

**Climate Scientists as Cassandra?
Complexity, Communication, and Democracy**

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Brigance Forum Lecture for Wabash College

Thank you. I am delighted to be here, and I would like to thank Dr. Jenny Hamilton and the faculty of the Rhetoric Department for inviting me; and, to the family, friends, and former students of the late William Norwood Brigance, I thank you for making possible this annual lecture. I'm deeply honored. Last September, at the Public Address Conference in Pittsburgh, I chanced to have dinner with two former Brigance Forum speakers. When I mentioned that I had been invited, one exclaimed, "You're giving the Brigance lecture! They're so friendly there." You clearly made an impression.

Professor Brigance's work altered our field, and it is fitting on this occasion to remember a scholar, professor, and shaper of the 20th century movement to place the study of communication firmly within the humanities. I can recall the impression his groundbreaking text, *History and Criticism of American Public Address*, had on me as a junior at the University of Richmond in the late-1960s.

Professor Brigance believed in the pivotal role great speakers and speech play in the public sphere. Ideas—thoughtfully crafted and publicly debated—can inform decisions and guide a nation. It is a thesis that's good to revisit, particularly when some question our ability to publicly debate or thoughtfully address the great challenges before us.

One who has raised such doubt is Indiana's former U.S. Congressman and Co-Chair of the 9/11 Commission, Lee Hamilton. In an interview last October for National Public Radio, Hamilton confessed, "I am concerned deeply about the future of my country." "We are confronted with a large number of very, very difficult problems," he said.

They come at us with great rapidity and great complexity. And whether or not the system -- the constitutional system -- we have can meet these challenges, I think, should be a deep concern to all Americans.

Hamilton went on to say:

When Lincoln ... [spoke] at Gettysburg ... the country was deeply divided. But the politicians of that day dealt with a relatively small number of issues What happens today to a politician is that they have to deal with a very large number of issues of enormous complexity, and I don't think it's a given. I don't think it's written in the stars, that we will always survive and prosper."

Hamilton is correct. The issues confronting our nation and, indeed, the world today are extraordinarily complex: Global financial stability, human rights and the struggles for democracy, energy policy, and the issue that's engaged me for the last five years—global climate change.

Congressman Hamilton was not speaking about climate change, though he well could have been. Indeed, the scale and complexity of the changes required to address this issue are unparalleled: How do we transform global structures of energy production, transportation, and pricing, and what are called “sunk carbon costs”—the capital investments in these structures—as well as the economic and regulatory arrangements that sustain these systems? As Michael Hulme (2009), Director of the Tyndall Centre for Climate Change Research points out, “climate change” is an idea “circulating anxiously” in our politics, business, religion, and in every sphere of social discourse (pp. 322).

Nowhere is this “anxiety” seen as much as in popular media, blogs and pseudo-documentaries such as *The Great Global Warming Swindle*, and from cartoonists and cable TV

commentators for whom every snow storm is fodder for the failures of Al Gore or “proof” that global warming is a myth.

I’ve asked myself many times—though I have worked in this area for years—why is climate change or climate science—admittedly, areas of enormous complexity—so contentious, so prone to hyperbole, *ad hominem*, and cynicism in our public life? My broader question, however, is this:

Are democratic publics—committed to the idea that our best decisions arise from open scrutiny and debate—also capable of addressing great complexities? And if not, what then are the barriers to doing so, and where within the communicative spaces of our public life do these barriers arise?

I pose these because I believe, implicit in them, is a more troubling question about the adjudication of knowledge itself. In my time with you, then, I want to argue that there are *accelerating changes in the sites of production and the distribution of knowledge about science that hinder our understanding of complexity*, and further, that these changes are contributing to an epistemic uncertainty not only about global warming, but climate science itself.

