel, Washington, D.C. (March 2).

McIntyre, S.; and R. McKitrick (2007), *The M&M Critique of the MBH98 Northern Hemisphere Climate Index: Update and Implications*, Informal report, online at *http://www.uoguelph.ca/~rmckitri/research/trc.html*

McKitrick, Ross (2005), *What is the 'Hockey Stick' Debate About?*, online at *http://www.climatechangeissues.com/files/PDF/conf05mckitrick.pdf*

McLean, John (2007a), *Ignoring a Natural Event to Blame Humans* (October), online at *http://mclean.ch/climate/global_warming.htm*

McLean, John (2007b), *Fallacies about Global Warming* (September), online at *http://mclean.ch/climate/global_warming.htm*

Mears, Carl A.; Matthias C. Schabel; and Frank J. Wentz (2003), "A reanalysis of the MSU Channel 2 tropospheric temperature record," *Journal of Climate* **16**, 3650–3664.

Meehl, Gerald A.; and Warren M. Washington (1996), "El Niño-like climate change in a model with increased atmospheric CO_2 concentrations," *Nature* **382**, 56–60.

Meehl, Gerald A.; Warren M. Washington; T. M. L. Wigley; Julie M. Arblaster; and Aiguo Dai (2002), "Solar and greenhouse gas forcing and climate response in the twentieth century," *Journal of Climate* **16**, 426–444.

Minnis, Patrick; J. Kirk Ayers; Rabindra Palikonda; and Dung Phan (2004), "Contrails, cirrus trends, and climate," *Journal of Climate* **17**, 1671–1685.

Minschwaner, Ken; and Andrew E. Dessler (2004), "Water vapor feedback in the tropical Upper Troposphere: Model results and observations," *Journal of Climate* **17**, 1272–1282.

Minschwaner, Ken; Andrew E. Dessler; and Parnchai Sawaengphokhai (2006), "Multimodel analysis of the water vapor feedback in the tropical Upper Troposphere," *Journal of Climate* **19**, 5455–5464.

Mitchell, J. F. B.; and T. C. Johns (1997), "On modification of global warming by sulfate aerosols," *Journal of Climate* **10**, 245–267.

Moberg, A.; D. M. Sonechkin; K. Holmgren; N. M. Datsenko; W. Karlen; and S. E. Lauritzen (2005), "Highly variable Northern Hemisphere temperatures reconstructed from low- and high-resolution proxy data," *Nature* **433**, 613–617.

Monckton, Christopher (2006), "Gore gored: A science-based response to Al Gore's global warming commentary, in London's *Sunday Telegraph* 19 November 2006," The Center for Science and Public Policy, Washington, D.C., online at *http://www.ff.org/centers/csspp/pdf/20061121_gore.pdf*

Monnin, E.; A. Indermühle; A. Dällenbach; J. Flückiger; B. Stauffer; T. F. Stocker; D. Raynaud; and J.-M. Barnola (2001), "Atmospheric CO_2 concentrations over the last glacial termination," *Science* **291**, 112–114.

Mörner, Nils-Axel (1973), "Eustatic changes during the last 300 years," *Palaeogeography, Palaeoclimatology, Palaeoecology* **9**, 153–181.

Mörner, Nils-Axel (2004) "Estimating future sea level changes from past records," *Global and Planetary Change* **40**, 49–54, online at *http://gsa.confex.com/gsa/inqu/finalprogram/abstract_ 54461.htm*

Mudelsee, M. (2001), "The phase relations among atmospheric CO_2 content, temperature and global ice volume over the past 420 ka," *Quaternary Science Reviews* **20**, 583–589.

Muscheler, Raimund; Fortunat Joos; Simon A. Müller; and Ian Snowball (2005), "How unusual is today's solar activity?" *Nature* **436**, E3–E4.

Nagashima, Tatsuya; Hideo Shiogama; Tokuta Yokohata; Simon A. Crooks; and Toru Nozawa (2006), "The effect of carbonaceous aerosols on surface temperature in the mid twentieth century," *Geophysical Research Letters* **33**, L04702.

