

Mapping Media Attention to Climate Change in Japanese Newspapers from 1988 to 2010

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Abstract

This article analyses a large-scale data set of climate change coverage in Japanese newspapers in order to create a media map. A gradual increase in climate coverage with repeating up-down attention cycles is found. Cluster analysis shows topics in climate coverage can be classified into two major categories: climate science and mitigation techniques, and international climate negotiations. Correspondence analysis shows a shift of media attention from climate change as one among several global environmental problems and Japan's international contribution, towards mitigation techniques. The shift begins in 1997, indicating this year as a tipping point of media attention. Finally, the relationship between political discourse and media attention is discussed, with reference to the media attention cycle model.

1. Introduction

Climate change is a global crisis that crosses generational lines. It has become an international issue of interest not only to journalists in developed countries, but also to those in the developing world. The quantity of reporting on climate change has gradually increased worldwide (Boykoff et al., 2016). The Paris Agreement was ratified by the European Union on October 5, 2016, and came into force on November 4. As a result, policies to counter climate change from 2020 onwards have become a major topic of discussion. The Paris Agreement includes developing

countries such as China and India, which were not included in the Kyoto Protocol (KP). This shows that the inclusion of previously non-participating developing countries in the Asian region was only a matter of time.

Climate change is not only an international problem but also a social and domestic one in many countries; a study of climate coverage can reveal the construction of climate change issues. The field of climate coverage studies emerged around 1990, when debate commenced within some developed countries over cutting emissions of greenhouse gases (GHGs), and expanded from the US to Europe. After 2000, as the economies of developing countries such as China and India grew rapidly, the reduction of their GHG emissions entered the agenda of international climate negotiations and become a major focus. Climate coverage studies have also come to incorporate a focus on analyzing reporting in Asia's developing nations, as described below.

Located within the Asian region, Japan has played an important role in the international debate over climate change since its outset, both as an advanced nation and as a nation with high GHG emissions. In addition, Japan is the only Asian nation that takes on responsibilities under the KP, and has grappled with policies to counter climate change for many years. However, compared to America or the European nations, the number of publications related to Japanese climate coverage studies in international journals is extremely small (Asayama & Ishii, 2012, 2013; Sampei & Aoyagi-Usui, 2009). This paper contributes to the study of climate coverage in Asia by examining reporting on climate change issues in Japanese newspapers.

2. Media attention studies of climate coverage

The study of media attention is a fundamental approach in media studies. Hansen (2015b) notes two key reasons for analyzing the media attention paid to

individual topics. The first is the idea that media attention reflects the foci and value systems of a society and culture. Hence, a change in media attention serves as an indicator of a change in the concerns of the people. The second reason comes from a constructivist perspective. In the process of constructing a social problem, the media is an arena in which the definition and meaning of the problem are determined, and it simultaneously shares that definition and meaning with society. This latter standpoint is widely accepted in climate coverage studies (Hansen, 2015a). Of course, approaches like frame and discourse analyses are being developed to study these points, but these analyses commonly treat articles as being the results of what the media pay attention to.

Downs' (1972) issue-attention cycle model is commonly referenced in climate coverage studies. According to the model, attention to a social problem (1) begins with latent information; (2) rises when some event serves as a trigger; (3) then, the costs of a solution are made clear, simultaneous to the end of the spread of optimistic thinking; (4) next, regardless of whether a solution is found, public attention declines or moves on to a different social problem; (5) and finally, the issue, having reached "a prolonged limbo" (40), is included as a problem within the structure of society—i.e., in the list of society's regular foci of attention. As this model shares common ground with constructivist approaches, it came to be referred to regularly within studies of environmental reporting, including those on climate coverage's media-attention cycle (Hansen, 2015a, 2015b).

Prior climate coverage studies dealing with media attention sketched out media attention cycles over a long period and revealed the special characteristics of each country's climate change coverage, considering its relationship to the statements by governments and climate scientists, and demonstrated the social construction process of problems and meanings related to climate change. In the early stages of climate

coverage studies, analyses of a single media-attention cycle were carried out (McComas & Shanahan, 1999; Trumbo, 1996), but as the timespan of climate change reporting lengthened, the number of articles on the topic repeatedly rose and fell, and research moved towards the study of multiple cycles (Carvalho & Burgess, 2005; Schmidt, Ivanova, & Schäfer, 2013). It was observed that media-attention cycles are diverse, because of social/cultural differences and differences in journalistic practices between countries (Brossard, Shanahan, & McComas, 2004). This caused a shift from the search for a generalized model to a focus on individual constructions of climate change in coverage. For example, in the US, after the first rise of the media-attention cycle, the attention of newspapers turned towards climate science (Trumbo, 1996). As this attention progressed, bias emerged from the attempt to create balance in reporting between a minority group of climate skeptics and the consensus view on anthropogenic climate change; this came to be linked to the political discourse of the US government on climate change (Boykoff, 2007; Boykoff & Boykoff, 2004). In the UK, on the other hand, newspapers with different ideologies showed different understandings of the risk of climate change within the first media-attention cycle, but in the next cycle, their reporting came to resemble the statements of climate scientists and the government on climate risks (Carvalho & Burgess, 2005). Moreover, UK media gradually switched its focus to mitigation techniques (Nerlich, Forsyth, & Clarke, 2012). Climate coverage research in Asian nations has tended to focus on a shorter time frame, but work in various countries such as India (Billett, 2010), China (Wu, 2009), and Korea (Yun et al., 2012) has revealed their special characteristics in this regard.

