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Analysis

Metaphor as a mechanism of global climate change governance: A study of international policies, 1992–2012

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ABSTRACT

This paper explores the emergence of a global climate change mitigation regime through an analysis of the language employed in international science-policy reports. We assume that a global climate regime can only operate effectively on the basis of a shared understanding of climate change which is itself based on a shared language of governance. We therefore carried out an in-depth thematic and metaphor analysis of 63 policy documents published between 1992 and 2012. Results show that global climate science-policy discourses universalise the myriad impacts of a changing climate into a single dichotomous impacted/not-impacted scenario and aim to govern this world according to economic principles of cost–benefit analysis. These discourses use metaphors that draw on narrative structures prevalent in the wider culture to produce and legitimate a reductionist representation of climate change. This representation undermines public understanding of and engagement with climate change by marginalising subordinate policy framings which do not align with the prevailing dichotomous framing. The types of documents we analyse in this paper represent important sources for journalists reporting on climate change. We therefore suggest that any attempt to improve public communication of climate change should include revisions to these organisational discourses.

1. Introduction

There is a growing sense that attempts at building an effective international governance regime for climate change are running out of steam (Conca, 2012; Geden, 2013; Jordan et al., 2013; Luers and Sklar, 2013). A lack of public support for emission reduction policies is one of the reasons given for this policy failure (Pidgeon and Fischhoff, 2011; Whitmarsh et al., 2013). This lack of support has been attributed in part to problems in the way climate change science is communicated (Pidgeon and Fischhoff, 2011; Carvalho and Peterson, 2012).

Despite a proliferation in media channels, the mainstream news media remains the primary source of information about climate change for the public (Painter, 2013). Mainstream news media reporting on climate change tilts towards powerful elite sources which provide a predominantly establishment view of the world (Mautner, 2008: 33). In this paper we therefore turn our attention to some of these 'powerful elite sources'. Our analysis examines the themes, metaphors and analogies in influential climate policy-science reports from many of the most prominent international climate governance institutions. We focus on the period 1992 to 2012.

Some researchers, such as Gupta and Dahan, have analysed shifts in climate change policies over time (Gupta, 2010; Dahan, 2013), but no attempt has yet been made to map the emergence of themes and metaphors in the attendant policy discourses over such a period. Two summits held at Rio de Janeiro were important landmarks in policy debates about climate change, and bookmark the time period covered in this analysis: the 1992 United Nations Conference on Environment and Development (UNCED), also known as the Rio Summit, Rio Conference, and Earth Summit and the 2012 United Nations Conference on Sustainable Development, also commonly called Rio+20 or Rio Earth Summit 2012 (see Hellsten et al., in press).

It has been argued that all governance is multi-actor (Newell et al., 2012), which is to say that policy emerges out of a decentralised interactions between a range of organisations, rather than just being the product of centralised decision-making within government (Stevenson and Dryzek, 2012). Hence one could justify an analysis towards a number of different documentary sources on the basis that to focus on government policy documents would be to ignore important contributions from non-state agencies (NSAs). However, corporate actors aside, research into governance has concluded that NSAs in fact often have only limited influence on policy development (Newell et al., 2012; Davies, 2011). Davies explains how governance and network theories often fail to recognise the extent to which power relations between public and private, structure and agency is exercised through a range of centralised

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institutions. Coordination and maintaining coherence across these different governance mechanisms require shared discourses (including metaphors), or engagement across different discourses (Davies, 2011).

In the light of this debate we have chosen to focus on reports from prominent international organisations involved in the building of a climate governance regime because although they may not govern entire policy fields on their own, international organisations often set and implement key rules within them; create, channel, and disseminate knowledge; shape dominant discourses; frame problems and solutions; influence negotiations through their ideas and expertise; and oversee the implementation of projects on the ground (Newell et al., 2012: 96). This grants them an important, and often underestimated, degree of autonomy and power to shape outcomes (Newell et al., 2012). In the final reckoning, policies are ideas about how the world should be, and "ideas do not exist apart from language" (Marx, 1953, cited in Prawer, 2011: 272). Because the sources we analyse are important sources for journalists, they have the power to define the language used to describe possible responses to climate change within the public sphere.