Nisancioglu, K. H. (2004), "Modeling the impact of atmospheric moisture transport on global ice volume," Ph.D. dissertation, MIT (June).

Nordhaus, William (2006), *Review of Stern Review* (November 17), online at *http://www.carbontax.org/wp-content/uploads/2006/12/nordhaus-_-stern-review-_-dec-2006.pdf*

Northrup, Amy (2004), *The Global Carbon Cycle in the Ocean and the Threat of Climate Change Because of Anthropogenic Carbon Emissions*, BISC 419 (April 22), online at *http://bioweb.usc.edu/courses/2004-spring/documents/bisc419-carboncycle.pdf*

Nozawa, Toru; Tatsuya Nagashima; Hideo Shiogama; and Simon A. Crooks (2005), "Detecting natural influence on surface air temperature change in the rarly twentieth century," *Geophys. Res. Letters* **32**, L20719.

Nozawa, T.; T. Nagashima; T. Ogura; T. Yokohata; N. Okada; and H. Shiogama (2007), *Climate Change Simulations with a Coupled Ocean–Atmosphere GCM (MIROC)*, Center for Global Environmental Research, Japan, Report No. CGER 1073.

O'Brien, S. R.; P. A. Mayewski; L. D. Meeker; D. A. Meese; M. S. Twickler; and S. I. Whitlow (1995), "Complexity of Holocene climate as reconstructed from a Greenland ice core," *Science* **270**, 1961–1963.

Ogilvie, A. E. J.; and T. Jonsson (2001), "Little Ice Age research: A perspective from Iceland," *Climatic Change* **48**, 9–52.

Oke, T. R. (1973), "City size and the urban heat island," *Atmospheric Environment* **7**, 769–779.

Oppenheimer, Michael; and R. B. Alley (2005), "Ice sheets, global warming, and Article 2 of the UNFCCC: An editorial essay," *Climatic Change* **68**, 257–267, online at *http://www.princeton.edu/~step/people/Oppenheimer%and%Alley%II%published.pdf*

Overpeck, J.; K. Hughen; D. Hardy; R. Bradley; R. Case; M. Douglas; B. Finney; K. Gajewski; G. Jacoby; A. Jennings *et al.* (1997), "Arctic environment change of the last four centuries," *Science* **278**, 1251.

Pandolfi, J. M.; E. Bradbury; R. H. Sala; T. P. Hughes; K. A. Bjorndal; R. G. Cooke; D. McArdle; L. McClenachan; M. J. H. Newman; G. Paredes *et al.* (2003), "Global trajectories of the long-term decline of coral reef systems," *Science* **301**, 955–958.

Parker, David E. (2004), "Climate: Large-scale warming is not urban," *Nature* **432**, 290.

Patterson, R. Timothy (2007), *Read the Sunspots* (June 20, 2007), online at *http://www.canada.com/nationalpost/financialpost/comment/story.html?id = 597d0677-2a05-47b4-b34f-b84068db11f4*

Peacock, Synte; Emily Lane; and Juan M. Restrepo (2006), "A possible sequence of events for the generalized glacial–interglacial cycle," *Global Biogeochemical Cycles* **20**, GB2010–GB2026.

Peltier, W. R. (1994), "Ice age paleotopography," *Science* **265**, 195–201.

Peterson, Thomas C.; and Russell S. Vose (1997), "An overview of the global historical climatology network temperature database," *Bulletin of the American Meteorological Society* **78**, 2837–2849.

Peterson, Thomas C.; Alan N. Basist; Claude N. Williams; and Norman C. Grody (2000), "A blended satellite–in situ near-global surface temperature dataset," *Bulletin of the American Meteorological Society* **81**, 2157–2164.

Petit, J. R.; J. Jouzel; D. Raynaud; N. I. Barkov; J.-M. Barnola; I. Basile; M. Bender; J. Chappellaz; M. Davis; G. Delaygue *et al*. (1999), "Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica," *Nature* **399**, 429–436.