3. Previous studies of climate coverage in Japan

None of the studies on climate change coverage in Japan have shown longitudinal changes in coverage over 10 years or more. As part of their research into the effectiveness of agenda setting in climate coverage between 1998 and 2007, Sampei and Aoyagi-Usui (2009) referenced the up-down cycle during this period. The period covered, however, was limited. The Kyoto Conference (COP3), which took place in 1997, was not included; nor was the Copenhagen Conference (COP15), which was held in 2009. In addition, it is also important to include the 1992 Earth Summit, at which the United Nations Framework Convention on Climate Change (UNFCCC) was adopted (e.g., Trumbo, 1996). By expanding the timeframe of the analysis, this paper reveals the long-term changes in media attention in Japanese newspapers arising through multiple up-down cycles not included in Sampei and Aoyagi-Usui's research.

By analyzing related topics in Japan's "big three" newspapers—the liberal *Asahi Shimbun*, conservative *Yomiuri Shimbun*, and center-left *Mainichi Shimbun* (McCargo, 1996)—Asayama and Ishii (2012) discovered that the Intergovernmental Panel on Climate Change (IPCC) was represented as a non-political, scientific body in their coverage. Moreover, by switching focus to carbon capture and storage (CCS), they suggested that Japan's reporting on climate change has a "technocratic" tendency (Asayama & Ishii, 2013). Their research revealed that Japanese newspapers' ideologies do not influence reporting on topics related to climate change, such as the IPCC or CCS. However, as their research focused solely on the science of, and countermeasures towards, climate change, it did not reveal the whole map of climate coverage.

This study contributes to this line of study by using a longer time period than previous research (from 1988 to 2010) and targeting broader coverage related to

climate change to draw a media-attention map of Japan's climate coverage, using a computer-assisted "big data" method to analyze a large volume of newspaper articles. I will discuss the results of the analysis from three viewpoints: the repeated up-down cycle of media attention and its relationship to political events, media attention to topics related to climate change, and the characteristics of media attention in each year. Finally, I will consider the connection between political discourse and the changes in media attention. To this end, prior to discussing the data, analysis methods, and results, I will briefly introduce Japan's climate change policy context.

4. Climate policy in Japan

Japan's climate policies have progressed in the context of international political relationships as well as opposition from internal interests. In May 1989, the United Nations Environment Programme (UNEP) Governing Council Session adopted the resolution that an anti-climate change international treaty would be drawn up. As some nations in Europe announced voluntary targets for carbon dioxide emission reduction, the government of Japan also announced an action plan to counteract global warming in 1990. As a consensus on reduction targets could not be reached by the government, this plan included two targets: one from the Ministry of International Trade and Industry (predecessor to METI: the Ministry of Economy, Trade and Industry) and one from the Environment Agency (predecessor to MOE: the Ministry of Environment) (Schreurs, 2002: 168).

Japan signed the UNFCCC at the Earth Summit held in Rio de Janeiro in 1992, and ratified it in 1993, also pledging one trillion yen of financial assistance. The entry into this treaty and the promise of large sums of financial aid came against a background of criticism of Japan for its low levels of international contribution relative to its status as an economic superpower, and the Japanese government's aim

of improving the nation's international image (Ohta, 2000). In accordance with the ratification of the UNFCCC, the Japanese government responded to global environmental problems by reforming the Basic Pollution Law to create the Basic Environment Law. However, there remained no concrete plan regarding climate change.

At the treaty negotiation meetings and the pre-COP preparatory talks, Japan played the roles of mediator and negotiator between European nations and the United States (Pajon, 2010: 34–37). Seeing an opportunity for international contribution by chairing a conference aimed at adopting the protocol, Japan became the host nation for COP3. The KP was adopted at 1997's COP3, and in accordance with the protocol Japan's government reformed parts of its legislation regarding energy. However, here too there was no concrete plan for implementation, only METI's proposed policy for developing energy technology. METI planned to reduce GHG emissions by replacing fossil fuel power stations with nuclear ones, a plan consequently adopted by the government and MOE (Tiberghien & Schreurs, 2007).

In 2001, the withdrawal of the US from the KP turned the spotlight on Japan. As Japan's basic diplomatic policy was to follow the lead of the US, European nations feared that it would also abandon the protocol, and engaged in persuasion efforts in an attempt to salvage it. However, despite Japan's policy of following the US and the difficulty of implementing the emissions reductions demanded by the KP, on this occasion the unique attachment of Japan's former capital's name (Kyoto) to the protocol made disposing of it impossible, and in 2002 it was ratified by Japan's government (Tiberghien & Schreurs, 2007).

