

Science in pictures: Visual representation of climate change in Spain's television news

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Bienvenido León

University of Navarra, Spain

M^a Carmen Erviti

University of Navarra, Spain

Abstract

The images used by the media to represent science can help people's understanding of complex processes and create meaningful links with audiences. This is particularly relevant in the case of climate change (CC), an important phenomenon that, nevertheless, is often perceived as a remote issue, with no relevance to daily life. This article presents the main results of a research on the images used in television news to represent CC. From a sample of 1476.4 hours of Spanish television news programmes, a content analysis of 78 stories on climate change was carried out. This was complemented with six semi-structured interviews at five TV newsrooms. Results indicate that the low rate of coverage of CC can be related to the scarcity of attractive images available to the channels.

Keywords

climate change, media and science, media representations, science journalism

1. Introduction

Climate change (CC) is considered to be one of the most significant issues of our time.¹ But, in spite of its relevance and possible consequences, many citizens perceive CC as a remote problem, with no impact on their daily lives. Research has shown that there are several reasons why the public is not conscious of the importance of CC, including the fact that the impact is perceived as uncertain, distant in the future and irrelevant to daily life (Gifford, 2008; Lorenzoni et al., 2007; Vlek, 2000; Ungar, 2007). In Spain, 61% of the population perceives CC as a distant problem, and feels indifferent about the need to take any action (Meira et al., 2011).

Research on media and science has demonstrated that media coverage of an issue affects public awareness (Ungar, 2000). But media have often presented a distorted representation of the process

Corresponding author:

Bienvenido León, University of Navarra, School of Communication, Pamplona, 31080, Spain.

Email: bleon@unav.es

of CC, as a result of several causes, including the influence of journalistic norms and values (Boykoff and Boykoff, 2004, 2007) and media ideology (Carvalho, 2007; Carvalho and Burgess, 2005).

In view of its complexity, some experts have suggested that it may be necessary to represent CC by means of icons; for example, consequences like extreme meteorological phenomena (Hulme, 2004). Such icons can help to ensure more efficient communication by creating symbols that are easy to identify. As Nicholson-Cole (2005) points out, images can play an important role in the process of adding context and significance to CC representation, in a way that makes it possible to establish a link between an abstract concept and daily life, showing its relevance to a local community and the people who belong to it. According to Nicholson-Cole, images can express emphatic messages, that are easy to remember, as they condense complex information in a more accessible way (Nicholson-Cole, 2005: 258).

Television is an important medium for communicating information about CC. In Spain, it is the primary source of information on this topic, because 83.3% of citizens get their information on CC from TV (Meira et al., 2011).

As we will see later, research on TV coverage of CC has virtually neglected the role of images, although images can play a fundamental role in this topic and in TV news in general. 'Formal elements' are often mentioned among 'news values' (particularly important factors in the selection of news). According to Muñoz Torres (2002: 117), formal elements can cause or reinforce the journalistic interest of events. Among formal elements, pictorial representation is considered to be a key element, especially for television, a medium that is 'heavily reliant on visuals' (Strömbäck et al., 2012: 720). Therefore, 'visual value' can be regarded as a factor contributing to the news selection process, which can be considered in conjunction with other news values (e.g. proximity or consequences).

Several authors have remarked on the importance of images for television news. Visual interest has dominated television production since its beginning and has been applied to a variety of programmes, including news (Baggaley and Duck, 1979: 50). McGregor (2002) suggests that the presence or absence of visuals and the capacity of the journalists to obtain images determines whether an event becomes news. Cebrián (2004: 240) considers that 'news with images are preferred to those without them, and the more original and spectacular they are, the more possibilities they have to be selected'. Aparici et al. (2009: 250) consider that images are both a strength and a weakness of television, because 'television condemns to silence those news which have no images to represent them. The importance, interest and strength of events is directly proportional to the existence of images.'

Furthermore, as Grabe and Bucy show, images play a fundamental role in the comprehension of TV news, because 'a typical news report may be comprehended ... without the viewer fully processing the myriad details contained within it' (2009: 16). Therefore, images are of paramount importance 'because reading and the apprehension of spoken language requires more deliberate cognitive effort than recognizing and deriving meaning from images, news *verbals* are poorly remembered compared to news *images*' (2009: 20).

2. The images of CC in the press and TV news

Research on the role of images in the representation of CC, either in press or television, is scarce. Doyle (2011) states that visualization has changed significantly in the last few years.² Smith and Joffe (2009) analysed the images of CC in the British press, from 2000 to 2006.³

Brönnimann (2002) studied CC coverage in German science popularization publications and popular press, showing that images of extreme meteorological phenomena are frequently used.⁴

However, the use of extreme weather as evidence of CC can be criticized, as, according to scientists, it is difficult to link the process of CC to specific weather phenomena. The trend of using images has even been regarded as a tricky practice because weather can be used as evidence to either support the existence of CC or to deny it (Boykoff, 2011: 43).

