

Political Framing of Climate Change in US News Imagery

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Abstract

While there has been considerable analysis of the content and framing of climate change news texts, the visual imagery that often accompanies and helps frame such texts remains relatively unexplored. This study analyzes image frames identified through cluster analysis the co-occurrence of 118 reliably coded image themes from 350 images in 200 news articles from 11 US newspaper and magazine sources over a nearly 40-year time span (1970s through late 2009). We discuss one image frame in particular – *Government, politics, and negotiation* – and its specific image themes, news sources and image types, change over time, and relationship to other image frames.

Keywords

Climate change communication; news media; imagery; framing; content analysis; image types

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Scholars across disciplines have called for research on climate change visuals (DiFrancesco & Young, 2011; Doyle, 2011; Hansen & Machin, 2008; Lester & Cottle, 2009; Moser, 2010; O'Neill, Boykoff, Niemeyer & Day, 2013). Extending the considerable research on textual coverage and framing of climate change in news content, this paper defines and describes the political image frame, its sources and characteristics, its change over time, and its relation to other frames.

Media Coverage and Framing of Climate Change and Its Influence

The public gets much of its information about environmental issues in general and climate change in particular from mass media (Corbett & Durfee, 2004; Krosnick, Holbrook, & Visser, 2000), and, increasingly, online/digital media (Boykoff, 2011). The media can affect people's perceptions of the environment (Ader, 1995; Besley & Shanahan, 2004; Corbett & Durfee, 2004). Issues typically require such mass media coverage before they can become part of the public agenda (Dearing & Rogers, 1996). Researchers have proposed that media coverage influences public attitudes via its framing of issues and have applied *framing theory* to understand the effects of media content (Entman, 1993; Scheufele, 1999). Framing is the "process by which the emphasis or construction of a message affects the interpretation of the receiver" (Shah, McLeod, Gotlieb & Lee, 2009, p. 85). Frames "select and present a subset of issue considerations or attributes over others to an audience" (Hart, 2010, p. 31). Framing includes defining a problem, interpreting causality, moral evaluation, and recommendation for possible responses or action (Entman, 1993). Framing can influence cognitions, attitudes, affect, and behavior, though most effects occur through complex interactions among audience

characteristics, message features, and resonance with existing cognitions, as well as other situational and contextual factors.

Entman (1993) identified two kinds of frames relevant to our purpose: *media frames* concern how content is framed, and *audience frames* concern individuals' mental maps or schemas. *First-level framing* is about an issue in general and thus not very detailed, while *second-level framing* is about particular issue attributes (Shah, McLeod, Gotlieb, & Lee, 2009). A deeper aspect of framing involves relationships among discourses. Framing connects two or more concepts, but is likely to do so only if one of the concepts is already relevant to pre-existing meanings or schemas (Nisbet, 2009). For example, Lester and Cottle (2009) found that TV visuals of climate-change cause (e.g., human sources of carbon emission) and impacts (nature and human lives and the material world) appeared together regularly but also in other combinations.

A great deal of research has analyzed the way text-based media coverage of climate change uses various frames (Bortree, Ahem, Dou, & Smith, 2012; Lakoff, 2010; Painter & Ashe, 2012; Smith & Joffe, 2009; Trumbo, 1996; Wilkins, 1993; Zamith, Pinto, & Villar, 2013). For instance, Boykoff's (2011) studies of media coverage of climate change from 1980 onward identified four main themes or frames: *political*, *scientific*, *meteorological*, and *cultural*. Nisbet (2009) provided perhaps the best conceptual and case analyses of climate change framing (and counter-framing). In the most comprehensive study of worldwide climate change print news coverage, Schafer, Ivanova, and Schmidt (2012) first summarized 25 studies on changes over time in attention to climate change issues in media from several countries. They then studied over 150,000 articles from top print media in 27 countries from 1996 to 2010, charting increases and decreases in the number of stories about climate change. Carvalho and Burgess (1005)

studied Nexis stories about climate change from the US, UK, Germany, and France from 1980-2007. One of their analyses compared science frames (e.g., carbon emissions, causes, consequences, effects, energy, greenhouse, warming, etc.) to political frames (people, president, world, government, state, actors, countries), as well as action frames and moral frames (with responsibility attributions), categorizing words based on their interpretations and contextual understandings. Based on collocated words (words within 5 words of each other), in the US climate change is associated with science and international politics, while in the UK it is associated with urgent action and threats, implying more of a political framing, and in France with action and moral frames. Interestingly, in the US, (global) warming and greenhouse are associated with the science frame (and in the case of global warming, more with threat and fight), while (climate) change has more associations with the political frame.

Images in News and Climate Change Coverage

Influence of Images in General.

Coleman (2010) provides a comprehensive overview of studies that affirm the importance of visual framing in news communication (see also Graber, 1990), and Joffe (2008) evaluates the use of visuals as elements of persuasive media messages.