The Japanese government expected to reduce GHG emissions through the use of nuclear power, but between the second half of the 1990s and the 2000s there were a large number of accidents at nuclear power plants and the proportion of those in

operation fell. Moreover, as cover-ups of historic nuclear power accidents came to light, the development of new nuclear power plants was halted. On the other hand, Japanese households' energy usage increased. As a result, as the KP came into effect in 2005, the Japanese government implemented nationwide campaigns aimed at encouraging energy conservation by its citizens and controlling the rising trend of energy usage.

At the same time, according to Asselt et al. (2009), the Japanese government began proactively working towards an international arrangement for the “post-Kyoto Protocol.” Japan was the main actor in the establishment of the Asia-Pacific Partnership on Clean Development and Climate (APP), advocating the transfer of energy conservation technology to participating countries and regarding the APP as an example of co-operative implementation under the UNFCCC. In the post-Kyoto negotiations, Japan advanced the APP as an example of a cooperative sectoral approach. Using this example, the Japanese government tried to introduce the sectoral approach to the post-Kyoto negotiations. Not only was this approach in line with Japanese economic interests (being seen as an opportunity for expansion and business growth in Asia and further afield), the Japanese administration also thought that it could bring both the US, which had abandoned the KP, and China, whose increase in GHG emissions had been significant, to the negotiating table (Asselt, Kanie, & Iguchi, 2009).

Japanese prime ministers of the late 2000s were directly concerned with the post-Kyoto negotiations. The 2007 Abe administration announced a long-term vision entitled “Cool Earth 50,” while the subsequent Asō and Fukuda administrations also participated in negotiations on medium-term goals and led discussions over emission reduction targets. Even after the Liberal Democratic Party (LDP) was removed from power for the first time in 15 years and replaced with the Democratic Party of Japan's

(DPJ) Hatoyama administration, proactive setting of medium-term targets did not cease. Under the assumption of continued increases in nuclear power generation capacity, Hatoyama announced a target of reducing GHG emissions by 25% to the United Nations. However, with the failure to reach an agreement at the 2009 Copenhagen Summit (COP15), the context for these goals changed; a final blow was dealt when, following the Tōhoku earthquake of March 11th, 2011 and the subsequent tsunami that caused a disaster at the Fukushima Dai-ichi nuclear reactor, the DPJ, concerned about the potential of such a large earthquake triggering severe aftershocks, ordered the suspension of operations at all of the country's nuclear power stations. As a consequence, the reduction of Japan's GHG emissions, which had been predicated upon the use of nuclear power, has become unlikely, and the ratification of the Paris Agreement has also become fraught with difficulty.

5. Data and method

To achieve the objectives of this paper, I analyzed climate coverage in Japanese newspapers between 1988 and 2010. I defined climate coverage as articles related to climate change; i.e., those referencing climate change, global warming, or the greenhouse effect. Articles were collected from Japan's "big three" newspapers—the *Asahi Shimbun*, the *Mainichi Shimbun*, and the *Yomiuri Shimbun*. These are the three national newspapers with the largest circulations. Articles were collected from the official archive databases of each company.¹ In order to locate climate coverage, all articles containing any of the keywords "global warming" (*ondanka*), "climate change" (*kikōhendō*), or "greenhouse effect" (*onshitsuka*) were collected (Sampei & Aoyagi-Usui, 2009; Trumbo, 1996). Articles from the "Local News," "Sports," and "Literature" sections were excluded from the analysis corpus. The remaining articles were those that could be read by a broad readership across Japan and were thus

representative of media attention at the national level. As a result, 41,453 articles were located for inclusion in the analysis corpus (*Asahi*: 14,690; *Yomiuri*: 12,875; *Mainichi*: 13,888). The corpus was tokenized by using the Japanese-language text-mining software *KH Coder* (Higuchi, 2004), and word frequencies for each article in the corpus were calculated. This provided the core data set used for the analysis. In the data set, I focused on norm words with the greatest numbers. I used 200 norms for analyzing, which were the top 200 sums of weighted scores of word frequency in the data set. The scores were calculated using an algorithm—Okapi BM25—to improve the computer analysis (Whissell & Clarke, 2011).

I used this data to analyze media attention regarding climate coverage in Japanese newspapers in the following three steps. For the first step of the analysis, the volume of media attention was operationalized as a count of articles related to climate change. The second step utilized cluster analysis to identify specific topics from their usage of vocabulary. In the third step, I used correspondence analysis to perform a multidimensional analysis of changes in media attention.²

Media attention can be described not only by a count of articles, but also by word frequencies and co-occurrence relationships. Climate coverage studies have adopted statistical analysis of large volumes of article or text data. Pioneering research conducted by Grundmann and Scott (2012) equated media attention to word frequencies to analyze climate coverage through a computer analysis. They collected text data from newspapers in the US, UK, Germany, and France to create a corpus; used a combination of keyword frequency, collocation analysis, and cluster analysis; and revealed differences in the usage of specific phrases between countries. As this and other such studies were focused on collocation, they used cluster analysis to reveal relationships between words within sentences. However, cluster analysis can also be used to divide documents or vocabularies into groups and specify topics

within a corpus (Cutting, Karger, Pedersen, & Tukey, 1992). For this paper, a hierarchical cluster analysis was used. In such an analysis, the distance between units of data is considered equivalent to their degree of similarity, and clusters are created from groups of words that are close together. The distance between word pairs is calculated using the Canberra distance,³ while the distance between clusters follows Ward's method.