The wide attention paid to the Stern report on the economics of climate change (Stern, 2006) and the ensuing discussions about the relative financial costs of mitigation versus unmitigated climate change highlight just how central economic frames are to discussion of climate policy. We argue that there is nothing intrinsic to anthropogenic changes in the chemical composition of the atmosphere which demands that decisions about whether and how to respond should be made solely through economic frames. Rather, we suggest that focusing attention on climate change as an economic problem is a conscious political act, performed primarily through language.

This is not to deny the relevance of economics to climate policy making, but it has been argued that justice and ethics (e.g. Vanderheiden, 2008) and democratic decision-making principles (Machin, 2013; Carvalho and Peterson, 2012) are equally important frames for governance of climate change. Suggesting that climate change is primarily an economic problem reduces the policy space for these alternative framings and the resultant marginalisation of these less expert, technical frames undermines efforts being made elsewhere to build strong positive public engagement (Machin, 2013; Carvalho and Peterson, 2012).

Given the importance attributed to the communication of climate change, we suggest a better understanding of how institutional narratives are shaping downstream framings of climate change can offer guidance as to where in the communication process interventions should be directed. The cultural circuits model provides a longitudinal analysis of how environmental discourses evolve as they are received and re-communicated through the cultural filters of producers and consumers (Carvalho and Burgess, 2005: 1460). The model identifies media professionals as the producers of environmental discourses; "groups of media professionals…produce stories from source materials which will define the days news" (Carvalho and Burgess, 2005). These media professionals produce texts, in line with linguistic, visual and genre norms which help define the public sphere (Carvalho and Burgess, 2005: 1458). Our interest is in elucidating what sorts of stories are told by the source materials which journalists use, and what discursive resources are used to tell those stories.

In the next section we briefly examine some interpretations of how and why public climate narratives have changed in the last twenty or so years. Our results will be compared against these timelines, to identify whether the shifts in the public sphere are apparent in the science-policy documents we analyse. We do not attempt to prove causality if the changes in framings of climate change coincide.

2. Conceptual Background

2.1. The Emergence of Market Mechanisms in Climate Change Narratives

Levy and Spicer (2013) highlight the role of competing imaginaries in shaping climate policy. Imaginaries provide a shared sense of meaning, coherence and orientation around highly complex issues. They are closely linked to the ways in which institutions and economic activity are organised and structured, and the ways people think they ought to be organised and structured (Levy and Spicer, 2013: 660). Levy and Spicer analyse how different groups of actors – NGOs, business and state agencies – have employed these imaginaries at different stages in the history of climate policy negotiations. The authors propose three distinct phases in the history of climate politics since 1990. 1990–1998, the 'Carbon Wars', was a period when incumbent powerful fossil fuel regimes, against rising concerns about climate change, worked to keep climate change off the policy agenda. 1998–2008 was a period of 'Carbon Compromise' when the inevitability of carbon regulation was accepted. Since 2009 we have been in a period of 'Climate Impasse' (Levy and Spicer, 2013: 660).

Kotekyo, in identifying the adoption of the Kyoto Protocol in 2005 as a key driver for "corporate strategic change" (2012: 25) also recognises 1998 as a year heralding broad acceptance of carbon regulation. Both Koteyko (2012) and Liverman (2011) see the adoption of the Kyoto Protocol (together with the launch of the EU Emissions Trading Scheme), which put the idea of carbon trading at the centre of global mitigation strategies, as the date at which discourses of market environmentalism started to come to the fore. Rogers argues that 2006 was a pivotal year in climate politics, when "global warming was acknowledged by the last, very powerful, hold outs" (2010: 3).

According to Liverman's study of international climate policy, the period up to 2008 saw three key narratives which emerge in the public discourse: that 'dangerous climate change' is to be avoided; that the responsibility for climate change is 'common but differentiated'; and the neoliberal claim that the market, in the form of carbon trading, is the best way to deal with the issue (Liverman, 2009: 295).

These different, but sometimes overlapping histories will provide a reference which will guide analysis of the documents. Do the discourses emerging from these documents change in ways which reflect these timelines? After outlining why we think metaphors have an important role to play in climate discourse and policy we then explain how we selected the documents analysed and the methods we employed to identify and categorise the metaphors and themes which constitute the data for our analysis. In the results section we bring some coherence to this data through a discursive account of the patterns emerging from the distribution of these metaphors through time and across the different documents. The discussion conceptualises these patterns within a broad historical and social context.