Disconnections and Climate Science

We are, I believe, witnessing a curious disconnect. At a time when the scientific organizations of every major country in the world report strong consensus, opinion polls in the U.S. show growing disbelief in climate change. For example, the National Research Council (2010) of the National Academies of Science has recently reaffirmed its conclusion that, “climate change is occurring, [and] is caused largely by human activities” (para. 3). At the same time, however, a *Washington Post-ABC News* (2009) survey finds that only a minority, 36%, of

Americans believe there is a scientific consensus on this, while 62% believe, incorrectly there is “a lot of disagreement” among scientists.

At times, this disconnect can be stark:

- This past winter, Fox TV’s Glenn Beck—whose show draws two million viewers—

policies have declined in salience? There is some evidence for the latter. A Pew Research poll finds that only 28% of Americans believe climate change should be a “top domestic priority;” putting it last, and behind jobs, the economy, and national security (Revkin, 2009). And a new Gallup (2011) poll last week found, only 51% said they "worry a great deal or fair amount" about global warming, down from 66% in 2008.

I believe it would be wrong, though, to attribute this simply to the economy. I believe something else is happening. Opinion polls also show that Americans *are uncertain about the basic conclusions of climate science and whether scientists themselves believe warming is occurring.*

For example, 48% of Americans believe that the seriousness of global warming is "exaggerated;" this is the highest skepticism in Gallup’s survey since it first asked this question in 1997. Similarly, in the last three to four years, there has been a growing uncertainty that human activities play any significant role in global warming. And, there has been increasing uncertainty as to whether scientists believe that such warming is actually occurring (Gallup, 2010).

Finally, a survey by Yale University finds a small, but disturbing trend—trust in scientists themselves has declined by almost 10% percent in just the last two years. Anthony Leiserowitz, the principal investigator for the survey told CNN that, along with the decline in those believing that global warming is happening, “these are steep drop offs and this is despite the fact that, if anything, the climate science is getting stronger” (“Americans Cooling on Climate Change,” 2010, para. 5). So what is happening?

Complexities and Causes of Climate Shifts

First, let's be clear, climate science is hard to communicate: It *is* complex: Even the phrase “global warming” is misleading: We're invited to view it as *slow, occurring evenly and everywhere at the same time*. Hence, it seems counter-intuitive that, while winter snows can occur in the Midwest, record droughts are spreading in the Southwest and temperatures in northeast Canada and Greenland this winter are running 15-20 degrees *warmer* than average.

And then, add the complexities in the climate system itself:

- That there are both positive and negative “forcings,” that is, multiple (and opposed) changes in the balance of energy in the climate system, contributing to warming or cooling, or both .
- And, positive feedback loops—for example, albedo effects on Arctic ice and on darker ocean water where, once an initial melting of ice starts (revealing more water), a self-sustaining cycle of warming is initiated.
- And, most importantly, the fact that changes in the climate system are often *over-determined*: This is another way of saying that shifts in the energy balance are the result not only of positive and negative forcings, but also from natural as well as anthropogenic influences.

In the face of such complexity, it would be tempting to say, “*The climate's always changed. It's all natural variability.*” It is another thing, however, for scientists to try to explain—or journalists to write about—the regression models that calculate the net, residual influence of these multiple causes.

It is not surprising then that the Yale Project on Climate Change Communication found most Americans remain seriously confused as to the causes of climate change. Only a tiny fraction, 8 percent, the project found, have a strong enough grasp to be awarded an ‘A’ or ‘B’, in

their grasp of the science. A full 52 percent would get an F (Leiserowitz, Smith & Marlon, 2010, p. 3).

If the problem were simply the public's lack of education, the answer would be clear—better science communication, and media that competently translate scientific expertise for a lay audience. As a former Brigrance Forum speaker Josiah Ober of Stanford University said, the challenge then would be, “how to put [that] knowledge, dispersed across many individuals and ... all levels of society, into action.”

While I agree, I fear the problem is also more complicated—the challenge of today's democracy is not simply how “to put knowledge into action,” but how *public* knowledge itself is “produced” and by whom, and with what effects.