In addition, researchers have also used word frequencies to demonstrate relationships within data sets. Using correspondence analysis, Sonnet (2009) analyzed articles containing vocabulary related to climate risk to categorize magazines into relative types. This kind of correspondence analysis has become widely used from the social sciences to medical research (Greenacre, 1992), and is now used to study changes in the attention, themes, and framing of newspaper reporting (Frewer et al., 1993; Hibino & Nagata, 2006; Shineha et al., 2008).

The computer-supported media attention analysis discussed above maintains consistency between means and ends, and has the potential to develop an understanding of longitudinal reporting in newspapers and other print media. By analyzing longitudinal climate coverage in Japanese newspapers, this study contributes to the study of print media.

6. Results

6.1. The rise and fall of media attention to climate change

As shown in Figure 1, up until 2010 there was an overall rising trend across several rising and falling cycles in Japanese coverage of climate change. The years displaying sharp rises in the number of articles published coincide with the international and domestic political events described in the previous section. First, in 1990, the article count peaked as the Japanese government announced its voluntary

target of lower emissions. With the next peak in coverage across all three newspapers corresponding to the Earth Summit in 1992, the first up-down cycle was formed. Coverage levels remained steady between 1993 and 1996, during which period no major political developments regarding climate change occurred. The Kyoto Conference in 1997 caused a sharp rise in coverage levels, forming the second up-down cycle. Subsequent peaks in 2001 and 2005 were comparatively small. As Sampei and Aoyagi-Usui (2009) mention, 2001 saw two COP events—COP6-bis and COP7—and was also the year in which the US broke away from the KP. However, with Russia’s ratification of the treaty, the KP came into force in 2005, and as a signatory, Japan launched a nationwide energy conservation campaign aimed at reducing household energy usage. In 2007, when the peak in climate coverage exceeded the levels seen in 1997, Sampei and Aoyagi-Usui point to the release of Al Gore’s “An Inconvenient Truth” and the IPCC’s fourth report as key factors (205).

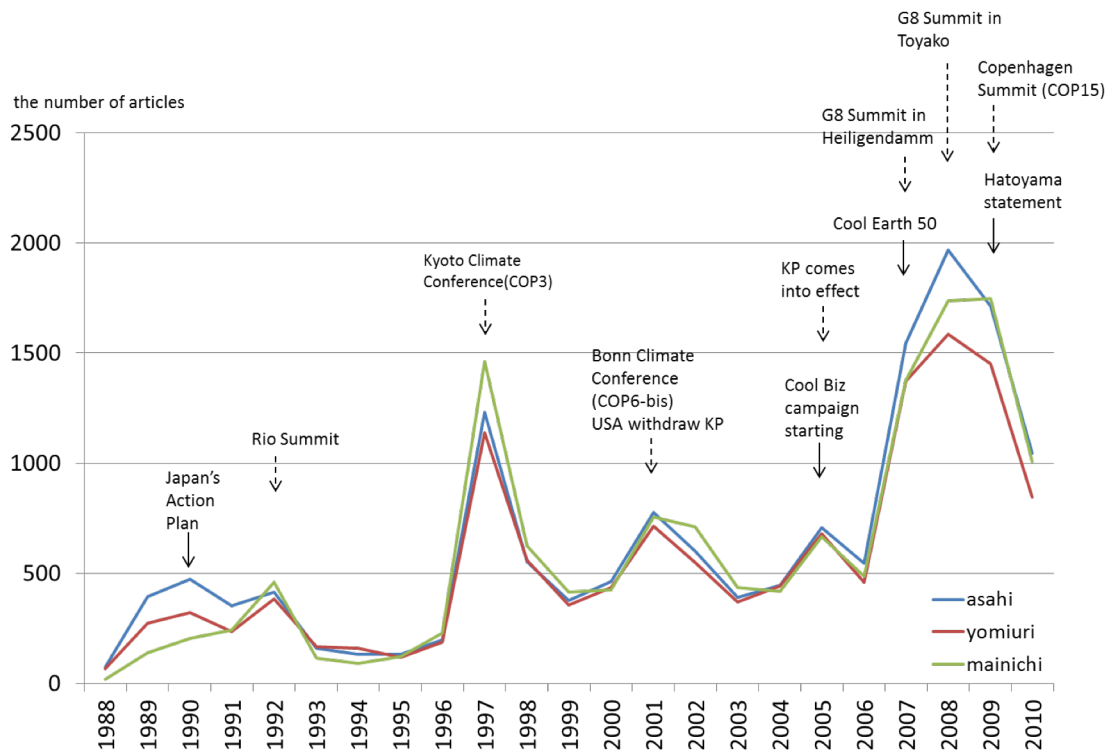


Figure 1. Climate coverage in Japanese newspapers, 1988–2010s.