Other studies have focused on the impact of images on the public's reaction to CC. According to Doyle (2011), maps and other images with scientific information can convey a feeling of control and make the problem seem less urgent. In addition, only visible effects are shown, leaving very important aspects aside. As Manzo (2010) notes, as the effects of greenhouse gasses that result from human activities are not always visible, images of CC usually represent only a partial point of view. In order to thwart such difficulties, Sheppard (2005) suggests that uncertainties could be represented through alternative visualizations, in several scenarios (global, regional and local), as well as informing on the non-visible aspects using other visual elements, like graphics or computer-generated images.

As a consequence of their denotative and symbolic value, visual representations can awaken emotions, which can help to interpret and add meaning to a scientific topic (Boholm, 1998; Oring, 1999). For example, research on the images of CC coverage in the Swedish press and television shows that visual representation of this topic is linked to several emotions, such as fear, hope, guilt, compassion or nostalgia (Höijer, 2010).

Although several studies have analysed different aspects of television coverage of CC (e.g. Boykoff, 2008; Gavin and Marshall, 2011; Wilson, 2002, 2009), the role of images has only been studied by Höijer (2010), Lester and Cottle (2009) and Petersen (2007). Petersen analysed environmental discourse on Danish TV during the summits of Rio de Janeiro (1992) and Johannesburg (2002), and studied tangentially some of the images of CC.

Lester and Cottle focused on TV news from 13–26 September 2004 on national channels of six different countries, as well as four international channels (BBC World, CNN International, Fox News and Sky News). Images were classified as iconic (48%), symbolic (33%) and spectacular (18%). They stress the power of images as symbolic messages and their importance as communication tools, which can be 'essential for processes of mobilization and solidarity', in connection to the understanding of news-mediated awareness of climate change (Lester and Cottle, 2010: 933).

As we have mentioned before, Höijer (2010) examined verbal and visual representations of CC in a tabloid newspaper and on a public TV channel in Sweden. It is argued that emotional representations of CC may enhance public engagement in the issue but also draw attention away from it.

On the one hand, television news can take advantage of the potential impact of images. But, in some cases, the need to use images can be a disadvantage. For example, CC cannot always be associated with specific images because of the high level of complexity and abstraction of the topic.

Television is more likely to cover events of high impact rather than less tangible environmental processes (Greenberg et al., 1989). Therefore, visible effects can receive frequent coverage, whereas information on causes is more difficult to portray, because atmospheric gas is invisible (Manzo, 2010: 98).

3. Research aim and methods

In this context, this article sets out to study the role of images in CC television news from the widely unexplored perspective of how the available images can contribute to shaping the messages. More specifically, it explores how availability of images influences the coverage, what kinds of images are used to represent CC, and how images can help, or make it difficult, to represent CC as a close or a remote process for the viewer.

Three hypotheses were formulated:

1. The shortage of available attractive images related to CC (especially on current events) can reduce the coverage of this topic on TV.
2. Images mainly show effects of CC, whereas images of causes are not as frequently used.
3. Images tend to represent CC as a remote process for the viewer. Individual actions connected to CC are scarce.

A content analysis of the two main news programmes (broadcast in the afternoon and in the evening) of the six leading Spanish television channels – La 1, La 2, Antena 3, Cuatro, Telecinco and La Sexta – was carried out. A sample of one week per month was recorded for two different years (July 2005–June 2006 and January–December 2011) in order to study a possible evolution. The years and weeks of sample were selected mainly for operational reasons.⁵

Among the main news tags of the first sample period was Katrina (August 2005), one of the deadliest and most destructive hurricanes of the last few years. As it took place at the same time as the shooting of the documentary *An Inconvenient Truth*, in which former US vice-president Al Gore plays a leading role, Katrina was included in the film. Both events contributed to an increase in the coverage of CC in 2006 (Boykoff and Roberts, 2007; Mazur, 2007). In 2011, Spain suffered a severe economic crisis, which reduced the coverage of other topics (La Sexta, 2011).

From 1632 news programs (1476.4 hours), a total number of 40.714 news stories were viewed in order to select those focusing on CC. Only 78 stories (0.19%) had the appropriate focus. This represents 0.05 CC stories per hour of television news.

For the purpose of this research, a *story* was operationally defined as any segment of the news programme with complete sense in itself, broadcast between the opening sequence and the credits of the programme. Typically, a story includes an introduction made by the anchorperson and the ‘video–audio package’, but sometimes it consists only of the ‘video–audio package’ (e.g. when more than one story is broadcast on different aspects of the same event or topic); a ‘reader’ by the anchorperson or a ‘reader’ covered with images.

We selected those stories that mentioned one of the following terms: ‘climate change’, ‘global warming’ or ‘greenhouse effect’. As one of the items was only a studio-based presentation, with no other images, we analysed only 77 items.

Two doctoral students coded the selected stories on CC. The code was previously tested with 14 items (20%). Finally, a sample of 39 items (50%) was coded by a different coder in order to establish inter-coder reliability, resulting in an average agreement of 94% (Holsti’s formula), which is regarded as acceptable.