As I proposed a moment ago, I believe there are accelerating changes in the production and distribution of such knowledge that may be hindering our understanding of complexity, and furthermore, that these changes are contributing to a deeper, epistemic uncertainty about climate change and about climate science itself.

Two developments, I believe, are especially important:

First, the challenge for journalists in reporting on complexities of global warming or science

comes at a time of crisis in the business model of traditional media. As newspapers declare bankruptcy or migrate online, the expertise available in newsrooms continues to decline.

Parallel with this, we are seeing a resurgence, particularly in the U.S. and Great Britain, of an ideological opposition to climate science that has been able to exploit openings created by these business trends. These include:

- The growth of alternative news (and opinion) platforms and sites of knowledge

production online, in popular cable news, and on radio talk shows; and second,

- An expanding *distribution network* of aggregators able to exploit the decline of science journalism by circulating alternative, cynical, and yet populist narratives to wider media outlets.

So, let me illustrate these trends and describe not only the steps that some scientists and media producers are taking to address these challenges, but also a larger challenge to the communication discipline itself.

Changes in Media Models and Science Journalism

First, let's recall that news coverage of climate change is occurring at a time of ongoing crisis in the business model of traditional media. As Bud Ward (2008), editor of the Yale Forum on Climate Change and the Media said, "it's hard for reporters to focus on ambitious climate reporting ... when their ranks are being 'carnaged'." Ward was referring not simply to the so-called "death of newspapers," but the downsizing of news staff and expertise as news media lose revenue, cut circulation, and migrate online.

The Pew Research Center's annual *State of the News Media* (2011) gives us some insight into what's happened to the industry lately. While revenue for some media, after years of decline, has begun to bounce back, income for newspapers continues to drop, falling almost 50% in the last four years.

The sharp drop in revenue has left newspapers downsizing everything—daily circulation, newspaper size, the space devoted to news, and the number of reporters. Overall, Pew's *State of the News Media* found that newspapers have now lost over 25% in daily circulation since 2000, and newsrooms—reporters, editors, copyeditors, etc.—shrunk by similar amounts. Pew estimates that 1,000 to 1,500 more newsroom jobs were lost in just 2010, meaning newsrooms are now

30% smaller than in 2000 (“Overview, p. 1). Pew concludes, this has left “the largest newsrooms in most American cities bruised and necessarily less ambitious than they were a decade ago” (“Key Findings,” p. 6).

And, while online versions are springing up, these still depend on news staff to produce content, and therein lies the problem. When the *Seattle Post-Intelligencer* moved online, for example, it slashed its news staff of 165 reporters and began operating online with only 20 (Yardley & Pérez-Pena, 2009). As a consequence, the Pew *State of the News Media* in 2010 found that, even the best of the online media sites “still have limited ability to produce content. [And that] capacity ultimately ... will depend on finding a revenue model far larger than what exists today.”

And as media cut staff, there is inevitably a loss of science expertise. Some are eliminating entire beats: The *San Jose Mercury News* reports that, “two decades ago nearly 150 papers had a science section. Now fewer than 20 are left, and [these] ... usually dedicate their scarce column inches to lifestyle and health” (Daly, 2010, para. 16). The Yale Forum on Climate Change and the Media put it bluntly: “The ranks of reporters best equipped to cover ... major environmental and climate change stories at most news outlets, particularly in local markets, are being decimated.” (Daley, 2010, para. 6).

And, the trend is similar in network and cable TV. In 2008, for example, CNN cut its entire science, technology, and environment news staff, and the Weather Channel cancelled its weekly climate program, "Forecast Earth." With its news staff cut, cable news is increasingly filling its time slots with opinion journalism.