Aside from those, a number of other factors also contributed to the coverage peak in 2007. Firstly, domestic political discourse was enlivened as attention turned to the upcoming 2008 G8 Hokkaido Toyako Summit. Moreover, as previously mentioned, the Japanese government was working towards the APP. Furthermore, at the “Future of Asia” international conference in May 2007, the first Abe administration revealed its “Cool Earth 50” proposal, going on to reference this plan at the G8 Heiligendamm Summit in June, with a number of related policies being subsequently announced.⁴ The activity of journalists was also a cause of the 2007 rise in coverage. With the commitment period of the KP beginning the following year, the *Asahi Shimbun* and *Mainichi Shimbun* ratcheted up their coverage of environmental issues, planning ongoing coverage series and events (Kawaguchi, 2008: 14–17; Takagi & Ishii, 2008: 18–21).

In 2008, the level of coverage rose even further. Prime Minister Fukuda, who was installed that year, inherited the “Cool Earth” proposal and announced the “Cool Earth Promotion Programme,” which proposed a target of cutting greenhouse gas emissions in half by 2050. In July 2008, Japan hosted the G8 Hokkaido Toyako Summit, at which climate change and the global environment were major themes, with topics such as post-Kyoto frameworks being discussed.

There was no significant decline in coverage volume in 2009. Although power in Japan transitioned from the LDP to the DPJ, Prime Minister Hatoyama announced to the United Nations that Japan would, with certain conditions, reduce greenhouse gas emissions by 25%. Even as the international discussion turned towards post-Kyoto approaches, this was a sudden proclamation that sparked a media event. However, the 2009 Copenhagen Conference, which had been expected to yield a post-Kyoto agreement, failed, and in 2010 there was a drop in climate coverage.

By examining a longer timespan than the previous literature, I was able to identify reoccurring up-down cycles in Japan's climate coverage. That these attention cycles coincide with major domestic and international political events shows that Japanese newspapers' attention is determined by domestic and international politics. We can therefore expect that the specific topics receiving attention will also follow the same trends. The next section shows the results of the topic analysis.

6.2 Topics in reports on global warming

In order to explain the dendrogram produced through the cluster analysis of 200 vocabulary words, Figure 2 consists of a summary diagram showing 14 clusters with the vocabulary words. As the figure shows, the 200 words are clustered into two major categories, consisting of those related to international negotiations on climate change, and those related to scientific techniques and countermeasures for climate change.

Firstly, the lower set of clusters consists of topics related to international negotiations on climate change, and includes Clusters 8 to 14. These clusters are made up of groups of words related to targets for reducing greenhouse gas emissions, and words related to treaties and negotiations. Included in this are Cluster 9, which relates to emissions reductions under the KP; Cluster 10, which deals with emissions targets; and Cluster 8, which relates to the necessity of dealing with global environmental problems. In addition to these, Cluster 11 deals with the FCCC, Cluster 13 with Japan and the US, and Cluster 14 with European, developed, and developing countries. This demonstrates that the attention of Japanese newspapers focused on topics and actors in international climate negotiations, as described above. The US is the world's largest emitter of GHGs. European nations had taken a proactive stance on combatting climate change even before the establishment of the