Pielke Sr., Roger A.; C. A. Davey; Dev Niyogi; Souleymane Fall; Jesse Steinweg-Woods; Ken Hubbard; Xiaomao Lin; Ming Cai; Young-Kwon Lim; Hong Li *et al*. (2007a), *Unresolved Issues with the Assessment of Multi-Decadal Global Land-Surface Temperature Trends* (February 5), online at *http://climatesci.colorado.edu/publications/pdf/R-321.pdf*

Pielke Sr., Roger A.; Jimmy O. Adegoke; Thomas N. Chase; Curtis H. Marshall; Toshihisa Matsui; and Dev Niyogi (2007b), "A new paradigm for assessing the role of agriculture in the climate system and in climate change," *Agricultural and Forest Meteorology* **142**, 234–254.

Pielke Sr., Roger; John Nielsen-Gammon; Christopher Davey; Jim Angel; Odie Bliss; Nolan Doesken; Ming Cai; Souleymane Fall; Dev Niyogi; Kevin Gallo *et al*. (2007c), "Documentation of uncertainties and biases associated with surface temperature measurement sites for climate change assessment," *Bull. Amer. Meteor. Soc*. **88**, 913–928 (June).

Piotrowski, Alexander M.; Steven L. Goldstein; Sidney R. Hemming; and Richard G. Fairbanks (2005), "Temporal relationships of carbon cycling and ocean circulation at glacial boundaries," *Science* **307**, 1933–1938.

Polissar, P. J.; J. B. Abbott; A. P. Wolfe; M. Bezada; V. Rull; and R. S. Bradley (2006), "Solar modulation of Little Ice Age climate in the tropical Andes," *Proceedings of the National Academy of Sciences* **103**, 8937–8942.

Pollack, Henry N.; and Shaopeng Huang (2000), "Climate reconstruction from subsurface temperatures," *Annual Rev. Earth Planet. Sci*. **28**, 339–365.

Polyakov, I. V.; and M. A. Johnson (2000), "Arctic decadal and interdecadal variability," *Geophysical Research Letters* **27**, 4097–4100.

Polyakov, I.; D. Walsh; I. Dmitrenko; R. L. Colony; and L. A. Timokhov (2003a), "Arctic Ocean variability derived from historical observations," *Geographic Research Letters* **30**, 31–34.

Polyakov, I. V.; R. V. Bekryaev; G. V. Alekseev; U. S. Bhatt; R. L. Colony; M. A. Johnson; A. P. Maskshtas; and D. Walsh (2003b), "Variability and trends of air temperature and pressure in the maritime Arctic, 1875–2000," *Journal of Climate* **16**, 2067–2077.

Power, Scott B.; and Ian N. Smith, "Weakening of the Walker Circulation and apparent dominance of El Niño both reach record levels, but has ENSO really changed?" *Geophysical Research Letters* **34**, L18702-5 (2007).

Prohom, M. J.; P. Esteban; J. Martín-Vide; and P. D. Jones (2003), "Surface atmospheric circulation over Europe following major tropical volcanic eruptions, 1780–1995," in *Volcanism and the Earth's Atmosphere*, Geophysical Monograph 139, American Geophysical Union.

Przybylak, Rajmund (2002), "Changes in seasonal and annual high-frequency air temperature variability in the Arctic from 1951 to 1990," *Int. J. Climatology* **22**, 1017–1032.

Pudsey, C. J.; J. W. Murray; P. Appleby; and J. Evans (2006), "Ice shelf history from petrographic foraminiferal evidence, northeast Antarctic Peninsula," *Quaternary Science Reviews* **25**, 2357–2379.

Rahmstorf, Stefan (2002), "Ocean circulation and climate during the past 120,000 years," *Nature* **419**, 207–214.

Rahmstorf, Stefan; and Richard Alley (2002), "Stochastic resonance in glacial climate," *EOS, Transactions of the American Geophysical Union* **83**, 129.

Rahmstorf, Stefan; David Archer; Denton S. Ebel; Otto Eugster; Jean Jouzel; Douglas Maraun; Urs Neu; Gavin A. Schmidt; Jeff Severinghaus; Andrew J. Weaver *et al.* (2004), "Cosmic rays, carbon dioxide and climate," *EOS, Transactions of the American Geophysical Union* **85**, 38–41.