Images can influence how much attention is given to messages overall. An eye-tracking study of print and internet news readers found that images influenced the stories people selected to read (Quinn, Stark, & Edmonds, 2007). Photographs in general, and especially ones depicting victimization, evoked longer reading times for accompanying news magazine text, and those who viewed victimization photos also acquired more information from the text (Zillmann, Knobloch, & Yu, 2001). A study involving internet news reading obtained similar results: threatening images (and to a lesser degree, innocuous images) resulted in more frequent selection

of the accompanying news stories and increased reading times in an open-ended news reading task (Knobloch, Hastall, Zillmann, & Callison, 2003).

Beyond increasing exposure, images have the power to actively frame public interpretations of given events (Smith & Joffe, 2009). Pictures help extract important aspects of text, develop viewers' mental schema, comprehension, and organization/context for later retrieval. Visual formats can expand working memory capacity, leading to better recall. Messaris and Abraham (2001) found that photographs were able to convey controversial meanings that might have been rejected had they been presented in textual form, and proposed that these images' unique ability to surreptitiously frame an issue may be due to their indexicality (the implied authenticity of connection between image and reality), their analogical quality, and their lack of explicit proposition syntax. Photos can increase the believability and memorability of text especially if they mirror the article information, although irrelevant images can reduce understanding (Garry, Strange, Bernstein, & Kinzett 2007). Graphics, in particular, have three main benefits in portraying risk. They can reveal otherwise undetected data patterns, such as trends or proportions; may activate schemas for interpreting numerical information, such as comparisons; and convey information in visual terms, increasing attention (Lipkus & Hollands, 1999).

Visuals may activate peripheral processing because they require less cognition and provide more emotional cues (Rodriguez & Dimitrova, 2011). Incidental details of images affect risk perception for threats described in accompanying text, and people tend to remember the information or the viewpoint represented by the photo better than they remember the information communicated through words. For example, portrayal of the ethnicity of the victims can generate overestimation of that ethnicity's risk (Gibson & Zillmann, 2000). Worse, photographs can

distort memory of news; people who read a news story about a hurricane accompanied by images of destruction were significantly more likely to report reading about injuries and deaths, even though no such information was included in the story (Garry, Strange, Bernstein, & Kinzett, 2007). Negative TV news images tend to reduce memory of prior material and of audio speech during the presentation, while increasing memory of visual materials after the presentation (Newhagen & Reeves, 1992).

Influence of Images in Climate Change Coverage.

Visuals can evoke more emotion, engagement, and concern than cognitive responses (Joffe, 2008; Leiserowitz, 2006), making it an effective medium for the social construction of risk messages such as climate change (Smith & Joffe, 2009). Nonthreatening visuals relating to normal emotions and concerns tend to foster the most affective engagement with climate change issues (O'Neill & Nicholson-Cole, 2009). Images (especially emotional) generally increase recall of accompanying textual content and reading time, and danger-signaling photographs increase readers' perception of risks (Zillman, Knobloch, & Yu, 2010). However, implicit rather than explicit attitudes are better predictors of eye gaze toward negative iconic images of climate change (Beattie & McGuire, 2012).

Through an analysis of Greenpeace climate change ads that appeared between 1994 and 2007, Doyle (2007) cautioned that continued use of photographs showing already-experienced climate change impacts increases the risk of instilling a sense of defeatism in the viewers. Similarly, across a set of studies, O'Neill and Nicholson-Cole (2009) found that the images that people identified as making climate change seem personally important (e.g., starving children and famine, graphs showing temperature rise) were also the most likely to make them feel that they were unable to do anything about climate change. An investigation of responses to 40

newspaper climate change images in Australia, UK and the US showed that climate impacts imagery fostered salience but low self-efficacy, that imagery of energy futures was associated with higher self-efficacy, and that politician and celebrity images generated lower saliency and in some cases lower self-efficacy (O'Neill, Boykoff, Niemeyer & Day, 2013).

Climate Change Image Framing.

In the case of environmental issues, framing is necessary to provide interpretive perspectives for abstract, complex, and unfamiliar topics. Indeed, many environmental issues need to be framed as problems at all in order to receive attention or importance (Doyle, 2007). Many environmental images have deep resonances, or frames, such as *nature vs. industrialism*, or *tradition vs. modernity* (Lester & Cottle, 2009). Yet, the portrayal of *nature* (natural environments, animals, and human interaction with animals) has significantly decreased, while images of *built environments* have significantly increased, in more than 8,000 images in the 296 winners of the Caldecott Medal for children's books, with the gap widening each decade (Williams, Podeschi, Palmer, Schwadel, & Meyler, 2012).

Analysis of a 2-week sample of 27 stories from 6 daily news programs involving six countries and four broadcasters identified two rhetorics of TV news climate change visuals: "scenes and spectacular images of nature(s), places and people as under threat," and *trust/credibility* via a restricted range of contexts and visual cues in or with which sources and agents appear (Lester & Cottle, 2009, p. 920). Images used in British newspapers to represent climate change risks from 2000-2006 were grouped into *immediate impacts*, *personalification*, and *graphical representations* (Smith & Joffe, 2009). DiFrancesco and Young (2011) similarly found an emphasis of news images on *people* and *impacts*. Images in British climate action campaigns represent both *scientific denotations* about global warming (globes and maps,

damaged physical environments, and people and animals) and *cultural connotations* of vulnerability and hazard (passing thresholds, social justice), yet also reflect an underlying Western/colonial discourse (Manzo, 2010a). Two more general underlying frames were about *global unity* in the face of such threats, and *international development in the context of social inequity*. Other frames in UK media images include *weather* and *renewable energy* (Manzo, 2010b). O'Neill (2012) assessed over 1500 images in climate stories from 13 newspapers. The most frequent images were *people* (esp. political), followed by *geographically or personally distant impacts*. O'Neill categorized the images as *political*, *contested* or *distant* frames.