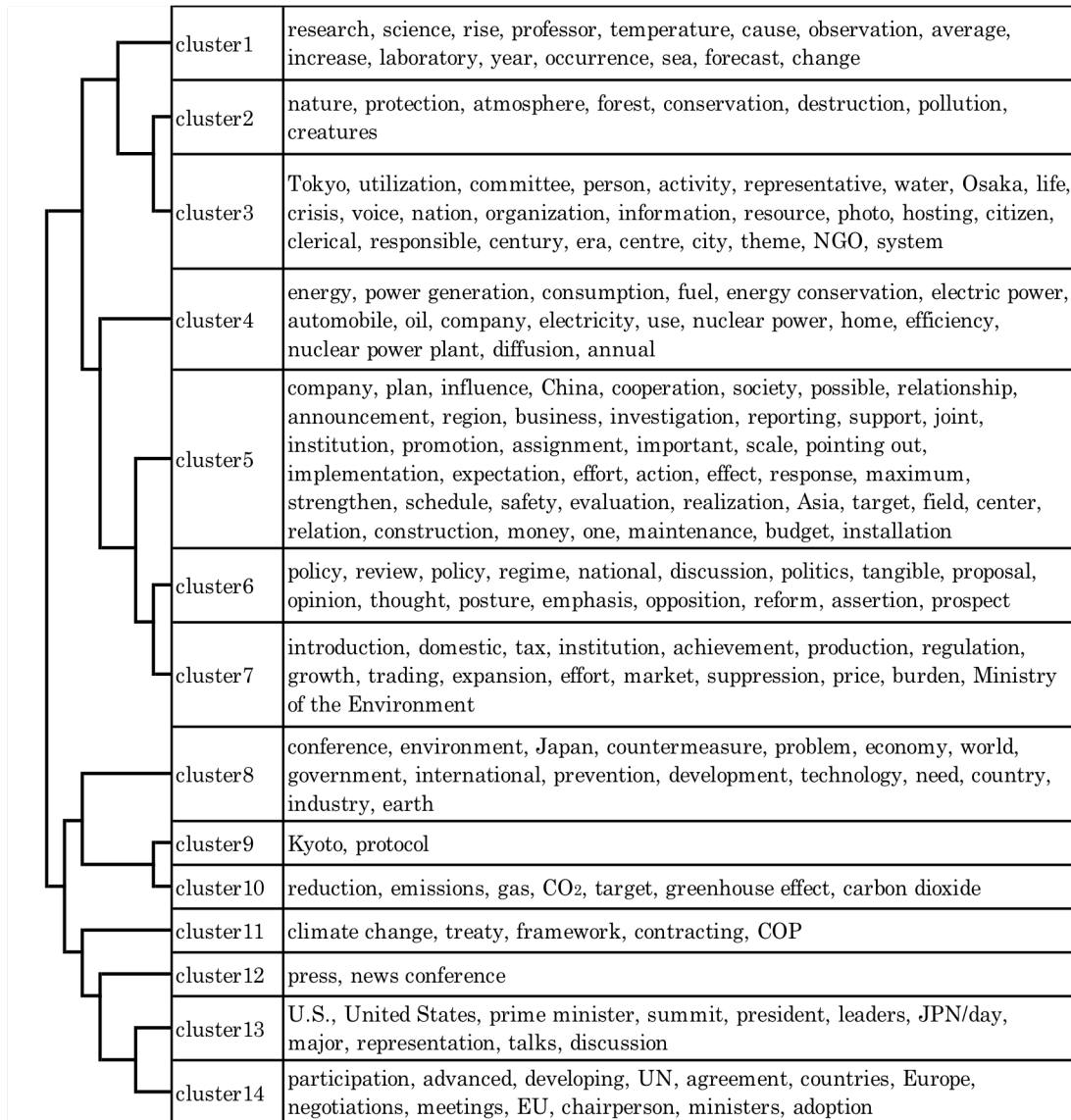


Figure 2. Summary of Cluster Analysis Results for the 200 Words.

FCCC. Developing countries, on the other hand, used the historical emissions records of developed countries to deny responsibility for their own current emissions. These divisions between developed and developing countries created difficulties in the negotiations. Working from these facts, we can conclude that the international climate negotiations cluster is an appropriate subdivision.

Next, let us look at the top set of clusters related to scientific techniques and countermeasures to climate change, encompassing Clusters 1 through 7. In Cluster 1, we find words related to climate science itself—e.g., science, research, and temperature. In the field of measuring global warming and observing climate change, climate scientists forecast the future on the basis of measurements of the climate, sea, and air. Cluster 2, which is near Cluster 1, comprises words related to global environmental conservation. Anthropogenic global warming does not merely impact human society, but also has a chance to cause major changes to existing ecologies and environmental destruction on a global scale. Merging closely with Cluster 2 is Cluster 3, which includes vocabulary related to citizen organizations and NGOs. As these organizations often take actions related to environmental preservation and climate change, these two clusters are closely aligned.

On a separate branch from Clusters 1, 2, and 3 are Clusters 4 to 7. Cluster 4 focuses on energy and energy conservation topics, referring to more efficient power generation, more fuel-efficient cars, electric cars, and energy conservation campaigns, and includes nuclear power, which the Japanese government viewed as a source of clean energy as it does not emit carbon dioxide. The remaining clusters—5, 6, and 7—are on a different branch from Cluster 4, and are made up of a comparatively large number of words. If we look broadly at Clusters 5 through 7, they can be explained together as a domestic policy topic related to domestic institutions and overall policymaking. Since Cluster 6 contains “policy,” “administration,” “citizens,” and “politics,” we may think of it as being related to domestic politics and policy. Cluster 7 includes “tax” and “system,” as well as “introduction,” “burden,” and “price,” so we can guess that it relates to economic policymaking in the context of alleviation. A tax on greenhouse gases, specifically a tax on carbon emissions, was heavily discussed from the late 1990s on (Schreurs, 2002). Cluster 5 is made up of a

larger number of words and cannot be defined as a specific topic. This kind of inexplicable cluster occasionally emerges in cluster analyses. Along with words like “enterprise,” “plan,” “action,” “implementation,” and “maintenance,” it also includes “funds” and “budget,” so at the least we can say that it has a broad relationship with domestic policy.

6.3 Transitions in media attention

Table 1 shows the results of the correspondence analysis. A correspondence analysis provides a multi-dimensional analysis of a cross table. It is preferable for the number of dimensions being used to explain over 80% of the data. Ordinarily, a correspondence analysis uses a two-dimensional plot, but in order to get over this condition, this research used three dimensions. Table 1 summarizes the three-dimensional scores for each year and word, divided up into eight quadrants.