Ramanathan, V. (1988), "The greenhouse theory of climate change: A test by an inadvertent global experiment," *Science* **240**, 293–299.

Ramanathan, V.; R. J. Cicerone; H. B. Singh; and J. T. Kiehl (1985), "Trace gas trends and their potential role in climate change," *Journal of Geophysical Research* **90**, 5547–5566.

Ramirez, E.; G. Hoffmann; J. D. Taupin; B. Francou; P. Ribstein; N. Caillon; F. A. Ferron; A. Landais; J. R. Petit; B. Pouyaud *et al.* (2003), "A new Andean deep ice core from Nevado Illimani (6,350 m), Bolivia," *Earth and Planetary Science Letters* **212**, 337–350.

Rayner, N. A.; D. E. Parker; E. B. Horton; C. K. Folland; L. V. Alexander; D. P. Rowell; E. C. Kent; and A. Kaplan (2003), "Global analyses of sea surface temperature, sea ice, and night marine air temperature since the late nineteenth century," *Journal of Geophysical Research* **108**, 4407–4443.

Reid, G. C. (1997), "Solar forcing of global climate change since the mid-17th century," *Climatic Change* **37**, 391–405.

Ren, F.; G. Wu; W. Dong; X. Wang; Y. Wang; W. Ai; and W. Li (2006), "Changes in tropical cyclone precipitation over China," *Geophysical Research Letters* **33**, L20702.

Rial, J. A. (1999), "Pacemaking the ice ages by frequency modulation of Earth's orbital eccentricity," *Science* **285**, 564–568.

Rignot, E.; and P. Kanagaratnam (2006), "Changes in the velocity structure of the Greenland Ice Sheet," *Science* **311**, 986–990.

Robinson, A. R.; N. E. Robinson; and Willie Soon (2007), "Environmental effects of increased atmospheric CO_2," *Journal of American Physicians and Surgeons* **12**, 79–90.

Robock, A. (2000), "Volcanic eruptions and climate," *Rev. Geophys.* **38**, 191–219.

Robock, Alan (2004), "Climatic impact of volcanic emissions," in Steve Sparks and Chris Hawkesworth (Eds.), *State of the Planet*, Monograph 150, American Geophysical Union.

Robock, Alan (2005), "Comment on 'Climate forcing by the volcanic eruption of Mount Pinatubo' by David H. Douglass and Robert S. Knox," *Geophysical Research Letters* **32**, L20711.

Roe, Gerard (2006), "In defense of Milankovitch," *Geophysical Research Letters* **33**, L24703.

Rohling, E. J.; P. A. Mayewski; R. H. Abu-Zied; J. S. L. Casford; and A. Hayes (2002), "Holocene atmosphere–ocean interactions: Records from Greenland and the Aegean Sea," *Climate Dynamics* **18**, 587–593.

Roper, L. David (2006), *Relationship of Antarctica Temperature to Atmospheric Carbon Dioxide and Methane*, online at *http://www.roperld.com/science/CO2_Temp.pdf*

Rutledge, D. (2007), *Hubbert's Peak and Climate Change*, California Inst. of Technology, presentation at Jet Propulsion Laboratory, Pasadena, CA (May), online at *http://www.rutledge.caltech.edu/*

Sabine, C.; and N. Gruber (2005), Response to comment on "The ocean sink for anthropogenic CO_2," *Science* **308**, 1743.

Sabine, Christopher L.; Richard A. Feely; Nicolas Gruber; Robert M. Key; Kitack Lee; John L. Bullister; Rik Wanninkhof; C. S. Wong; Douglas W. R. Wallace; Bronte Tilbrook *et al.* (2004), "The oceanic sink for anthropogenic CO_2," *Science* **305**, 367–371.

Scafetta, N.; and B. J. West (2006), "Phenomenological solar contribution to the 1900–2000 global surface warming," *Geophysical Research Letters* **33**, L05708.1–L05708.4.

Schimel, D. S.; J. I. House; K. A. Hibbard; P. Bousquet; P. Ciais; P. Peylin; B. H. Braswell; M. J. Apps; D. Baker; A. Bondeau *et al.* (2001), "Recent patterns and mechanisms of carbon exchange by terrestrial ecosystems," *Nature* **414**, 169–172.