Research Questions

We derive three primary research questions from this prior research: RQ1: What climate change image themes constitute a political/politics frame? RQ2: What image types are associated with the political image frame? RQ3: Does the extent of political image framing change over time? RQ4: How is the political image frame associated with other major climate change frames?

Method

Data Selection and Sources

A corpus of news stories about climate change was downloaded from the LexisNexis news database. This corpus included stories that were indexed under the terms 'climate change' or 'global warming' from approximately 100 US news sources for all available dates through September 2009. For this study, we analyzed two sub-samples of the corpus. Subset A was developed 1) to allow inspection of fluctuations in quantity of news coverage over the time period of interest, and 2) to obtain estimates of the proportion of print news articles that contained images during each month of the time span. For this subset, we used only the print news sources that were 1) available over an extended time period (median time span 17 years),

and 2) appeared to have had stable image metadata creation procedures. Of the 34,349 articles retrieved from the 39 sources that met these criteria, the metadata indicated that 11,752 (34.2%) had one or more images. The number of available news stories during any time period were due to actual fluctuations in news coverage and to differences in availability of archived news sources for different time periods.

Subset B included all print news sources which 1) were associated with image metadata for some records, and 2) were available on microfilm or as paper copy at the university library. This second subset contained 14,932 articles from 11 sources. Of those, 5,639 (37.8%) had image metadata. Candidate articles from this set were randomly selected, and read and classified as ‘primarily about climate change’ or ‘not primarily about climate change’. Articles were selected iteratively until 200 articles were identified that met the thematic, graphics-containing, and local availability criteria. Once image identity had been determined through microfilm scans, all images that could be located in high-quality digital or hard copy format were acquired. The final data consisted of 350 images from 200 articles, which were used in digital and printed formats for coding. Figure 1 shows the relative percentage of images to news stories over the time period, along with significant climate change events. That these peaks in coverage seem to be associated with major reports or conferences reinforces Downs’ (1972) concept of issue attention cycles.

--- Figure 1 Goes about Here ---

Coding Image Themes and Identifying Image Frames

Date of publication and source for these images were taken from the retrieved article metadata. Images were classified by type, and included charts, illustrations, photographs, diagrams, hedcuts, infographics, maps, tables, and a few combinations.

As an alternative to developing image categories and classifying each image or image component as a member of a particular a priori category, we used a semantic tagging-inspired coding approach. Prior research about the topic of climate change and preliminary examination of the image set served as starting points for development of a relatively large initial set of image themes that were relatively low in semantic complexity.

Once the initial codebook was ready, three coders (1st, 4th, and 5th authors) coded each of the images independently, with weekly joint discussions of the coding and possible code clarifications. Coding involved examining each image, caption, and associated headline and to determine presence or absence of each potential theme, and revising the code operationalization or adding a new code. Because all codes were operationalized as presence(1)/absence(0), rendering traditional inter-coder reliability measures inappropriate, we used Perrault and Leigh's (1989) 'index of reliability' (I_r) (average was .99), which determines expected levels of chance agreement without relying on marginal frequencies. We also computed Krippendorff alpha (KA) (average was .86) to provide some comparison with traditional measures, to verify most codes also had high traditional reliability values, and to identify themes that appeared in few images and were coded with some disagreement. The two primary researchers (one of whom was a coder) and the two additional coders then proceeded with consensus coding sessions for the remaining disagreements. The 118 final themes and specific operationalizations of themes is the result of multiple rounds of coding of the 350 images by three coders, involving over 175,000 separate codings, over 20 weeks. (For detailed operationalizations for each theme, see Rebich-Hespanha et al., 2012.)

We adopted an even more 'emergent' approach to identifying frames of a level of semantic complexity that is useful for interpretation of communication processes. We used an

agglomerative, hierarchical clustering approach (average linkage) to group themes based on patterns in co-occurrence of the 118 coded themes across the 350 images – that is, the frequency of times that any two themes were associated with the same image. Because hierarchical clustering approaches lack goodness-of-fit tests that can identify the number of clusters that best capture patterns in the data, the choice of where to segment the tree was based on researcher intuition and implemented using a partitioning algorithm (Prosperi et al., 2011).

Results

RQ1: Image Frames and Image Themes

Overall, 42 image frames were identified through the cluster analysis (with an additional set of 15 separate regions or countries, from Africa to U.S., India to North America), 19 of which had 2 or more constituent image themes. The largest of the frames was *Monitoring and quantifying: Greenhouse gas emissions, energy generation and use, economic implications*, involving 222 images and 13 themes. The second largest was *Climate science, research, and scientists*, with 221 images and 5 themes. The smallest was *Urban pollution*, with 13 images and two themes.