2.2. The Role of Metaphor in Climate Policy Narratives

Discourse has many meanings (Stevenson and Dryzek, 2012) but, given the focus of our analysis, we work with discourse as a political strategy (Wodak, 2008: 1). It is assumed the narratives we are analysing are strategic, and intended to serve political ends (Hampton, 2009). We wish to understand how economic frames are deployed in these documents, and what themes and metaphors are used to build those frames.

Though metaphors have been "largely neglected in mainstream critical discourse analysis" (Hart, 2008: 96), cognitive linguists have shown that metaphors are important to thinking and acting in the world, including political acting (Lakoff and Johnson, 1980). They can enable as well as constrain the ways we think about policy issues, especially with regard to largely abstract, complex and seemingly intractable problems like climate change. Whilst Lakoff and Johnson wrote about what they called 'conceptual metaphors' that map the concrete onto the abstract and the familiar onto the unfamiliar and thus create new knowledge and potential for action, the policy analyst Donald Schön wrote about 'generative metaphors', that is to say, ways of seeing something as something else by carrying over knowledge from one domain of experience to another (see Schön, 1993[1979]: 137); for example seeing a slum as a blight or an ecosystem calls for different policy actions. He argued that such metaphors derive their "normative force from

certain purposes and values, certain normative images, which have long been powerful in our culture". Many of these metaphors are tacit, go unnoticed and are difficult to detect. In this article we want to reveal some of most potent metaphors that shape international climate policies and therefore may have economic impacts. However, we are fully aware that some of the metaphors we have collected might not be classified as such by other researchers.

Metaphors have an especially important role to play in anchoring novel phenomena in familiar and shared ideas (and hence language and culture). Anchoring describes the means by which people come to understand an unfamiliar event. People can only make sense of the world by finding ways to reconcile their beliefs with some set of facts about how reality must operate (e.g. Schön and Rein, 1994). To anchor an object is to fit it into an existing system of classifications, is to name it and relate it to other objects in the system (Wells, 1987: 443). Hence anchors allow groups to make sense of novel risks by classifying and naming the threat, making the unfamiliar familiar (Washer and Joffe, 2006: 2143).

Metaphors, in providing an alternative framing for novel and abstract phenomena, are powerful anchoring devices. As such they serve to constrain the discourse (van der Sluijs et al., 1998) by framing a topic in such a way as to privilege particular understandings of a problem over other possible interpretations (Nerlich and Koteyko, 2009).

Schön was perhaps the first to highlight the importance of metaphors in policy making in the 1970s. About three decades later Schlesinger and Lau (2000) studied the use of policy metaphors in political judgement. More recently, Thibodeau and Boroditsy (2011) found that even the subtlest instantiation of a metaphor (via a single word) can have a powerful influence over how people attempt to solve social problems like crime and how they gather information to make 'well-informed' decisions. Interestingly, they also found that the influence of the metaphorical framing effect is covert: people do not recognise metaphors as influential in their decisions; instead they point to more 'substantive' (often numerical) information as the motivation for their problem-solving decision.

3. Sourcing the Documents

We analysed documents from nine institutions (Table 1). Analysing documents from different sources helps us to understand how texts combine to create a particular discourse. The document selection followed some clear principles. Firstly, they had to be international in scope. Secondly, the documents had to come from organisations which were publishing regularly on this topic over the period concerned, to allow for a chronological comparison of the texts (except for the 2009 Copenhagen Communiqué, which addressed themes common throughout the period of study, but used a particular event to amplify those themes). However not all texts were published annually (for example the German Advisory Council reports), nor did the search terms identify appropriate documents for each organisation in every year of analysis. G7/G8 reports did not always contain reference to climate change if it wasn't a feature of discussions in that year. Thirdly, the sources had to be of some significance in the climate mitigation debate, to be sufficiently authoritative to be reasonably considered as shaping and framing downstream climate policy discourses. Relevant documents were identified either by citation tracking, Google searches, or searches within the websites of the relevant institution. The search terms employed were a combination of the year of interest, the institution of interest (or searching by year within the search fields of the institutional website) or the year and institution within Google or the year, institution and either the term 'climate change' or 'global warming.' We drew on existing familiarity with the international climate policy landscape to guide the search. On the basis of these criteria the following organisations were identified as producing publications of relevance to the project objectives: OECD (Organisation for Economic Co-operation and Development), IPCC (Intergovernmental Panel on Climate Change), UNFCCC (United Nations Framework Convention on Climate Change), IEA (Institute of Economic Affairs), EU (European Union), UNEP (United Nations Environment Programme) and G8 (Group of Eight). Additionally, the sources had to be accessible which, when going back to 1992, was not always straightforward (for example, a key OECD document from 1995 was only available following a request to the OECD directly for a copy).