Schmidt, Matthew W.; Maryline J. Vautravers; and Howard J. Spero (2006), "Rapid subtropical North Atlantic salinity oscillations across Dansgaard–Oeschger cycles," *Nature* **443**, 561–564.

Schuster, Ute; and Andrew J. Watson, "A variable and decreasing sink for atmospheric CO_2 in the North Atlantic," to be published in the *Journal of Geophysical Research* (2007), online at *http://lgmacweb.env.uea.ac.uk/ajw/Reprints/Schuster_Watson_JGR_in_press.pdf*

Schwartz, Stephen E. (2003), "Requirements for empirical determination of Earth's climate sensitivity," *AAAS Annual Meeting, Denver, CO, February 14–18*, online at *http://www.ecd.bnl.gov/steve/abstracts/Empirical.html*

Schwartz, Stephen E. (2004), "Uncertainty requirements in radiative forcing of climate change," *J. Air and Waste Manage. Assoc.* **54**, 1351–1359.

Schwartz, Stephen E. (2007), "Heat capacity, time constant, and sensitivity of Earth's climate system," *Journal of Geophysical Research* **112**, D24S05, online at *http://www.ecd.bnl.gov/pubs/BNL-76939-2006-AB.pdf*

Schwartz, Stephen E.; Robert J. Charlson; and Henning Rodhe (2007), "Quantifying climate change: Too rosy a picture?" *Nature Reports, Climate Change* **2**, 23–24.

Seager, Richard (2006), "The source of Europe's mild climate," *American Scientist On-Line* (July–August), online at *http://www.americanscientist.org/template/AssetDetail/assetid/51963?fulltext=true&print=yes*

Senior, C. A.; and J. F. B. Mitchell (2000), "The time dependence of climate sensitivity," *Geophysical Research Letters* **27**, 2685–2688.

Shaviv, Nir J. (2005), "On climate response to changes in the cosmic ray flux and radiative budget," *Journal of Geophysical Research* **110**, A08105.

Shaviv, Nir J.; and Ján Veizer (2004), *On the Role of Cosmic Ray Flux Variations as a Climate Driver: The Debate*, online at *http://www.sciencebits.com/ClimateDebate*

Shaviv, N.; and J. Veizer (2003), "Celestial driver of Phanerozoic climate?" *GSA Today* **13**, 4–10.

Shepherd, A.; and Wingham, D. (2007), "Recent sea-level contributions of the Antarctic and Greenland Ice Sheets," *Science* **315**, 1529–1532.

Sherwood, Keith; and Craig Idso (2006), "Highly over-hyped: Greenland's and Antarctica's impacts on sea level CO_2," *Science* **9**, 29, online at *http://www.co2science.org/scripts/CO2ScienceB2C/articles/V9/N13/EDIT.jsp*

Shine, K. P. (2005), "Comments on 'Contrails, cirrus trends, and climate'," *Journal of Climate* **18**, 2781–2782. A reply to P. Minnis, *Journal of Climate* **18**, 2783–2784 (2005).

Siegenthaler, Urs; Thomas F. Stocker; Eric Monnin; Dieter Luthi; Jakob Schwander; Bernhard Stauffer; Dominique Raynaud; Jean-Marc Barnola; Hubertus Fischer; Valerie Masson-Delmotte *et al.* (2005), "Stable carbon cycle–climate relationship during the Late Pleistocene," *Science* **310**, 1313–1318.

Singer, S. Fred; and Dennis T. Avery (2007), *Unstoppable Global Warming—Every 1500 years*, Rowman & Littlefield.

Smerdon, Jason E.; and Alexey Kaplan (2007), "Comment on 'Testing the fidelity of methods used in proxy-based reconstructions of past climate': The role of the standardization interval," submitted to *Journal of Climate*, online at *http://www.ldeo.columbia.edu/~jsmerdon/papers/2006_agu_smerdonetal.pdf*

Smith, Thomas M.; and Richard W. Reynolds (2005), "A global merged land–air–sea surface temperature reconstruction based on historical observations (1880–1997)," *Journal of Climate* **18**, 2021–2036.