--- Table 1 Goes about Here ---

The third largest frame is what we label the *Government, Politics, and Negotiation* (GPN) image frame, with 164 images and 8 themes. Table 1 lists the name, coding operationalization, percentage occurrence, and coding reliabilities.

The GPN image frame represents climate change as a political issue centered around political figures and political entities (21%), in public and semi-public spaces (19%) and with audiences (11%), associated more with disagreement and opinion differences about climate conditions, appropriate action, and scientific data interpretation (18%) than with cooperative

agreements or accords (10%), and that involves more national (federal agencies or reports) policies and issues (including regulatory actions) (18%) than international (e.g., U.N., IPCC, multiple national governments) (7%) or state (7%).

RQ2: Image Sources, Types and Frequency

As Table 2 shows, by far the most frequent image source for the GPN images was *The New York Times* (40.2% of all GPN images). The dominance of this single news source is due to two factors: this source is available across the longest time span, and the monthly volume of news stories about climate change is much greater for *The New York Times*. *The San Francisco Chronicle* and *The Wall Street Journal* are also important sources of images for the set, contributing 14.6% and 12.8%. Sources for images in GPN frames are significantly different from the overall image sources, primarily due to greater coverage in *The San Francisco Chronicle* and *The Wall Street Journal*, and less in the *Los Angeles Times*, *The Economist*, and the *Washington Post*.

--- Table 2 Goes about Here ---

The most frequent image type in the GPN image frame is photographs (59% of all photographs), significantly higher than maps (40%), illustrations (26%), and diagrams (12%), but not significantly different than charts (48%) ($F(4)=2.0, p<.001, \text{adj. } R^2 = .09$), compared to the percent of all images that were GPN images (47%). (As image frames are based on theme code co-occurrences, and a given image may be coded for multiple themes, a given image, and thus the image type, may appear in multiple image frames.)

RQ3: GPN Frame Over Time

Though the overall percent of all article images that represent the GPN image frame is close to half (47%), Figure 2 shows that the GNP image frame has become somewhat more

prominent over time, with an increase from 41% in the first period with approximately half the images (1987-2005) to 54% during and 2006-2009. (Due to the small sample size and high variance, the one-tailed t-test was not significant). The peak percentage of the GPN image frame was 1998, following the COP3 meeting in Kyoto, Japan, where the Kyoto Protocol was drafted, when *all* images that year included a GPN frame. The other peak was 2009, when the U.S. House passed the cap and trade bill (78%). Other higher than average percentages occurred around events such as the 1992 Rio Summit (67% for 1992 and 1993), the 1996 IPCC 2nd Assessment Report (also 67%), and, around 2001, the IPCC Third Assessment Report, the COP6-2 in Bonn Germany, and the U.S. withdrawal from the Kyoto Protocol (with 70%).

--- Figure 2 Goes about Here ---

RQ4: Association with Other Major Climate Change Image Frames

Here we describe the more contextual nature of this image frame by the extent to which it co-occurs with 14 other major climate change image frames, as summarized in Table 3.

--- Table 3 Goes about Here ---

Image frames of monitoring and quantifying, energy efficiency, and regular (sometimes vulnerable) people are not especially politically framed – that is, there is no disproportionate representation of political image frames between images that include those three other image frame and those that do not. However, there was a significant association for each of the other 11 image frames.

Lower than chance representation of the GPN frame occurred in the image frames of “visions of industry impact on environment,” “climate science, research, scientists,” “temperature record,” “water-related impacts,” “future climate, sea level rise, and landscapes,” “impacts on polar animals and landscapes,” “food and agriculture,” and “impact on human

health.” Indeed, most of these were highly disproportionate (under 30%). Thus we might conclude that such topics are under-politicized in terms of image framing.

Higher than chance representation occurred for “alternative energy and energy prices,” “celebrities raising awareness,” and “public action,” all over 66%.

Discussion

Politics Frame of Climate Change Images

Reflecting the “glocal” (global, subcontinental, national, local) nature of the multiple dimensions of climate change, responses, and political responsibilities (Gupta, van der Leeuw, & Moel, 2007), GPN images do have separate international, national and state foci. However, images representing policies and politics at the local level do not cluster in the GPN frame, indicating some disconnect with the need to scale up and down the levels.

It is of course no surprise that some topics are more, or less, politicized than others, and the judgment of this differential emphasis depends to some extent on one’s views about whether different topics should or should not be politicized. As Carvalho and Burgess (2005, p. 1467) assert, “coverage of climate change has been strongly linked to the political agenda on this issue ... the media build particular images of scientific knowledge and uncertainty on climate change, and emphasize or de-emphasize forecasts of impacts, in order to sustain their political preferences regarding the regulatory role of the state, individual freedom, and the general economic and social status quo.” For example, the low politicization of industry impact on the environment, impacts on animals and human health, and food and agriculture may be interpreted as a form of hegemonic and implicit control/suppression of the media through corporate interests. It may be a positive sign, however, that news stories do not politicize, through their images, more factual and scientific issues such as climate science, temperature record, water-

related impacts, and sea level rise. The argument here would be that scientific evidence associated with climate change should not be distorted, minimized, or rejected for political purposes.