The following variables were codified:

- Source: *internal production* (produced by the television channel), *external production* (produced by news agencies or other sources external to the channel) or *both* (internal and external). Since, in many cases, the source of the images was not explicit, several signals were taken into account. When several channels used the same image, it was coded as *external production*. Images from remote places, where the reporter of the channel does not appear, are also coded as *external production*. However, images from Spain were codified as *internal production*, unless there was an indication to the contrary.
- Timeliness: *recent* (shot on the same or on the previous three days), *archive* (not recently shot) or *both* (a combination of recent and archive images). As the date of shooting was not always explicitly indicated, images repeated on different days were coded as *archive*.

- Role of the images: *iconic* (images directly related to the reality referred to in the text); *symbolic* (images which are associated with reality by convention); *other* (images with any other role).
- Thematic category: The number of shots in each item was coded and classified. The 77 stories in the sample included 1473 shots, of which 1335 were coded. The remaining 138 shots show graphics, animation, feature film excerpts, sources' statements and journalists' stand-ups. The 1335 shots that we coded were classified into 23 different categories and were finally gathered in five thematic categories: *causes*, *consequences*, *solutions*, *protests* and *other topics*.

In order to find out the reasons behind editorial and production decisions, once the results of the content analysis were obtained, six semi-structured interviews were conducted at the television newsrooms in Madrid, in December 2012. We interviewed three news producers (*editores*), one section head (*jefe de sección*) and two reporters (*redactores*). A request for interviewees was sent to the news directors of the six channels, and the interviewees were selected from those that accepted the invitation.⁶ Each interview lasted for about 45 minutes and was conducted using a list of 12 questions about coverage of CC, availability of images and the images used to illustrate stories on CC.

4. Results

4.1. Content analysis

As we have mentioned before, only 78 items on CC were broadcast within 1632 programmes, accounting for 1476.4 hour of news (0.05 items per hour). The number of stories in the sample was distributed as follows:

Cuatro: 18
La Sexta: 17
La 2: 16
La 1: 14
Antena 3: 7
Telecinco: 6

A total of 38 stories belong to the 2005–06 sample, while 40 were broadcast in 2011. However, considering La Sexta was only included in the 2011 sample, we had to exclude these 17 items from the comparison. Therefore, the number of items is reduced from 38 to 23 items; this indicates that CC coverage of TV news in Spain has decreased in the period from 2005–06 to 2011.

The 38 stories of 2005–06 were broadcast in January (3), February (6), March (1), April (3), June (8), September (1), October (3), November (1) and December (12). The 40 stories of 2011 were broadcast in January (1), February (1), March (4), May (2), June (2), September (2), November (2) and December (24). Therefore, December was the month with the highest number of stories (31.5% in 2005–06 and 60% in 2011), while there are no stories in July and August.

The sampling period includes stories about the summits of Montreal (December 2005) and Durban (2011). Both summits account for 23 stories (29.4% of the sample).

The main results of the image analysis are presented below.



Figure 1. Images of external production.

Source: Cuatro, La 1, Antena 3 and Telecinco.

Source

The results of our content analysis on the origin of the images show that only 20 stories (25.9%) are covered exclusively with images of internal production, while 38 stories (49.3%) are covered with images of external production and the remaining 19 stories (24.6%) include both types.

CC is often related to international politics. That is why many of the images used to cover this topic are provided by international news agencies. This is the case for climate summits, like Montreal 2005 (COP 11) and Durban 2011 (COP 17).

As Figure 1 shows, several channels covered the closing session of the Durban summit with some images recorded from the same point of view (probably with the same camera).

Images of the poles, which are used as a frequent resource to illustrate the ice melting process, are also of external production. In fact, in our sample, we found that several channels use the same images to cover different news events. For example, the image used in 2006 by Cuatro to cover Earth Day is also used in 2011 by La Sexta to illustrate the effects of the economic crisis in the social awareness of CC.