Smith, Thomas M.; Thomas C. Peterson; Jay H. Lawrimore; and Richard W. Reynolds (2005), "New surface temperature analyses for climate monitoring," *Geophysical Research Letters* **32**, L14712.

Solanki, S. K.; and M. Fligge (1998), "Solar irradiance since 1874 revisited," *Geophysical Research Letters* **25**, 341–344.

Solanki, S. K.; and M. Fligge (1999), "A reconstruction of total solar irradiance since 1700," *Geophys. Res. Lett.* **26**, 2465–2468.

Solanki, S. K., and M. Fligge (2000), "Reconstruction of past solar irradiance," *Space Science Reviews* **94**, 127–138.

Solanki, Sami K.; and Natalie A. Krivova (2004), "Solar irradiance variations: From current measurements to long-term estimates," *Solar Physics* **224**, 197–208.

Solanki, S.; N. Krivova; and T. Wenzler (2005), "Irradiance models," *Adv. in Space Research* **35**, 376–383.

Solanki, S. K.; I. G. Usoskin; B. Kromer; M. Schussler; and J. Beer (2004), "Unusual activity of the Sun during recent decades compared to the previous 11,000 years," *Nature* **431**, 1084–1087.

Soon, Willie (2007a), *Quantitative Implications of the Secondary Role of Carbon Dioxide Climate Forcing in the Past Glacial–Interglacial Cycles for the Likely Future Climatic Impacts of Anthropogenic Greenhouse-Gas Forcings*, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, online at *http://aps.arxiv.org/ftp/arxiv/papers/0707/0707.1276.pdf*

Soon, Willie; and Sallie Baliunas (2003a), *Lessons and Limits of Climate History: Was the 20th Century Climate Unusual?*, informal report, George C. Marshall Institute, Washington, D.C.

Soon, Willie; and Sallie Baliunas (2003b), "Reconstructing climatic and environmental changes of the past 1000 years: A reappraisal," *Energy and Environment* **14**, 233–299.

Soon, Willie; and S. Yaskell (2007), *Year without a Summer*, online at *http://www.mitosyfraudes.org/Calen/Year1816.html*

Spörer, F. W. G., "Über die Periodizität der Sonnenflecken seit dem Jahre 1618," *Viertel-jahrsschr. Astron. Ges.* (Leipsig) **22**, 323 (1887); *Bull Astron.* **6**, 60 (1889).

Stern, David I. (2005a), *Reversal in the Trend of Global Anthropogenic Sulfur Emissions*, Rensselaer working papers in economics, No. 0504 (May), online at *http://www.rpi.edu/~sternd/GEC2006.pdf*

Stern, David I. (2005b), "Global sulfur emissions from 1850 to 2000," *Chemosphere* **58**, 163–175.

Stott, Lowell; Kevin G. Cannariato; Robert Thunell; Gerald H. Haug; Athanasios Koutavas; and Steve Lund (2004), "Decline of surface temperature and salinity in the western tropical Pacific Ocean in the Holocene epoch," *Nature* **431**, 6–59.

Streutker, David R. (2003), "A study of the urban heat island of Houston, Texas," Ph.D. thesis, University of Houston.

Tapping, K. F.; D. Boteler; A. Crouch; P. Charbonneau; A. Manson; and H. Paquette (2006), *Modelling Solar Magnetic Flux and Irradiance during and since the Maunder Minimum*, online at *http://www.lps.umontreal.ca/~paquetteh/Maunder_SP.pdf*

Taylor, George (2006), *Antarctic Temperature and Sea Ice Trends over the Last Century: An Assessment of Antarctic Climate Data* (March), online at *http://64.119.172.31/awpf.pdf*

and *http://www.co2science.org/scripts/CO$_2$ScienceB2C/articles/V9/N13/EDIT.jsp?Print=true*

Taylor, K. (1999), "Rapid climate change," *American Scientist On-Line*, July–August, online at *http://www.americanscientist.org/template/AssetDetail/assetid/15750?fulltext=true&print=yes*

Thompson, David W. J.; and Susan Solomon (2002), "Interpretation of recent Southern Hemisphere climate change," *Science* **296**, 895–899.