Years from 1988 to 1995 were plotted in the third quadrant, with the exception of 1994, which was plotted alongside 1996 in the second quadrant. Vocabulary plotted in the third quadrant included “summit,” “international,” “cooperation,” “technique,” “development,” and “funds.” At this time, especially ahead of the Earth Summit, Japan was announcing technology development and financial aid as pillars of its international contribution policies. In addition, alongside climate change, the Earth Summit also adopted a treaty related to biodiversity and forest resources. Words from quadrant 3 were used extensively in relation to these issues. Therefore, the special media attention features of the period from 1988 to 1995 (excluding 1994) can be explained as general global environmental issues, the Earth Summit, and Japan’s international contribution. In quadrant 2, we find words such as “nuclear energy,” “oil,” and “resources,” along with “science,” “temperature,” “observation,” and “sea”—words related to climate science.

Dimension	D1	D2	D3		
Contribution	51.48%	20.50%	14.58%	Year	Vocabulary
Quadrant 1	+	+	+	2008, 2010	countermeasure, main, year, company, China, possible, announcement, support, challenge, indication, expectation, maximum, schedule, safety, evaluation, realization, Asia, policy, national, discussion, prospects, voice, domestic, system, expansion, market, price, burden
Quadrant 2	-	+	+	1994, 1996	oil, nuclear power, nuclear power plant, research, science, rise, professor, temperature, observation, laboratory, sea, change, plan, influence, society, region, investigation, scale, center, construction, installation, Tokyo, utilization, water, resource, era, city, tax, production
Quadrant 3	-	-	+	1988, 1989, 1990, 1991, 1992, 1993, 1995	problem, international, development, technology, necessity, summit, cooperation, institution, fund, protection, atmosphere, conservation, pollution, creatures
Quadrant 4	+	-	+	2009	economy, world, US, Prime minister, president, leader, JPN/day, meeting, relationship, importance, Response, enhancement, field, budget, United Nations, agreement, negotiation, policy, consideration, politics, thought, emphasis, crisis, growth, press, news conference
Quadrant 5	+	+	-	2007	emission, gas, greenhouse effect, country, industry, protocol, company, home, business, cooperation, initiative, target, association, one, participation, Europe, opinion, opposition, reform, people, photograph, charge, introduction, achievement, trading
Quadrant 6	-	+	-	1998, 1999, 2000, 2002, 2003, 2004, 2005, 2006	energy, generation, fuel, energy conservation, electric power, car, electricity, usage, efficiency, diffusion, year, cause, average, occurrence, prediction, promotion, implementation, effect, maintenance, activity, Osaka, life, nation, information, citizen, century, centre, theme, system, nature, forest
Quadrant 7	-	-	-	1997	CO ₂ , carbon dioxide, conference, environment, earth, consumption, increase, report, action, developed, countries, adoption, tangible, organization, regulation, effort, suppression
Quadrant 8	+	-	-	2001	reduction, goal, Japan, government, United States, representation, consultation, Climate Change, framework, COP, developing, meeting, chairperson, minister, proposal, posture, assertion, committee, representative, hosting, clerical

Table 1. Three-Dimensional Quadrant Division Analysis

Only 1997 is plotted in quadrant 7. The vocabulary in this quadrant includes “CO₂,” “increase,” “developed,” “regulation,” and “adoption”; all are related to the KP. The Kyoto Conference was the special feature of this year’s coverage.

Leaving out 2001, 1998 to 2006 are grouped together in quadrant 6, along with words related to energy efficiency reforms and energy conservation (“energy,” “fuel,” “electricity,” “power generation,” “energy conservation,” and “efficiency”), as well as words related to citizens’ activities (“citizen,” “lifestyle,” and “activity”); 2001 is plotted on its own in quadrant 8. The special characteristic of coverage in this year relates to the extent of reporting on America’s withdrawal from the KP.

Also in a quadrant on its own is 2007, in quadrant 5. The most important words to be plotted in this quadrant include “emission,” “trading,” “introduction,” and “opposition.” This is because in 2007, the Tokyo Metropolitan Area introduced Japan’s first emissions capping system. The Japanese government then examined the creation of a national trading system. Additionally, Europe had introduced cap and trade in 2004, and the first period of that system ran until 2007. From these facts, we can consider the special characteristic of climate coverage in 2007 to be the focus on cap and trade systems.

2008 and 2010 are in quadrant 1, while 2009 is in quadrant 4. The vocabulary found in quadrant 1 include words related to Japan’s APP efforts such as “Asia,” “China,” “support,” “market,” and “expansion.” Plotted alongside 2009 in quadrant 4 are words including “economy,” “crisis,” “prime minister,” “president,” “Japan,” and “America.” These relate to the “Lehman Shock,” as it is known in Japan—the global financial crisis that engulfed the world’s economy, including Japan. President Obama, who had been inaugurated in 2008, announced the “Green New Deal,” a set of policies that were also examined by the Japanese government. Here we can see that these became a focus of attention during 2009. In addition, with the transition from

the Bush administration, which had opposed the KP, to the Obama administration, the return of the US to climate change negotiations was anticipated. Finally, as previously mentioned, there was some anticipation of a post-Kyoto accord in light of events like Prime Minister Hatoyama's announcement to the United Nations.