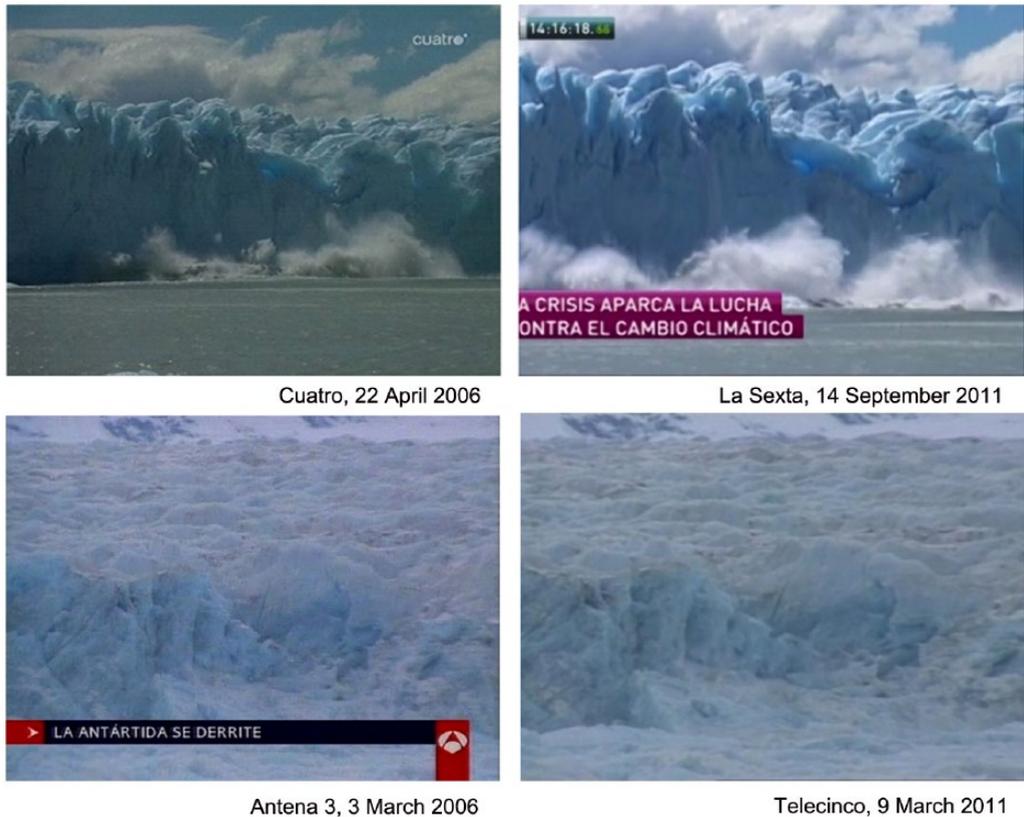


Figure 2. Images of external production.
Source: Cuatro, La Sexta. Antena 3 and Telecinco.

Antena 3 and Telecinco shared other images of ice melting. Antena 3 used them to inform viewers about ice melting in Antarctica in 2006, while Telecinco, five years later, used the same shot to report that scientists had detected that the melting process was taking place faster than they expected (Figure 2).

Our content analysis shows that six stories (8%) included images provided by scientific groups or institutions. One of them is a *time-lapse* sequence, broadcast by La 2, Antena 3 and La Sexta, credited to Centro de Estudios Científicos (CECs) of Chile.

The comparison of the origin of images between 2005–06 and 2011 (excluding La Sexta, which is not included in the first sample year) shows a significant drop in the number of stories that are only illustrated with images of internal production, decreasing from 39% (15 stories) in 2005–06 to 9% (two stories).

Timeliness

38 items (49.3%) were covered with recently shot images, nine (11.6%) with archive images and 39 (50.6%) with both types. Considering recentness as a relevant news value, the fact that more



Figure 3. Images with a symbolic role.

Source: Telecinco, 28 October 2005.

than half of the stories included archive images can be interpreted as a relevant obstacle to accurate coverage of CC on TV news.

In 2005–06, the percentage of stories containing archive images was 52.6%, whereas in 2011 it ascends to 82.6%. Therefore, the use of archive images increases as coverage decreases.

As we have shown, in some cases, the same shots are used for many years. This points towards the existence of a serious barrier to accessing recent material about certain topics, like polar ice melting. This shortage can be a burden to those who are covering CC because editors may not have enough images to illustrate the stories properly.

Role

We have already pointed out that the invisibility of CC is one of the problems in communicating this topic. Therefore, it is foreseeable that some images play a symbolic role because they are related to a concept, rather than to a specific event. In fact, Lester and Cottle (2009) consider that some images (e.g. chimneys and traffic) are symbols of the human origin of CC; human impact is symbolically associated with suffering and individual or collective losses; and the use of images showing extreme weather conditions provide an implicit nexus to CC as the cause of such phenomena.

In our study, we have detected that some of the stories including statistical data or predictions for the future contain a number of symbolic images. For example, a story broadcast by Telecinco shows a group of children in bathing suits, with empty bottles in their hands, lying on the street, next to a grill. In this context, these images suggest that a percentage of the population will undergo water shortage (Figure 3).

From our content analysis, we have identified a new role for the images, which has not been mentioned in previous studies: comparison. In our sample, we found three stories using comparative images. All of them show ice-melting processes: on Mount Kilimanjaro, and glaciers in the Alps and Greenland. All of those images were broadcast during the first sample period (2005–06). For example, La 2 showed a colour etching of the glacier known as Mer de Glace, in the Alps, (a work by Carl Hackert, which dates back to 1781), and compared it to current images of the glacier (Figure 4).



The Alps in 1781



The Alps in 2005

Figure 4. Comparative role of the images.

Source: La 2 Noticias, 2 December 2005.

Thematic category

The most abundant shots are those showing ice melting (230 shots), followed by climate summits and other international events (220), animals (135), protests (118), and chimneys and factories (114). The remaining topics are much less frequently used (Figure 5).