4. Analysis

4.1. Documents Analysed

The document search brought back 63 documents for analysis (Table 1). We did not identify any documents from before 1992. The distribution in Table 1 reflects, broadly, the years in which these organisations published reports solely or largely about climate mitigation policy. This is not an exhaustive list; other organisations could have been researched and other reports discussing climate change from these organisations found. Nonetheless, the number of reports, and years covered, will provide data which can reasonably be assumed to be representative of the whole.

4.2. Methods

The 63 policy documents were analysed using qualitative thematic analysis as described by Braun and Clarke (2006) in conjunction with metaphor analysis. In order to identify themes and metaphors, we read all the articles in the two corpora and extracted keywords themes and candidate metaphors, in the case of metaphors referring to whole linguistic expressions that are metaphorically used. When deciding whether a word/expression had been used metaphorically we considered whether it has a more basic, concrete meaning in other contexts (Pragglejaz Group, 2007) and whether it opened up, in Schön's term, a new perspective on the world, generated new ways of seeing. We adopted the Pragglejaz principles or metaphor identification relatively loosely, focusing on policy-relevant metaphors or generative metaphors in Schön's terms rather than pervasive conceptual metaphors, such as the use of the spatial preposition 'under' in utterances such as "He was

Table 1
Documents analysed.

Organisation	Number of documents	Year of publication
European Union/European Commission	13	1992, 1993, 1995, 2001, 2003, 2004, 2005, 2006, 2007, 2008, 2010, 2011, 2012.
UNFCCC (United Nations Framework Convention on Climate Change)	12	1992, 1995, 1996, 1998, 1999, 2000, 2001, 2002, 2004, 2005, 2009, 2010.
OECD (The Organisation for Economic Co-operation and Development)	9	1992, 1993, 1995, 1996, 1997, 2000, 2004, 2007, 2011.
G7/G8 (Group of 7/Group of 8)	8	1993, 1995, 2001, 2004, 2005, 2008, 2009, 2012.
IPCC (Intergovernmental Panel on Climate Change)	7	1992, 1995, 1999, 2001, 2004, 2007, 2011.
UNEP (United Nations Environment Programme)	6	1997, 2001, 2002, 2003, 2006, 2012.
IEA (International Energy Agency)	5	2000, 2004, 2006, 2008, 2010.
German Advisory Council on Global Change	3	1995, 1997, 2003.
Copenhagen communiqué	1	2009.
Total	63	

under her influence". We carry out metaphor analysis as part of discourse analysis rather than cognitive or conceptual analysis (Cameron et al., 2009).

We systematically extracted sections containing keywords indicating candidate themes and metaphors from each policy document and entered them into a spreadsheet the rows of which represented the policy documents and the columns recorded the instances of different candidate themes and metaphors. Candidate metaphorical expressions were compared between the researchers and ordered into groups and patterns until consensus was achieved.

As readers will see, the distinction between overarching themes and key metaphors is not an easy one to make and we believe that they in fact strongly interact and what is a metaphor for one reader may be theme for another. However, we are certain that both together are implicated in generating new ways of seeing, speaking and acting and need to be monitored and discussed. They should not remain tacit, as the form the discursive background if not bedrock against which or on which climate change policies are made.

To give some examples: We coded 'rebound effect' as a metaphor, as the phrase was originally used in medicine and is now being used in the context of earth science and global environmental change. A rebound effect is indeed defined as: "the effect that the lower costs of energy services, due to increased energy efficiency, has on consumer behaviour both individually and nationally. Put simply, the 'rebound' effect is the extent of the energy saving produced by an efficiency investment that is taken back by consumers in the form of higher consumption, either in the form of more hours of use or a higher quality of energy service" (Herring, 2008). There is, as one can see, an awful lot of information encapsulated in these two words or in this one metaphor. By contrast, we listed 'sustainability' as pervasive theme, as it has established, albeit conflicting, meanings in terms of continued economic growth and using methods that do not harm the environment (Herring, 2008).