Alternative Sites of Production and Distribution

At the same time that newsrooms shrink, Pew's *State of the News Media* reports, the number of *non*-journalistic players entering the information and news field is growing rapidly. These newer players include corporations, ideological think tanks, activist bloggers, and online "pass-through" sites or "aggregators." Aggregators, like Yahoo and Google News, collect a wide variety of web content—headlines, podcasts, videos, tweets, and posts in the blogosphere—and re-post these in a single location for easy distribution to other media outlets.

As a result, the production of climate news (and commentary) is now generated increasingly in a milieu of alternative media platforms, sources of "knowledge" claims, and competing ideological agendas. Climate skeptics, especially, have proven adept at exploiting the decline in traditional science journalism and the explosive growth of online aggregator sites.

One of the most popular of these sites is the conservative Drudge Report. Drudge ranked 2nd in market share for political news websites recently. It's known for its provocative, daily headlines available for download by the producers from cable news and other outlets. Drudge is also a prolific aggregator of sensational news or opinion about climate change, often posting commentary from climate denialists' blogs and other marginal sites. Its headlines have included: "Obama climate czar has socialist ties" and "Global cooling? 30 years of warmer temperatures go poof!"

As a result, it is more likely that a cynical post about climate change—if it has enough "edge"—will be more quickly distributed by an aggregator like Drudge than a report from a leading science journal. For example, Drudge, one of the largest aggregators, gets over 2 million hits daily (and 14 million unique visitors monthly) from reporters, editors, cable TV news producers, and individuals, searching for headlines that attract audiences. Consider this headline,

used by Fox News, last January: “*30 Years of Global Cooling Are Coming, Leading Scientist Says*”:

From Miami to Maine, Savannah to Seattle, America is caught in an icy grip [which] one of the U.N.'s top global warming *proponents* says could mark the beginning of a mini ice age. ... It could be just the beginning of a decades-long deep freeze, says Professor Mojib Latif, one of the world's leading climate modelers. (FoxNews.com, 2010)

At the time of its report, Fox News placed at the top of the most-watched cable networks, logging the most viewers in prime time with 3.2 million. And, Dr. Latif is, in fact, one of the world's leading climate scientists. There was only one problem with the Fox News report: It was blatantly false. When a reporter phoned Latif to confirm the Fox story, Latif replied, "I don't know what to do. They just make these things up" (Romm, 2010, para. 1).

The source of the Fox News error was apparently an online post at the *Daily Mail*, a UK newspaper, titled “The Mini Ice Age Starts Here.” The blogger had misquoted Dr. Latif, but the post was picked up by the Drudge Report and other aggregators and quickly distributed to other papers, bloggers, cable news producers, and then posted by FoxNews.com.

Latif himself had previously objected to such misquoting. Two months earlier, he told National Public Radio that climate skeptics were misusing his work to suggest we were headed for a period of “global cooling.” His research, he explained, had merely suggested a few years “hold” in temperatures, when human-caused warming might be partly offset by ocean cycles; “these short-term changes,” he said, “are much smaller than the long-term warming trends. So ... we are not talking about a net cooling;” after this “hold,” warming would accelerate again (NPR, 2009, para. 14, 10).

Errors occur in news stories. My point is simply that this trend is more likely as news operations cut more staff, including editors and fact-checkers. As a result, misleading or ideologically-driven stories more easily survive and are distributed more rapidly.

To be fair, the rise of aggregators can serve science as well. NOAA, NASA's Goddard Institute for Space Studies, and other scientific agencies also have sites which gather and distribute high-quality climate research to the public. Yet, for every NASA or NOAA site, there are far more numerous sites by climate skeptics, as well as platforms that aggregate and distribute skeptics' views to wider outlets. Sites such as Climate Depot, Air Vent, the Heartland Institute as well as Drudge are able to facilitate rapid distribution of climate anomalies and skeptical commentary across multiple platforms. Indeed, they now function as alternative news "feeds" for mainstream sources.