Less related to any specific topic is the question as to whether the over- or under-representation of the GPN image frame accurately reflects the inherent political aspects of the topic, or whether there are journalistic or other biases involved. This may interact with some of the disproportionate representation of the GPN image frame in several of the news story sources (e.g., *The San Francisco Chronicle* and *The Wall Street Journal*, while its appearance in *The New York Times* was not disproportionate with the newspapers' actual coverage). Swyngedouw (2010) takes the under-representation position. He explicates the tension between both politicization of and the need to apply political action toward climate change, and a "post-political frame" (p. 215) which some see as a move towards decoupling or even removing politics from public discourse due to increased technocratic management, a market-based ideology, and reinforcement of the socio-political status quo. One example is transforming pollution into the market process of carbon taxes and trading – that is, a depoliticized commodity, which, paradoxically, uses the very same corporate and capitalist mechanisms that fostered the problem. From this perspective, the representation of a neutral scientific technocracy grounded in objective facts, the lumping of highly disparate cultural and interest groups into "the people" or "humanity," and the displacing of democratic and ideological conflict with institutionalized social and technological management and policies, are all ways in which the deep radical politics of public dissent are being bypassed.

Future Research

On the *image creation* side, content analysis of text or visuals by itself cannot uncover ways in which institutional and socio-cultural factors influence the types of environmental visual imagery that are produced or collected, distributed, and selected for use (for examples, see Doyle, 2007; Moser, 2010, p. 31; Rice et al., 2012, p. 13; Schafer, Ivanova, & Schmidt, 2012). Reporters, editors, producers, and publishers all work within journalistic norms and constraints (Boykoff, 2011). Grundmann and Krishnamurthy (2010), as do many others, argue that the professional norm/ritual of “balanced reporting” initially lead to equal coverage of both the small percent of deniers and the large percent of scientific supporters, implying no consensus. Newspapers in other countries, such as Germany and UK, instead focus on the official scientific consensus, although US news media have been shifting more toward this approach. Images are typically chosen by editors or photograph editors, not the journalist, so coordination between text and visuals may be lacking, possibly leading to misinterpretation and reframing of the article topic (Zillman, Knobloch, & Yu, 2010). Thus future research should analyze how and why specific images and their frames are selected for with particular news stories; assess the extent to which the images and content reinforce, contradict, or are unrelated to each other; and evaluate effects on reader interpretations, attitudes and intentions.

On the *image interpretation* side, content analysis alone is also unable to provide insight into how images are perceived, interpreted and remembered by audiences (Olausson, 2011). Research that elucidates relationships between politically framed images of climate change and people’s mental images of climate change and their perceptions of, attitudes toward, and intentions associated with those images (e.g., Leiserowitz, 2006; Nicholson-Cole, 2005; O’Neill & Hulme, 2009) is much needed. Certainly climate change political framing should be included

as one focus of research on the relationships of political news content on media and individual agenda-setting.

Beyond these potential avenues for future basic research on political image framing of climate change, many opportunities exist for applying current understanding of image framing to comparative or formative evaluations of images developed for media or climate communication campaign (see Rice & Atkin, 2013). For example, there could be an interaction effect of the under- or over-representation of political image framing with some types of other image frames (e.g., primarily scientific vs. primarily industrial).

Conclusion

As Coleman (2010, p. 233) recently noted, “visual framing provides an important new direction for theory building and future research.” This study has provided a number of contributions to future research on mass media images of climate change: the random sampling of images from a comprehensive over-time population of climate change news stories, the extensive and reliable framework for coding images, the analytical approach to identifying image frames, the trend in political images, and the relationships between political and other image frames.

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Table 1

Image Themes Constituting the Government, Politics, and Negotiation Image Frame

GPN Image Frame Themes		Theme Operationalization	M	SD	Ir	KA
audience	Representation includes an audience that is attending to a speaker/performer. Includes situations in which person featured appears to be speaking to an audience (e.g., using a microphone, podium, presentation screen, or stage) and reference is made to a presentation, conference, meeting, performance, or similar.		.11	.32	.99	.93
cooperative agreement, treaty, pact, or accord	A cooperative agreement, treaty, pact, or accord between political, social, business, or environmental leaders that is being pursued or has been reached. Includes references to actions being taken to satisfy responsibilities based on such an agreement. Includes representations of signatures or signatories to an agreement. Includes any mention of the Kyoto Protocol. Does not include references to commitments, pledges, or plans made independently by an entity that are not explicitly part of a cooperative agreement, treaty, pact, or accord.		.10	.30	.98	.90
disagreement, difference of opinion, debate, or controversy	Disagreement, difference of opinion, debate, or controversy about things such as current conditions, environmental issues, appropriate courses of action, economic or technological constraints, or interpretation of scientific data.		.18	.39	1.00	.99
political figures	Individuals who have been elected or appointed to political office. Lawmakers and all leaders who occupy high-level positions in federal and state agencies. Individuals who lead federal agencies are considered political figures. Includes general references to leaders of political parties such as 'Democrats' or 'Republicans' or the 'GOP'. Includes references to political entities such as 'Washington', 'the Capitol', or the 'administration' when information about activities, positions, or advocated policies of these entities is provided. Does not include references to legislation, bills, politics, etc. unless political figures associated with these activities are also mentioned. Does not include scientists or environmental leaders who are engaging in political activities; includes only figures elected or appointed to political office.		.21	.41	.94	.82