Thompson, L. G.; M. E. Davis; E. Mosley-Thompson; T. A. Sowers; K. A. Henderson; V. S. Zagorodnov; P.-N. Lin; V. N. Mikhalenko; R. K. Campen; J. F. Bolzan *et al*. (1998), "A 25,000-year tropical climate history from Bolivian ice cores," *Science* **282**, 1858–1864.

Titus, James G. (1990), *Greenhouse Effect, Sea Level Rise, and Barrier Islands: Case Study of Long Beach Island, New Jersey*, online at *http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsSLRBarrier_Islands.html*

Trenberth, Kevin E. (2004), "Comment on 'Impact of urbanization and land-use change on climate' by E. Kalnay and M. Cai in *Nature* **423**, 528–531 (2003)," *Nature* **427**, 214.

Turner, John; Steve R. Colwell; Gareth J. Marshall; Tom A. Lachlan-Cope; Andrew M. Carleton; Phil D. Jones; Victor Lagun; Phil A. Reide; and Svetlana Iagovkina (2005), "Antarctic climate change during the last 50 Years," *Int. J. Climatology* **25**, 279–294.

Usoskin, Ilya G.; Sami K. Solanki; Manfred Schussler; Kalevi Mursula; and Katja Alanko (2003), "Millennium-scale sunspot number reconstruction: Evidence for an unusually active Sun since the 1940s," *Phys. Rev. Letters* **91**, 211101-1 to 211101-4.

Vaquero, J. M. (2007), *Historical Sunspot Observations: A Review, http://arxiv.org/pdf/astro-ph/0702068*

Vaquero, J. M.; M. C. Gallego; R. M. Trigo; F. Sánchez-Bajo; M. L. Cancillo; and J. A. García (2006), "A new reconstruction of total solar irradiance since 1832," *Atmósfera* **19**, 267–274.

Varekamp, J. C. (2006), "The historic fur trade and climate change," *EOS, Transactions of the American Geophysical Union* **87**, 593-597.

Vecchi, G. A.; B. J. Soden; A. T. Wittenberg; I. M. Held; A. Leetma; and M. J. Harrison (2006), "Weakening of tropical Pacific atmospheric circulation due to anthropogenic forcing," *Nature* **441**, 73–76.

Velicogna, I.; and J. Wahr (2006), "Measurements of time-variable gravity show mass loss in Antarctica," *Science* **311**, 1754–1756.

Volz, Hartwig (2006), "Sea water emissivity: A neglected climate forcing," *Second International Conference on Global Warming and the Next Ice Age, Santa Fe, New Mexico, July 17–19*.

von Storch, H. E.; E. Zorita; J. Jones; Y. Dimitriev; F. González-Rouco; and S. Tett (2004), "Reconstructing past climate from noisy data," *Science* **306**, 679–682.

Vose, R. S.; D. R. Easterling; and B. Gleason (2005), "Maximum and minimum temperature trends for the globe: An update through 2004," *Geophys. Res. Letters* **32**, L23822-6.

Vose, Russell S.; Thomas R. Karl; David R. Easterling; Claude N. Williams; and Matthew J. Menne (2004), "Comment on 'Impact of urbanization and land-use change on climate' by E. Kalnay and M. Cai in *Nature* **423**, 528–531 (2003)," *Nature* **427**, 214–215 (2004).

Wang, Y.-M.; J. Lean;, and N. R. Sheeley Jr. (2002), "Role of a variable meridional flow in the secular evolution of the Sun's polar fields and open flux," *Astrophysical Journal* **577**, L53–L57.

Webster, P. J.; G. J. Holland; J. A. Curry; and H-R. Chang (2005), "Changes in tropical cyclone number, duration, and intensity in a warming environment," *Science* **309**, 1844–1846.

Weckström, J.; A. Korhola; P. Erästö; and L. Holmström (2006), "Temperature patterns over the past eight centuries in Northern Fennoscandia inferred from sedimentary diatoms," *Quaternary Research* **66**, 78–86.