Pew's *State of the News Media* put it bluntly: "*In the digital realm the news industry is no longer in control of its own destiny.*" With each technological advance, it reported, a new layer of complexity—and a new set of players—has been added in connecting news *content* to readers and advertisers. These intermediaries—programmers, content aggregators, and mobile device makers—increasingly "control access to the public" (Pew, 2011).

As a result, our "knowledge" of science, gathered by content aggregators like Drudge, is more likely to sustain narratives of "uncertainty" and cynicism about climate change. Consider the story of "Climategate," certainly the most pernicious of such narratives.

The Narrative of "Climategate"

Just weeks before the December, 2009 UN climate summit in Copenhagen, hackers broke into computers at the University of East Anglia and downloaded over 1,000 personal emails from

leading climate scientists. Skeptic bloggers jumped on the story; they alleged the emails exposed a “scandal,” a “hoax,” and a “conspiracy” by scientists to silence their critics.

Fanned by the Drudge Report and Fox News, the “Climategate” story went viral and served up headlines for cable news and newspapers across the U.S. The leaked emails, the stories charged, were a “smoking gun,” evidence that scientists had conspired to manipulate data to support their view that climate change was real or human-influenced. The British newspaper *The Telegraph* called it, “the worst scientific scandal of our generation.”

Within a week after a blogger coined the term, Google listed over nine million hits for “Climategate.” Ironically, newspaper coverage of global warming had been declining in the U.S., until the Climate gate story broke; then, framed as “scandal,” coverage spiked. Typical was the accusation in one paper, “We have discovered that a good portion of the science used to justify 'climate change' was a hoax perpetrated by leftist ideologues with an agenda” (quoted in Israel, 2010, para. 3). Indeed, polls showed the U.S. public believed it was “very likely” or “somewhat likely” that scientists had falsified their research (Rasmussen, 2009).

Prominent climatologists received death threats. Phil Jones, director of the Climatic Research Unit at East Anglia, told a reporter, “People said I should go and kill myself.” The death threats, he said, were coming from all over the world.” (Pearce, 2010, p. 2).

The real scandal, however, turned out not to be the science, but the media’s stumbling in the face of unproven allegations and story frames too juicy not to publish. Within months, no fewer than six major, independent investigations in the UK and the U.S. had cleared the scientists of the charges they had tampered with their research and exonerated the underlying science itself. The investigations—conducted by three universities, the British House of Commons' Science and Technology committee, and the U.S. Commerce Department’s inspector

general—did find that some of the scientists used intemperate language or, ridiculed climate skeptics; the most serious finding was that some scientists were overly cautious, refusing to share their data with critics. None of the inquiries, however, found anything in the emails to question the basic science (Gulledge, 2011).

Despite these findings, “many people were left wondering whether climate change was really as much of a threat as it had been made out to be” (Rigg, 2011). The reason is not hard to find.

On his CNN Sunday news show “Reliable Sources, Howard Kurtz pointed to the disparity between the amount of coverage that Climategate had received in the media when the controversy first broke in late 2009, and the amount of media attention it got after the investigations had cleared the scientists. Kurtz noted, for example, that when the hacked e-mails were first leaked, Fox TV’s Glenn Beck called global warming a “big hoax” and asked, with no trace of irony, “Why has no network covered this global warming fix?” Yet, after the inquiries exonerating the scientists, Beck had no comment (Rousey, 2010, para. 3).

While Climategate stories have died down, similar narratives of scandal, falsifying of data, and charges of unethical behavior by climate scientists continue to percolate in popular blogs and stirred by aggregators like Drudge. For example, top “news” feeds on the Drudge Report just two weeks ago included:

--“2010 tied for 'hottest' year?! Relax, it is 'purely a political statement’” and,

--“Close the EPA - 'It's time to stop funding carbon mysticism with taxpayer dollars,’”

As a result, we confront what sociologist Ulrich Beck (2009) identified as the question of contemporary society: What counts as proof, he asked, “in a world where [both] knowledge and lack of knowledge ... are inextricably fused” (p. 320).