When the shots are classified according to the categories mentioned in the methodology section, the images showing consequences (visual evidence that the Earth's climate is changing), constitute the first category (571 shots), followed by solutions (adaptation and mitigation, 349 shots). As hypothesized, images of causes were not as frequent because, as mentioned earlier, the causes of CC are often invisible. However, using symbolic images such as chimneys and factories, which become the most frequent symbols used to represent gas emissions, palliates invisibility.

Consequences

The most frequently used image is that of ice melting, which is displayed in mountain glaciers (Mount Kilimanjaro, the Alps), the Arctic (North Pole, Greenland, Alaska, etc.) or the Antarctic. More specifically, CC is represented with ice blocks floating on the water, as well as unfrozen areas (Siberia and other places of the northern hemisphere) and polar bears.

Polar bears are included in the category of *animals*, which contains 135 shots. Polar bears and fish on the seabed are frequently displayed as evidence of global warming. Other species are also displayed (e.g. crabs, Iberian lynx, brown bear and monarch butterfly).

Extreme meteorological phenomena, which are portrayed in 55 shots, include floods, hurricanes and droughts. The fact that there are relatively few shots of extreme weather phenomena indicates that, in general, images are not used in a sensationalist way, when informing about CC, given that these kinds of images could have a high visual impact and even a dramatic potential.

In our study, images of *people in places related to CC* are displayed only in 30 shots (5.25% in the category of *consequences*). This corroborates the conclusion of previous studies, which found that images of human beings were rarely used to cover CC.

Fires are shown only in 12 shots, in spite of the fact that large areas of Spain are burned every summer, and it is foreseeable that CC will increase the 'frequency, intensity and magnitude' of the

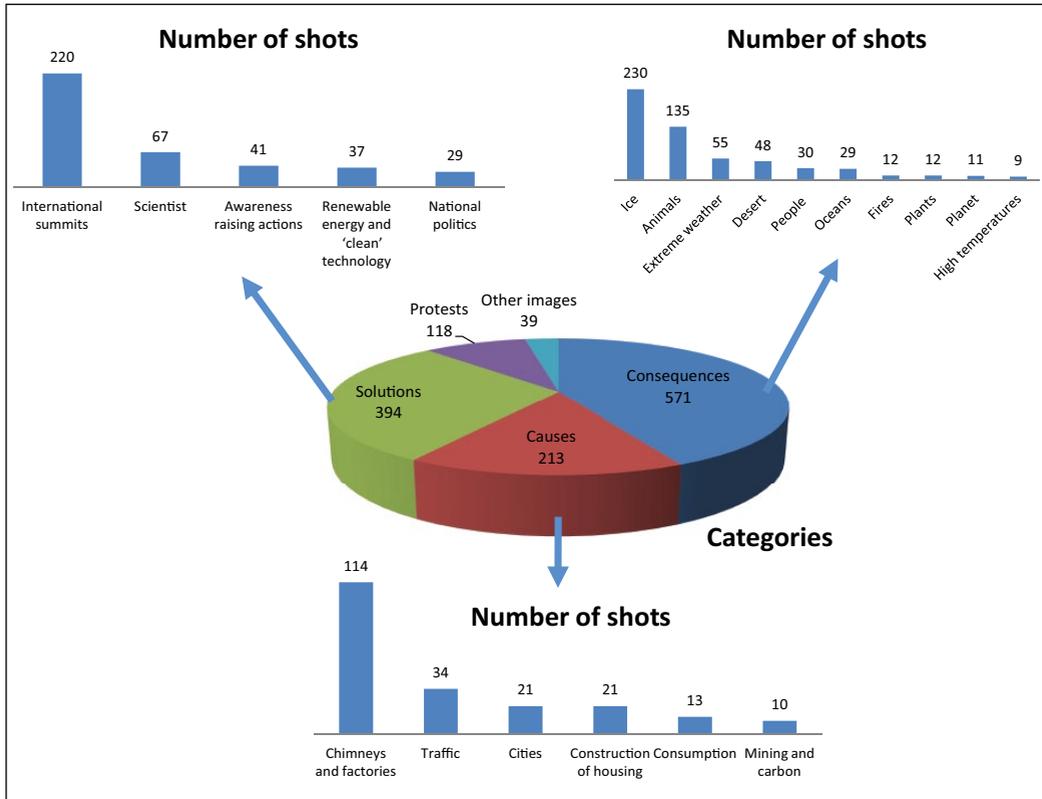


Figure 5. Thematic classification of the images.

fires in the Iberian peninsula because of an increase of temperatures and periods of drought (Ministerio de Medio Ambiente, 2005: 29). The use of images of fires to cover some aspects of CC is a good opportunity to highlight the local impact to viewers, which might help to increase public awareness.

Surprisingly, only nine shots were used to portray high temperatures (thermometers, sun, people in summer clothes or drinking water, etc.). This kind of image is also an opportunity to represent the local impact of CC.