Wegman, Edward J.; David W. Scott; and Yasmin H. Said (2006), *Ad Hoc Committee Report on the "Hockey Stick" Global Climate Reconstruction*, The Congressional Committee on Energy and Commerce, Washington, D.C. (July 14), online at *http://republicans.energycommerce.house.gov/108/home/07142006_Wegman_Report.pdf*

Wenzler, T.; S. K. Solanki; and N. A. Krivova (2005), "Can surface magnetic fields reproduce solar irradiance variations in cycles 22 and 23?," *Astronomy and Astrophysics* **432**, 1057–1061.

Wigley, T. M. L.; Richels, R.; and Edmonds, J. A. (1996), "Economic and environmental choices in the stabilization of atmospheric CO_2 concentration," *Nature* **379**, 240–243.

Wigley, Tom M. L.; V. Ramaswamy; J. R. Christy; J. R. Lanzante; C. A. Mears; B. D. Santer; and C. K. Folland (2006), *Temperature Trends in the Lower Atmosphere: Understanding and Reconciling Differences* (April), online at *http://www.climatescience.gov/Library/sap/sap1-1/finalreport/default.htm*

Willson, R. (2006), "A critical review of the time series of total solar irradiance satellite observations," AGU Fall Meeting 2006, Paper SH41A-02, *http://www.acrim.com/senior%20review%202007/SH41A-02_fall%20AGU_final.pdf*

Wingham, D. J.; A. Shepherd; A. Muir; and G. J. Marshall (2006), "Mass balance of the Antarctic Ice Sheet," *Transactions of the Royal Society* **364**, 1627–1635.

Wu, Lixin; Dong Eun Lee; and Zhengyu Liu (2005), "The 1976/77 North Pacific climate regime shift: The role of subtropical ocean adjustment and coupled ocean–atmosphere feedbacks," *Journal of Climate* **18**, 5125–5140.

Yang, Bao; Achim Braeuning; Kathleen R. Johnson; and Shi Yafeng (2002), "General characteristics of temperature variation in China during the last two millennia," *Geophysical Research Letters* **29**, 1324–1327.

Zhang, Qi-Bin; Guodong Cheng; Tandong Yao; Xingcheng Kang; and Jianguo Huang (2003), "A 2,326-year tree-ring record of climate variability on the northeastern Qinghai–Tibetan Plateau," *Geophysical Research Letters* **30,** 1739–1742.

Zhou, Liming; Robert E. Dickinson; Yuhong Tian; Jingyun Fang; Qingxiang Li; Robert K. Kaufmann; Compton J. Tucker; and Ranga B. Myneni (2004), "Evidence for a significant urbanization effect on climate in China," *Proceedings of the National Academy of science* **101**, 9540–9544.

Zorita, Eduardo; and Hans von Storch (2005), "Methodical aspects of reconstructing non-local historical temperatures," *Memorie della Società Astronomica Italiana* **76**, 794–801.

Zorita, E.; H. von Storch; F. J. González-Rouco; U. Cubasch; S. Legutke; I. Fischer-Bruns; and U. Schlese (2003), "Simulation of the climate of the last five centuries," GKSS Report, 2003/12, *http://coast.gkss.de/staff/storch/pdf/gkss_2003_12.pdf*

Zubrin, Robert (2007), "The hydrogen hoax," *The New Atlantis*, Winter.

Zwally, H. J.; W. Abadalati; T. Herring; K. Larson; J. Saba; and K. Steffan (2002), "Surface melt-induced acceleration of Greenland Ice-Sheet flow," *Science* **297**, 218–222.

Zwally, H. J.; Giovinetto, M. B.; Li, J.; Cornejo, H. G.; Beckley, M. A.; Brenner, A. C.; Saba, J. L.; and Yi, D. (2005), "Mass changes of the Greenland and Antarctic ice sheets and shelves and contributions to sea-level rise: 1992–2002," *Journal of Glaciology* **51**, 509–527.

Zweck, Chris; and Philippe Huybrechts (2003), "Modeling the marine extent of Northern Hemisphere ice sheets during the last glacial cycle," *Annals of Glaciology* **37**, 173–180.

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Figures are **bold**, tables are *italic*, and color figures are **extra bold**

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