GPN Image Frame		M	SD	Ir	KA
Themes	Theme Operationalization				
public or semi-public social space	Image landscape, vista, or scene is a social space that is open and accessible either freely, by paying, or by membership in a formally or informally-defined group. Includes parks, streets, town squares, public spaces in government or educational institutions, commercial districts or shops, meeting halls, conferences, ceremonies, performance venues, showrooms, transportation centers, or places of business that customers regularly visit. Does not include cases in which these locations do not serve as the setting for a person or event. Does not include places of business that are rarely visited by customers. Does not include private portions of public or commercial institutions such as offices or laboratories. Does not include spaces which can be classified under the “agricultural”, “industrial”, “ocean/coastal”, “ice/snow”, or “wilderness” landscape types.	.19	.39	.93	.77
inter-national government programs or policies, legislation, legal issues	Any representation of international government involvement in an issue. International-level government programs, policies, legislation, or legal cases/lawsuits. Includes reference to reports or studies released by an international governmental body such as the United Nations (UN) or the Intergovernmental Panel on Climate Change (IPCC). Actions or policies that involve at least 2 national governments should be included in this code. Actions or policies of Europe as a whole (not individual countries) or the EU should be included in this code. Includes policy statements or official actions of political figures that represent 2 or more national governments. Does not include information that allows comparison of activities or conditions (such as emissions levels, GDP levels) globally or of 2 or more countries if a governmental policy, entity, or representative is not explicitly mentioned. Carbon trading schemes and carbon markets should be considered government programs.	.07	.26	.98	.83

GPN Image Frame Themes		Theme Operationalization	M	SD	Ir	KA
national government programs or policies, legislation, legal issues	Any representation of national government involvement in an issue. National-level government programs, policies, legislation, or legal cases/lawsuits. Includes reference to reports or studies decisions released by a national governmental body such as the EPA or the Supreme Court. Includes references to actions or policies of the federal government. Includes policy statements or official actions of political figures that represent a national government. References to actions or policies of the national or federal government that involve national-level governments of more than one country should be coded as ‘international government programs or policies, legislation, legal issues’. Does not include information about national-level activities or conditions (such as emissions levels, GDP levels) if a governmental policy, entity, or representative is not explicitly mentioned. Carbon trading schemes and carbon markets should be considered government programs.	.18	.39	.97	.87	
state government programs or policies, legislation, legal issues	Any representation of state or regional government involvement in an issue. State- or province-level government programs, policies, legislation, or legal cases/lawsuits. Includes reference to reports or studies released by a state governmental body. Includes references to actions or policies of a single state government or multiple state governments. Does not include information about state-level activities or conditions (such as emissions levels, GDP levels) if a governmental policy, entity, or representative is not explicitly mentioned. Carbon trading schemes and carbon markets should be considered government programs.	.07	.25	.98	.87	

Coding was 0 = absent; 1 = present; mean is percent of the 350 images.

Ir = adjusted agreement (Perreault & Leigh, 1989); KA = Krippendorff’s Alpha.

Table 2

Manifest Code Sources and Image Type: Descriptive Statistics Overall and for Government, Politics and Negotiation Frame (GPN)

Source	Percent Overall	Percent GPN	Image Type	Percent Overall	Percent GPN
<i>The New York Times</i>	40.9	40.2	Photo	54.3	68.9
<i>The Washington Post</i>	13.1	9.1	Chart	12.6	12.8
<i>The San Francisco Chronicle</i>	10.3	14.6	Illustration	12.3	6.7
<i>USA Today</i>	8.6	7.3	Map	8.6	5.5
<i>Wall Street Journal</i>	8.3	12.8	Diagram	4.9	1.2
<i>Los Angeles Times</i>	6.0	3.7	Chart/Illustration	3.0	0
<i>U.S. News and World Report</i>	6.0	.6	Chart/Photo	3.0	0
<i>The Economist</i>	4.0	1.2	Hedcut	2.0	0
<i>San Jose Mercury News</i>	3.4	4.9	Photo/Illustration	2.0	.6
<i>Newsweek</i>	2.6	1.8	Infographic	1.4	0
<i>Sacramento Bee</i>	2.3	3.7	Table	0.9	.6
			Map/Table	0.3	0
			Photo/Chart	0.3	0
N images	350	164		350	164
Cross-tabulation between GPN frame or not, all sources		$X^2 (10) = 31.5 ***$	Cross-tabulation between GPN frame or not, comparing chart, diagram, illustration, map, photo		$X^2 (4) = 31.5 ***$

Table 3.