Causes

In this category, the most frequently used images are those of industrial chimneys emitting gas into the atmosphere (114), well ahead of other images. Chimneys represent greenhouse gas emissions, together with those of traffic (34 shots), the sky covered with pollution (21), consumption of energy and other resources (13), and coal mining (10). There are also 21 shots of the building industry (which are associated in 2006 with the un-fulfillment of the Kyoto protocol by Spain).

This classification shows that chimneys are widely accepted by TV channels as a symbol of the causes of CC. However, chimneys (the same as traffic or cities) contribute to creating an anonymous image, which does not help to promote personal engagement. Only 13 shots are related to a

personal family environment of consumption of energy and other resources, although they contribute to the increase in greenhouse gas emissions. One of the few stories including this kind of image (five shots) focuses on the start-up of the Kyoto protocol and explains that 60% of the gas emissions are the result of 'waste in domestic consumption' (Cuatro, 2006).

Solutions

We have already explained how important climate summits are for the coverage of CC. Therefore, it is not surprising that images of these events are the most frequently used in this category (and the second one considering all categories), accounting for 220 shots.

Images of climate summits and other international conferences mainly show images of politicians, but also non-governmental organizations (NGOs) and journalists. The images of the conferences typically also include informal meetings, conversations, the pressroom and the outside of the conference venue.

Scientists appear in 67 shots, mainly working in places related to CC (ships on expeditions, coastal areas, glaciers, etc.) and, to a lesser extent, in labs. According to the number of shots, scientists reach only the seventh position in the list, which means their representation is very limited.

Awareness-raising actions account for 41 shots, including advertising campaigns, activities at schools, tree planting and other actions that try to direct citizens' attention towards the importance of CC mitigation. Images of renewable energy and 'clean' technology (37 shots) represent alternatives to the current polluting way of life, based on fossil fuels and wasteful usage of energy. Most images in this group show wind turbines and solar cells, whereas those related to a household environment are scarce.

As a conclusion, images used to represent possible adaptation and mitigation solutions are less frequent than those of impacts, and, above all, they connect CC with international politics, a remote environment to the individual sphere, in which citizens might feel committed to the problem and capable of taking action.

Protests

Images of demonstrations and protests are relatively frequent (118 shots). They seem to be very attractive for TV news, although some of the events are only attended by small groups of people. This corroborates the importance of the visual impact in some protest actions, which are frequently staged by ecologist groups during climate summits. Environmental activists take part in the summits as representatives of guest institutions as well as carrying out lobbying activities; their numerous delegations demonstrate their communication strategies (Pearce, 2010).

Results on the number of images by channel provide some information on the approach that each one is taking. La 1 and Telecinco use mainly images of international conferences, which indicates that they stress an international politics approach. On the contrary, La 2 and Cuatro are more focused on the impact of CC, using mainly images of ice. Scientists are the most frequent visual theme for Antena 3, whereas animals are the most frequent for La Sexta, thus showing their respective focus.

Finally, if we make the sample homogeneous in order to compare the shots in the two years of the sample, we exclude La Sexta and we can see a change in the most frequent images. In 2011 the international summits are first, with 188 shots (85.4%), most of them about the Durban summit; whereas in 2005–06 there are only 18 shots (8.1%) about summits. This is due to the fact that the 2011 sample includes an entire week of a summit, whereas the 2005 sample only includes the

beginning of the Montreal conference. Apart from this, the other categories of images maintain similar percentages in both years. Therefore, CC is illustrated in a similar way in both years.

4.2. Interviews

The interviewed news producers and reporters agree that CC is a difficult topic and it is not easy to shape as a TV news story. According to them, there are several reasons for this: there is a scientific process with some controversial data, there are politically complex negotiations, and there is contradictory information coming from sceptical sources.

Furthermore, the interviewees reported that, to a certain extent, CC is still on the news agenda, but time has played against it. News producers of La 2 and Cuatro (the channels with a more dramatic decrease in the coverage from 2005–06 to 2011) think that the current economic crisis has affected the coverage of CC.

Iñigo Herraiz, news producer at La 2, states that:

There has been an avalanche of information on the crisis and this has inevitably led to the disappearance of CC from the global agenda and, as a consequence, from the national agenda. We try to follow this topic, but sometimes you are dragged by the news flow.

Fernando Sanz, section head at Telecinco and Cuatro, points toward other aspects, which have also contributed to diminishing the coverage of CC:

The interest that we saw a few years ago has deflated, probably neither media nor politicians nor scientists have been able to communicate the real magnitude of the problem, which I think was exaggerated, and then the news of a counter position has contributed to blurring CC.

Both Sanz and news producer at Antena 3, Alejandro Dueñas, consider CC to be an ‘alternative’ (not mainstream) topic and for this reason it does not get much time in generalist channels.

Generally speaking, news producers distinguish between three types of information on CC, each with its own specific images: nature, climate summits and energy saving. Some of the interviewees point out that information on individual actions related to the environment (especially consumption habits) is quite frequent in TV news, even more so as a consequence of the current economic crisis. However, it is not so frequent that such stories are associated with CC, because the ‘journalistic imagery’ understands CC as something global, related to far off global consequences and climate summits.