The old model of news—a media monopoly, singular, authoritative—is dead. But is another model still possible? One that is open, pluralist, but that also serves a public well? The evidence to date is not promising. While information sources and opinion have proliferated, our ability to judge questions of complexity, such as in science, seems not to have kept pace.

But the challenges of a new model extend beyond the problems I’ve just outlined. I believe those of us in the communication field are called to rethink—not just the crisis in traditional news media—but the actually-existing *sources* of social knowledge, their modes and sites of distribution to a broader public.

New Initiatives in Climate Science Education

There are, in fact, some encouraging signs, initiatives underway by scientists, scholars, and others to engage the sites at which public knowledge about climate change is produced (or re-produced) and distributed to wider publics.

The Union of Concerned Scientists (2010), for example, has launched one of the most comprehensive websites covering the basics of climate science and “big picture solutions” to the impacts from warming already underway. Also, the Howard Hughes Medical Institute has “announced plans to spend \$60 million producing documentaries in an effort to raise the nation’s scientific awareness” (Harmon, 2011, p. A16).

And ClimateCentral.com, an independent, non-profit journalism and research organization, has launched a site dedicated to “helping mainstream Americans understand how climate change connects to them” (climatecentral.org/about). The site links breaking news with interactive graphics to localize the issue of climate change for visitors; in addition, it works with

other journalists to generate easily-usable content for other distribution sites, much like other online aggregators.

Finally, in an effort to engage media producers directly, the Yale Forum on Climate Change and the Media has hosted a series of meetings between scientists and major publishers, editors, and TV producers to aid their understanding and communication of climate change and climate science. Following this have been two prominent initiatives:

First, over 100 scientists recently launched a Climate Science Rapid Response Team. The team makes climate scientists available on short notice to reporters or for talk radio or TV debate with climate skeptics.

Second, the American Geophysical Union—perhaps the premier organization of climate scientists—has just begun an interactive, online Climate Q & A service, with over 700 scientists taking shifts to answer journalists’ questions or interact with news media. Both initiatives are meant to help in filling the void left by the cut-backs in news staff.

But, better science communication can only take us so far. The changes I’ve identified in the social production of “knowledge” also require us to look at how something is constructed as a *problem* in the first place. How do science reports, or cynical blog posts, frame a phenomenon—such as climate change—as something we should (or should not) care about? And care about this, specifically, among the myriad events that compete for our attention.

How democratic publics come to understand or embrace a phenomenon as a “problem” was the question that concerned the great American pragmatist, John Dewey, in the last century. Dewey taught us, and as students of communication, we surely know that a simple, linear relationship between *information*, on the one hand, and a *concern* about something, on the other, does not exist. Something becomes a concern or a “problem,” Dewey suggested, within a

context of personal, affective motivation, a dim feeling of trouble, or a disruption of habits in our thinking (Dewey, 1927; Russill, 2008).

Conclusion

So it is with those issues which, as Congressman Hamilton warned, “come at us with great rapidity and great complexity.” Climate scientists struggle to educate us about what is perhaps the greatest of these—a set of “facts” but also their implications, which, if rightly told, disturb our habits of thought and thus become for us a *problem*. For most nations, climate change has been accepted as a serious threat. For them, the debate is over, and they have moved to initiatives to begin to adapt to changes that are already occurring—adjusting planting and harvesting dates, designing seawalls, changing insurance and banking approaches, and regional pooling of risks.

For us, climate change remains a contentious debate and, at times, a not-so-serious debate, defined more by sarcasm than science. As a consequence, I believe, the great question for us is the possibility of media, that is, at once, open, democratic, and pluralistic, but also one that enables us to become competent to understand and make sense of complexities, and about the actions we, as a society, shall take.