Association of GPN Image Frame with Other Major Image Frames

Major Image Frames			9. Government, politics, and negotiation		X^2
			No	Yes	
1. Monitoring and quantifying: Greenhouse gas emissions, energy generation and use, economic implications	No	36.6%	54.7%	45.3%	.19 ns
	Yes	63.4	52.3	47.7	
2. Visions of industry impact on environment	N	78.3	48.5	51.5	10.7 ***
	Y	21.7	69.7	30.3	
3. Alternative energy and energy prices	N	85.7	56.3	43.7	8.6 **
	Y	14.3	34.0	66.0	
5. Energy efficiency	N	94.3	53.6	46.4	.57 ns
	Y	5.7	45.0	55.0	
8. Celebrities raising awareness	N	87.7	57.3	42.7	17.6 ***
	Y	12.3	23.3	76.7	
10. Public action	N	94.3	55.2	44.8	9.4 **
	Y	5.7	20.0	80.0	
12. Climate science, research, scientists	N	36.9	45.7	54.3	4.5 *
	Y	63.1	57.5	42.5	
14. Temperature record	N	85.4	48.5	51.5	17.8 ***
	Y	14.6	80.4	19.6	
17. Water-related impacts	N	87.7	51.5	48.9	4.0 *
	Y	12.3	67.4	32.6	
19. Future climate, sea level rise, and landscapes	N	88.9	49.8	50.2	12.2 ***
	Y	11.1	79.5	20.5	
20. Impacts on polar animals and landscapes	N	85.1	49.0	51.0	13.9 ***
	Y	14.9	76.9	23.1	
21. Food and agriculture	N	90.3	49.7	50.3	15.6 ***
	Y	9.7	85.3	14.7	
25. Regular (sometimes vulnerable) people	N	77.1	53.0	47.0	.02 ns
	Y	22.9	53.8	46.2	
26. Impact on human health	N	98.0	52.5	47.8	6.3 **
	Y	2.0	100.0	0.0	
Percent		100%	53.1%	46.9%	
N		350	186	164	

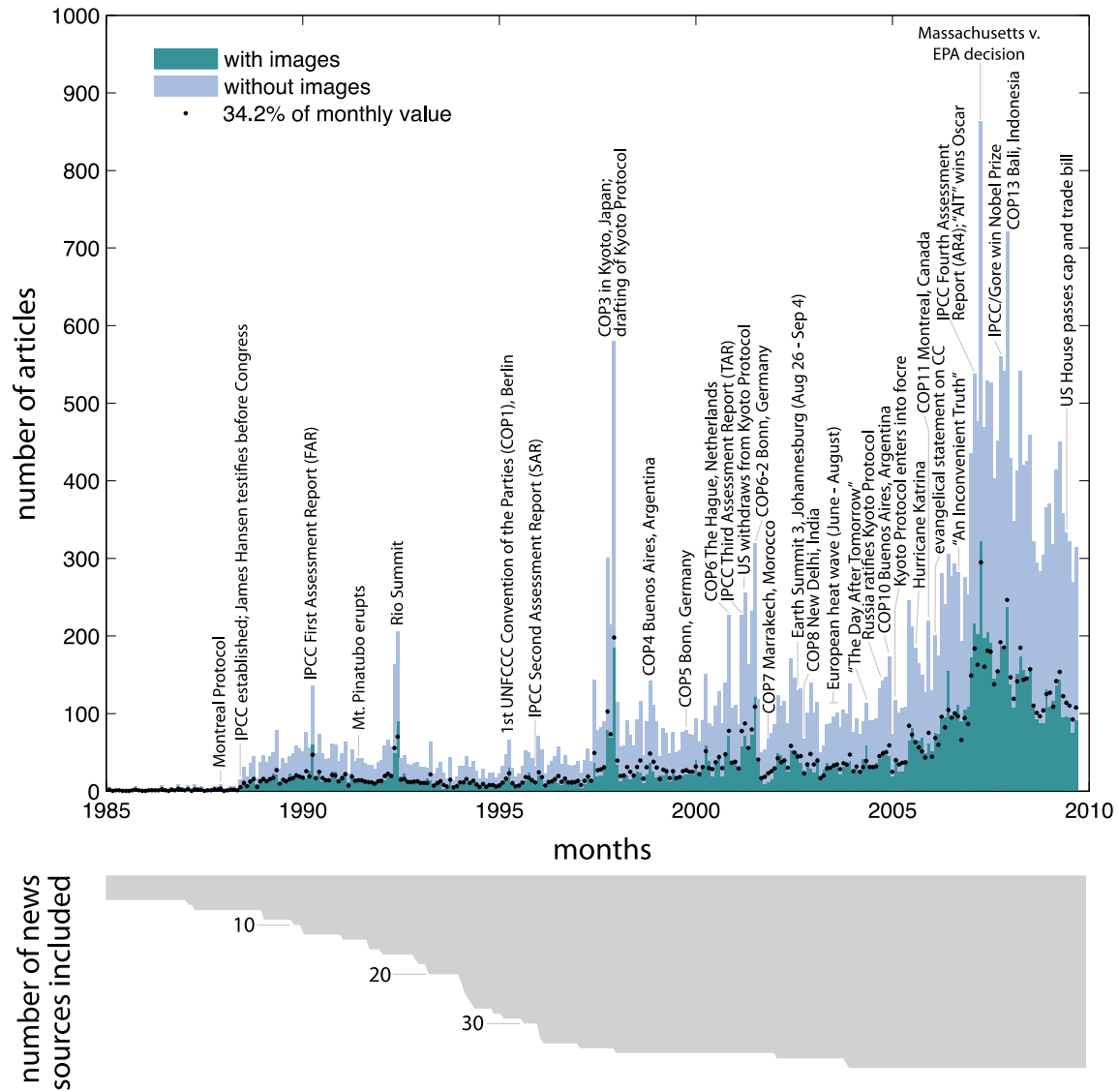


Figure 1. Key climate-related events and total number of articles about climate change with and without images in 39 US print news publications between 1985 and September 2009.