Interviewees confirm that it is not possible to inform viewers through television without images. For example, Irene Fernández, reporter at La 2, explained that, sometimes, there is no specific image available to illustrate scientific work. She covered research about plankton, a microscopic organism, in 2007 and 2010, as an indicator of temperature increase:

Plankton has no image to show but arctic landscapes are visually attractive. Therefore, I tried to hook the viewers, starting with landscapes, and then I informed them about the research, with images of test tubes and microscopes, but with a lot of support from additional images of landscapes.

Therefore, as Fernández suggests, the images of scientists at work are not attractive enough to meet journalistic criteria, although they can be used in combination with other images that are more appealing to the viewer.

In the view of Alejandro Dueñas, news producer at Antena 3, it is obvious that it is necessary to have a good image related to the topic, in order to include CC in the rundown of a news programme:

A specific image is so important for this type of story that I am sure that some organizations like Greenpeace, when they call a press conference on CC, they announce that they have some images they will provide to the TV channels (e.g. info-graphics or simulations), because they know this is important. Therefore, from the very sources, the characteristics that a TV story must have are considered to be settled.

Assistant news director at Cuatro, Juan Luis Fuentecilla, explained that there are not many ways to obtain original images related to CC and, therefore, most of them come from news agencies, which provide the same shots to all the channels. Fuentecilla thinks that, in many cases, agencies get the images from ecological associations, scientific institutions or are purchased by the agencies from some TV broadcasters (e.g. the BBC).

The interviews with news producers and reporters confirmed that the Spanish channels did not send any staff reporters or correspondents to the Montreal or Durban summits, and they covered both events using images provided by international news agencies.

News producers agree that CC is mainly covered using archive material, with the exception of climate summits. Fernando Sanz, section head at Telecinco and Cuatro, states that the use of archive images diminishes the interest of the stories:

When CC began to be a frequent topic of conversation, we showed images of the poles, bears, images from satellites and they were something new, which helped to tell the stories. But this is not the case when it is always the same message and the same images.

According to the interviewees, most of the archive images that the channels can access that could potentially be connected to CC are related to ice melting, chimneys and traffic.

In addition, they appreciate particularly those images that allow for a visual comparison of the situation in specific places over time. Some of the interviewed producers were particularly interested in this role of the images. Assistant news director at Cuatro, Juan Luis Fuentecilla, said that a story on CC is more likely to be selected when a comparative video is included: 'A story is likely to get more time if it has some new or a high impact images; or when it allows viewers to make a comparison, for example a satellite image of a region five years ago and today.'

Antena 3 news producer Alejandro Dueñas explained that they used a comparative video, provided by Greenpeace, showing what the Spanish coast will look like in the future, as an opening story in 2007: 'because it had a powerful headline, with information of high impact and influence in daily life and expectations of the audience in the country, and it had a spectacular display.'

5. Discussion

Hypothesis 1

Compared to other topics, CC was a marginal topic for TV news in Spain in 2005–06. The most outstanding topics in that year were sports (20.13% of the total broadcast time), disasters and accidents (9.6%), and government-related stories (6.68%). In 2005–06, stories about the environment accounted for 1.45% (Fernández del Moral et al., 2008), and CC stories represented only 0.17% of the broadcast time (2927 seconds). As we explained earlier, the amount of coverage about CC on

Spanish TV news has decreased from 2005–06 to 2011 (from 38 to 23 items). Therefore, we can assume that CC is also a marginal topic in 2011 compared to other topics, although further research is needed to confirm this point.

News producers link this lack of interest to several factors, one of them being the scarcity of images. Comparing the results of 2005–06 and 2011, our research indicates that the shortage of coverage is related to a decrease in images produced internally and an increase in the use of archive material. This data show that scarcity of ‘fresh’ images may be a relevant factor that explains the amount of coverage of CC on television.

On the other hand, the symbolic value of some images, as well as the need to compare images to show the impact of the climate along a time sequence, illustrate how difficult it is to portray an ‘invisible’ topic with delayed consequences. Not surprisingly, the most frequent symbolic image is that of chimneys, which is related to the causes of CC.

Hypothesis 2

Spectacular images – especially those of impacts – predominate in the representation of CC in Spanish TV news. News producers and reporters agree on the visual value of the consequences of CC. They specifically point to the news interest of simulations or comparative images showing changes in places that the viewers can identify.

Ice and polar bears are still icons of CC. However, it can be stated that there are no local icons, because it is not possible to identify one or more images that are used as repeated references to CC in Spain. Although some of the effects are well known (e.g. the drawback of glaciers in the Pyrenees), producers think these impacts are not visually attractive enough. On the contrary, other images of visual impact, such as extreme weather phenomena, are frequently shown but they are not associated to CC,⁷ though some stories on CC do use images of extreme weather.