Frankly, most of us don't need to know the intricacies of regression models or the threshold levels for CO₂ absorption in oceans to judge of the seriousness of ocean acidity, the decline in food crops, or the loss of coral reefs. As Susan Hassol, Director of Climate Communication at the University of Colorado, points out: The broader question before us is not, in the end, a technical one, for example, “Do we stabilize [atmospheric CO₂] at 400 parts per million or 420 parts per million?” Instead, she says, “It's, what kind of people are we?” (Slack, 2011, p. 16).

In answering this, I can hear Professor Brigance reminding us, the rhetorical arts still have a place. For, since Aristotle and the debates of the Assembly in ancient Athens, the rationale for rhetoric has come from its etymological root, the word “*rhetor*.” The term signified both one who could speak well and one who was a “citizen.” *Rhetor* assumed a democratic people. In their role as *citizens*, the Athenians had a responsibility—in the face of great challenges—to speak well, but also to govern well.

Our fate, then, need not be Cassandra’s—doomed to speak but have no one listen. We still have a say in the accountability and uses we make of our systems of public communication. More importantly, we, ourselves, retain the capacity for scrutiny and judgment—our ability to insist on standards of evidence, probity, and seriousness of public debate.

These are the *ars rhetorica*, the “arts” that Professor Brigance taught and that Departments of Rhetoric, such as at Wabash, still insist should be part of a humanities education. That as issues “come at us with great rapidity and great complexity,” we turn not just to the scientist, but the *rhetor*, those among us whose seriousness of speech and discernment is still the hope of a democratic society.

References

- Americans cooling on climate change, surveys says. (2010, January 27). CNN. Retrieved January 16, 2011, from http://articles.cnn.com/2010-01-27/world/climate.report.america.trust_1_climate-change-climate-skeptics-climate-leaders?_s=PM:WORLD
- Beck, U. (2009). *World at risk*. Cambridge: Polity Press.
- Daly, J. (2010, January 7). Why the decline and rebirth of environmental journalism matters. Yale Forum on Climate Change and the Media. Retrieved October 5, 2010, from www.yaleclimatemediaforum.org/2010/01/why-decline-rebirth-of-environmental-journalism-matters
- Dewey, J. (1927). *The public and its problems*. New York, NY: Henry Holt. FoxNews.com. (2010, January 11). Thirty years of global cooling are coming, leading scientists says. Retrieved January 16, 2011, from www.foxnews.com/scitech/2010/01/11/years-global-cooling-coming-leading-scientist-says
- Gallup. (2010, March 11). Americans' global warming concerns continue to drop. Retrieved January 15, 2011, from www.gallup.com/poll/126560/americans-global-warming-concerns-continue-drop.aspx
- Gallup. (2011, March 14). In U.S., concerns about global warming stable at lower levels. Retrieved, February 8, 2011, from <http://www.gallup.com/poll/146606/concerns-global-warming-stable-lower-levels.aspx>
- Gulledge, J. (2011, March 1). Sixth independent investigation clears "climategate" scientists. Pew Center on Global Climate Change. Retrieved March 13, 2011, from

www.pewclimate.org/blog/gulledgej/sixth-independent-investigation-clears-climategate-scientists

Harmon, A. (2011, February 25). A nationwide day for honoring Charles Darwin, but handled with caution,” *The New York Times*, p. A16.

Hulme, M. (2009). *Why we disagree about climate change: Understanding controversy, inaction, and opportunity*. Cambridge, UK: Cambridge University Press.

Israel, B. (2010, November 4). Global warming likely to get cool reception in Congress. *Live Science*. Retrieved March 12, 2011, from

www.livescience.com/10246-global-warming-cool-reception-congress.html

Joling, D. (2010, January 21). Global warming opens up Arctic for underseas cable. *USA Today*. Retrieved February 7, 2011, from

www.usatoday.com/weather/climate/globalwarming/2010-01-21-arctic-ice-undersea-cable_N.htm

Keyes, S. (2010, November 3, 2010). Report: Meet the 2010 GOP freshman class. Retrieved February 5, 2011, from <http://thinkprogress.org/2010/11/03/gop-frosh-class/>

Krugman, P. (2009, September 27). Cassandras of Climate. *The New York Times*, p. A21

Leiserowitz, A., Smith, N. & Marlon, J.R. (2010) *Americans' Knowledge of Climate Change*. Yale University. New Haven, CT: Yale Project on Climate Change Communication.