Note: The top chart shows the total number of articles without images (light blue) and with images (dark blue) for 39 US print news sources for each month between January 1985 and September 2009. Black dots indicate the “expected” number of image-containing articles each month based on the global image frequency of 34.2% of total articles. Key climate-related events are indicated. The bottom chart shows the number of news sources available during each monthly time period.

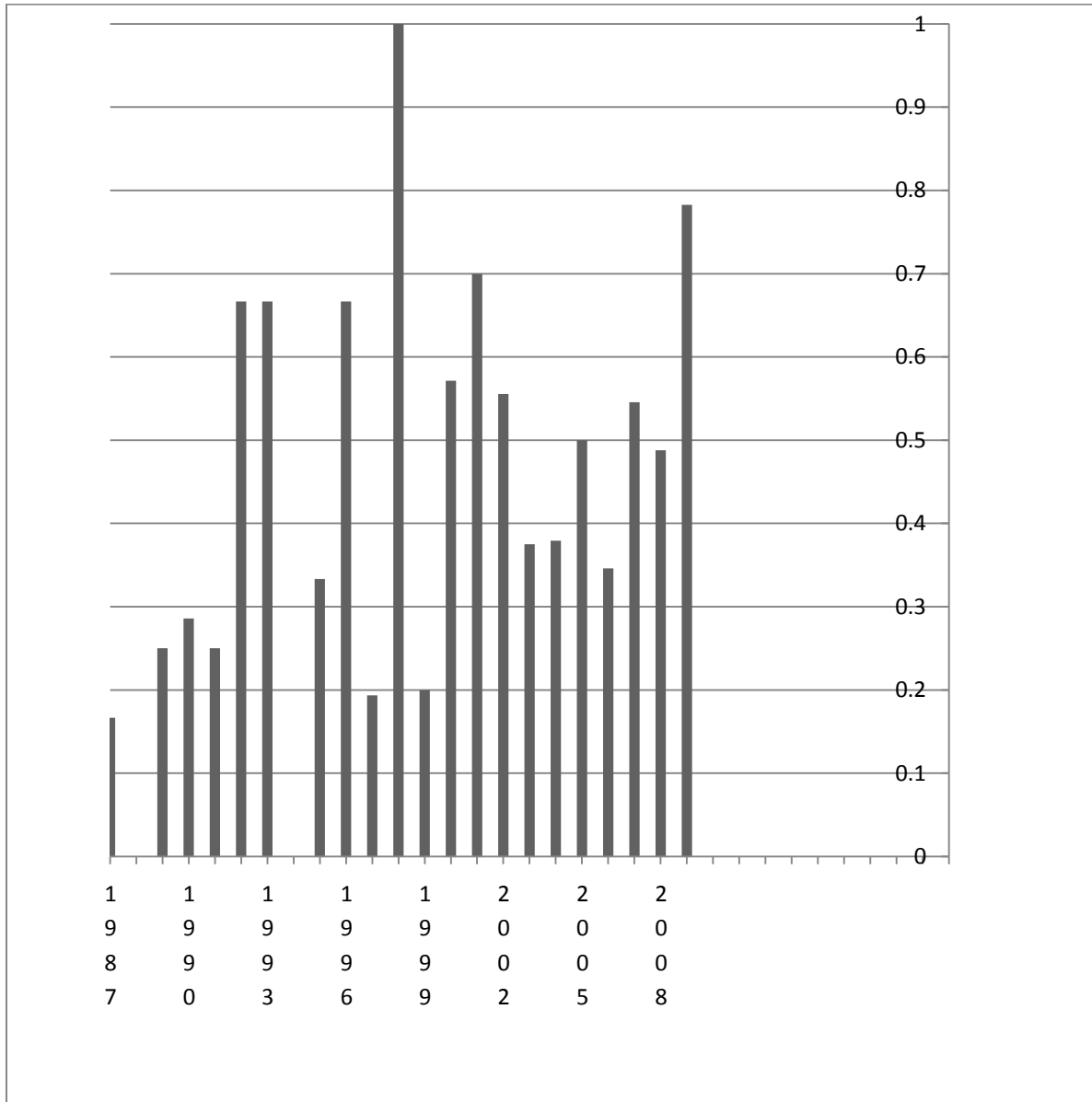


Figure 2. Percent of images each year that represent government/politics/negotiation themes, 1987-2009.

Note: right column ranges from 0% to 100%. There were no GPN images (out of 5) in 1988, and no climate change images of any kind in 1994.