Vocabulary related to these events makes up the special characteristics of this year's coverage.

Summing up the results above, from 1988 to 1996, climate coverage was particularly focused on global environmental problems and Japan's international contributions, as well as nuclear power and climate science. However, the Kyoto Conference in 1997 was a tipping point that significantly changed media attention toward climate change. From 1998 to 2006, with the exception of 2001 when the focus was on America's withdrawal from the KP, media attention focused on mitigation techniques such as energy efficiency and energy conservation. Finally, from 2007 to 2010, media attention shifted once more, this time to focus on mitigation techniques such as emissions cap and trade schemes and multilateral enforcement.

7. Conclusion and discussion

Finally, I would like to summarize the findings of this research and discuss the construction of the climate change problem in the news media. In addition, I would like to mention the theoretical contribution of this research to our understanding of the media attention cycle.

This paper succeeded in creating a map of media attention in climate change reporting in Japanese newspapers using three methodologies, showing the repeated up and down media attention cycles, the topics of climate coverage, and the relative relationship of media attention year to year. The results show that 1997 was a

dividing line at which media attention changed significantly, and the trend of media attention related to climate change corresponded with major events in international or domestic politics.

First, this trend likely means that the Japanese media merely fulfills the role of a medium for transmitting political messages. If the media is just an engine for transmitting information, then the construction of Japan's climate change problem has been primarily done through political pronouncements. This logic is probably appropriate, because as the results of this research show, Japan's media attention has closely tracked the country's climate change policies. In addition, Asayama and Ishii (2012, 2013) also point out a technocratic tendency in reporting on the IPCC and CCS. This paper indicates the possibility that the technocratic tendency is common to broader climate coverage in Japanese newspapers.

This technocratic trend certainly exists within the Japanese media; however, it does not seem possible to conclude that Japan's climate change problem has been entirely determined by political statements. When the US dropped out of the KP in 2001, the possibility that Japan would imitate this move was floated. Japan's METI had opposed the setting of concrete targets since 1990 (Schreurs, 2002: 166–167), while the Japan Business Foundation (Keidanren), which had a strong connection with the ruling LDP, opposed the Protocol (Tiberghien & Schreurs, 2007). It would not have been unusual if the Koizumi administration of the time had chosen to drop out of the Protocol—if it were the case that everything was determined by political statements. However, Japan did not take the option of abandoning the KP. Tiberghien and Schreurs (2007) suggest that the KP had significant symbolism, and that the Foreign Ministry's calculations and strong support from the public and citizen groups led to this decision; however, they note that the intentions of the pro-US Koizumi administration are unknown (88).

This paper presents one likely reason for Japan's decision not to abandon the KP. Since 1998, the Japanese media had focused heavily on GHG reduction measures in the form of energy efficiency and energy conservation. This means that the emission reduction targets imposed upon Japan by the KP were effectively seen as being implemented already, since mitigation techniques aimed at achieving those reductions had been widely reported on. This situation had already been in place for four years by 2001; Japanese society as a whole thus had an expectation that the KP would be ratified. In this situation, the somewhat populist Koizumi administration would have found it difficult, from a public opinion standpoint, to choose the abandonment option. Although media reporting on climate change was not a primary actor in the construction of the problem, consistent, ongoing reporting influenced the reconstruction of the climate change problem and probably influenced Japan's political pronouncements.

The results of this research show that Japan's changing media attention closely resembles the changes in Downs' (1972) issue attention cycle. Until 1996, media attention was devoted to topics related to the definition and empirical proof of the climate change problem—global environmental issues, Japan's international contribution, climate science, and so on. However, with the adoption of the KP in 1997, media attention switched to mitigation techniques, and proceeded to shift from energy efficiency and energy conservation topics to policy and institutional mitigation techniques. The up-down cycle pointed out by Downs cannot be seen here, but the media-attention cycle need not be fixed to such a cycle from the outset. Single up-down cycles like those pointed out by Downs can be confirmed (e.g., Trumbo, 1996), but there are instances where this is not the case. As shown in the research results of this present study, cases exist where Downs' attention cycle can be observed through the analysis of multiple up-down cycles. The elasticity of Downs'

issue attention cycle model will continue to be useful in climate coverage studies in the future.

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Notes

¹ “Kikizou II Visual” (Asahi), “Yomidas Rekishikan” (Yomiuri), and “Maisaku” (Mainichi).

² 191 of 200 words were used in the correspondence analysis, as 9 words were outliers. Correspondence analysis is very sensitive to outliers in the data; they can cause all of the remaining data to cluster around the origin, rendering the results impossible to interpret. Therefore, the removal of outliers is a standard practice in this kind of analysis (Hoffmann & Franke, 1986: 225).

³ In text mining, the Canberra Distance, which is sensitive to data close to 0, is considered effective (Gordon, 1999: 20).

⁴ Ministry of Foreign Affairs of Japan, G8 Summit 2008 Toyako, <http://www.mofa.go.jp/policy/economy/summit/2008/info/theme.html> (accessed December 2016).

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