Hypothesis 3

Images portraying renewable energy production or energy-saving actions are not frequently used to illustrate solutions to CC. As we have seen, political negotiations are the most frequent category, likely because climate summits are extensively covered. Therefore, CC is mainly illustrated with images of ice melting in the poles and those related to international negotiations, which Spanish viewers may regard as remote realities. However, news producers and reporters do not think of images about domestic energy-saving actions as possible illustrations for CC. Although they are interested in energy consumption, usually they do not link this topic to CC.

6. Conclusion

CC is a marginal subject for TV news, compared to other topics. Images on CC are a scarce commodity, because the most evident consequences and related international events take place in remote places, and therefore they are not easy to access for the Spanish channels.

As a result, TV news media often cover CC with images produced by external sources, which do not satisfy the traditional appetite for recent ‘fresh’ material; and this topic is often covered with archive images, which news producers regard as less attractive for the viewer. Therefore, the shortage of recent attractive images is one possible explanation for why CC is not covered more extensively on TV news.

Although 'image value' can influence 'news value', the assessment of the specific weight of the images in the news selection process would require further research. Future research could work to understand the relationship between the frequency of coverage of a topic and the use of archive images.

Images of the impact of CC are more frequent than those of causes (twice as frequent), because they provide a better visual representation. As CC is a relatively 'invisible' topic, images with a symbolic role are often used. Among the most frequently used images, polar ice melting and polar bears can still be considered as icons of CC, although they only represent 17.22% of the total shots used. This indicates that CC is covered with diversified array of images, including, among others, climate summits, protests and pollution evidences.

Compared to what previous studies show, the coverage of CC on TV seems to have experienced an evolution, as TV news appears to have put images of extreme weather phenomena aside. Extreme weather is not portrayed very often in connection to CC, although it could provide interesting images. This fact can be interpreted as a signal of quality in the coverage. Generally speaking, TV news outlets avoid sensationalism when covering CC, given that, according to scientists, it is difficult to establish a clear causal relationship between CC and a specific extreme weather phenomenon. In addition, images used to compare past and present situations have become more relevant.

Images tend to represent CC as a remote process for the viewer. Prevailing images come from faraway places (mainly the Arctic and the Antarctic), or tend to portray CC outside the reach of individual action (e.g. international summits or industrial chimneys). This may convey the idea that CC mitigation or adaptation is something that is not connected to citizen's daily life and personal behaviour.

Images about energetic consumption in a household environment, which may help to situate CC within the sphere of individual action, represent a very small percentage (0.9%). Therefore, viewers do not receive any visual information about what they could do to reduce greenhouse gas emissions.

In sum, the way climate change is represented in Spain's television news shows that the role of images as facilitators of people's understanding of science must not be taken for granted, because production routines and journalistic values can play a relevant role in the process of representation.

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Notes

1. In 2007 the Intergovernmental Panel on Climate Change (IPCC) of the United Nations stated that the average temperature of Earth has increased by 0.74 °C in the last century, and this increase is 'very probably' due to the 'greenhouse gas' emissions, due to human activities (IPCC, 2007).
2. In the first half of the 1990s, CC was associated to graphics, tables and maps, as well as to extreme meteorological processes. As the action of many stakeholders has progressed, images of politicians and activists have become more frequent. At the end of the 1990s, images of the early scientific evidence appeared; in particular, ice melting in the poles. Since then, the image of polar bears on drifting blocks of ice has become one of the icons of CC.
3. They concluded that about two-thirds of the articles included some graphic illustration and those showing immediate effects, like ice melting and flooding, predominated. In the final years of their study, images about effects in the UK were more frequent.
4. Palm trees (representing a warmer climate) and glaciers were dominant in previous decades, but as time progressed, images of extreme meteorological phenomena have become more frequent.

5. The 2005–06 sample was recorded for a previous study on television news content (Fernández del Moral et al., 2008). The sampling weeks in 2011 were selected mainly for operational reasons, derived from the convenience of recording the broadcasts. However in December 2011, the selected week deliberately included the Durban summit (COP 17) because of the importance of summits for the coverage of CC. La Sexta was recorded only in 2011, because it didn't begin to broadcast until February 2006.
6. The interviewees were: Iñigo Herraiz, news producer of La 2 Noticias; Alejandro Dueñas, news producer of Antena 3 Noticias; José Luis Fuentecilla, of Noticias Cuatro (news producer from 2005 to 2007 and currently assistant news director); Fernando Sanz (section head at Telecinco and Cuatro); Rafa Lobo (reporter of La 2 Noticias); and Irene Fernández (reporter of Noticias Cuatro).
7. Stories about hurricanes or floods are not included in our sample because they do not mention the search words we used for sample selection.

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Author biographies

Bienvenido León, PhD, is Associate Professor of science journalism and television production at the School of Communication of the University of Navarra, Spain. He is the founding director of the Research Group on Science Communication of this institution.

M^a Carmen Erviti, PhD, is Assistant Professor of written communication at the School of Management Assistants of the University of Navarra, Spain. She is a member of the Research Group on Science Communication of this university.