<http://environment.yale.edu/climate/files/ClimateChangeKnowledge2010.pdf>Maron, D.

F. (2010, October 15). Climate change is not rocket science—or is it? Retrieved February 20, 2011, from www.eenews.net

Macalister, T. (2010, October 10). The Guardian. Climate change could lead to Arctic conflict,

- warns senior NATO commander. Retrieved January 6, 2011, from www.guardian.co.uk/environment/2010/oct/11/nato-conflict-arctic-resources
- National Research Council. (2010, May 19). Strong evidence on climate change underscores need for actions to reduce emissions and begin adapting to impacts. Office of News and Public Information. Retrieved February 13, 2022, from www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=05192010
- NATO commander warns of climate change triggering war. (October 12, 2010). Retrieved February 22, 2011, from www.eenews.net/climatewire/2010/10/12/6/
- NOAA. (2011, January 12). 2010 tied for warmest year on record. Retrieved March 4, 2011, from www.noaanews.noaa.gov/stories2011/20110112_globalstats.html
- NPR. (2009, November 22). Scientist explains earth's warming plateau. Retrieved March 15, 2011, from www.npr.org/templates/story/story.php?storyId=120668812&ft=1&f=1007
- Pew Research Center. (2011, March 14). State of the News Media. Available at: <http://pewresearch.org/pubs/1924/state-of-the-news-media-2011>
- Rigg, K. (2011, February 20). Skepticgate: revealing climate denialists for what they are. Retrieved, 2011, from _____
- Rousey, J. (2010, July 12). Media not excited anymore about debunked climategate scandal. Retrieved March 12, 2011, from www.mediaite.com/online/media-not-excited-anymore-about-debunked-climategate-scandal/
- Union of Concerned Scientists(2010) http://www.ucsusa.org/global_warming/
- Rasmussen Reports. (2009, December 1-2). Toplines – Climate change – December 1-2, 2009.

Retrieved January 24, 2011, from

www.rasmussenreports.com/public_content/business/econ_survey_questions/december_2009/toplines_climate_change_december_1_2_2009

Revkin, A. C. (2009, January 23). Environmental issues slide in poll of public concerns. *The New York Times*, p. 13.

Rignot, E., I. Velicogna, van den Broeke, M. R., Monaghan, A. & Lenaerts, J. (2011).

Acceleration of the contribution of the Greenland and Antarctic ice sheets to sea level rise, *Geophysical Research Letters*, 38, L05503, doi:10.1029/2011GL046583.

Romm, J. (2010, January 11). Fox News, WhatsUpWithThat push falsehood-filled Daily Mail article on global cooling. Retrieved January 17, 2011, from

<http://climateprogress.org/2010/01/11/foxnews-wattsupwiththat-climatedepot-daily-mail-article-on-global-cooling-mojib-latif/>

Russill, C. (2008). Through a public darkly: Reconstructing pragmatist perspectives in communication theory. *Communication Theory*, 18, 478–504.

Slack, G. (2011, March/April). Scientists fight back. *SIERRA*, p. 16.

Ward, B. (2010, December 18). 2008's year-long fall-off in climate coverage. The Yale Forum on Climate Change and the Media. Retrieved February 13, 2009, from

www.yaleclimatemediaforum.org/2008/12/2008-year-long-fall-off-in-climate-coverage

Washington Post. (2009, December 10-13). Washington Post-ABC News Poll. Retrieved March 10, 2011, from http://www.washingtonpost.com/wp-srv/politics/polls/postpoll_121509.html