In the following table no weighting is given to frequency of key themes and metaphors in the results. The presence of a theme or metaphor in the right hand column indicates the term appeared at least once in one of the documents analysed for the year concerned. Metaphors are highlighted in bold (Table 2).

Table 2
Themes and metaphors.

1992	**Sinks** and **reservoirs**. Stabilisation. Precautionary. Sustainable economic development. **Energy security**. **Fight** global warming. **Market mechanisms**. Natural **balance**. Heat **sink**. Carbon **sinks**. **Business as usual**. **Greenhouse**.
1993	**Remedial** action. Costs and benefits. Earth's **energy budget** disturbed.
1995	**Tolerance window**. Admissible emission profiles. **Preservation of Creation**. Ecosphere is located in the centre of the **temperature window**. Sustainable development. **Sinks and reservoirs**. 'Parties may use global warming potentials to reflect their **inventories and projections** in carbon-dioxide-equivalent terms'. Costs and benefits of various intervention strategies. **Market signals**. Cause–effect relationship. **Carbon leakage**. No regrets policy. **Command and control policies**. **Sink enhancement**. '**Greening government**'. Environmentally responsible management. Environmental industries. Environment-economy integration. Balance two central roles — on the one hand job creation and greater business efficiency, and on the other hand the protection of the environment. Global competitiveness.
1996	Energy efficiency. Sustainable and environmentally sound renewable energy sources. A need to make 'man, the environment and the economy inseparable'. **Global climate security**. **Keep the (climate policy) machine turning productively**. Environmentally sound technologies. **Greening of world markets**.
1997	Sustainable. **Sinks and reservoirs**. Energy efficiency. Renewable energy. Sequestration. Innovative environmentally sound technologies. Market imperfections. **Crash barriers**. **A human fingerprint**. Business as usual. **Syndromes**. **Climate window**.
1998	Sustainable. **Sinks and reservoirs**. Energy efficiency. Renewable energy. Sequestration. Innovative environmentally sound technologies. **Market imperfections**.
1999	**Sources and sinks**
2000	Costs and benefits. **Leakage** of carbon emissions. Sustainable development. **Sinks**. **Energy Security**. 'Aggressive global co-ordination to **combat** climate change'.
2001	Sustainable development. Cost–benefit. **Sources and sinks**. Capacity building. Business as usual. Environmentally sound technologies.
2002	Sustainability. Developed. Developing. **Sources and sinks**.
2003	**Climate window**. **Carbon stocks**. Cost–benefit analysis. **Guard rail**. **Runaway greenhouse effect**. **Carbon cycle**. Positive feedback. Contraction and convergence. Dangerous limit.
2004	**Tackle** climate change. Dangerous limit. **Combating** climate change. Sustainable development. Business as usual. **Breakthrough technologies**. **Combat** climate change. System level. Non-linear. **Thresholds**. Causal chain. **Cascade** of uncertainty. Fuzzy boundaries. Feedbacks. Cycles. **The high-impact-low-probability tail**. Global **fight** against climate change. Win–win. **The clock is ticking**. **Attacking** climate change. No regrets. Climate friendly.
2005	**Sources and sinks**. Environmentally sound technologies. Sustainable development. **Energy security**. **Clean energy**. **Carbon pools**. **Combat** climate change.
2006	**Nature's early warning systems**. Managing our planetary habitat. **Energy security**. **Clean energy**. Non-linear responses. Climate surprises. Deep uncertainties. **Thresholds**.
2007	Transition. **Energy security**. 'First mover' advantage. **Mainstreaming climate change**. **Global low carbon economy**. Global community. **Climate proofing**.
2008	**Low carbon economy**. **Combat** climate change. **Energy security. Low carbon society**. Sustainable economic development. **Low carbon technologies**. **Clean Energy**. **Stabilisation**. **Carbon leakage**. **Carbon sinks**. **Carbon markets**.
2009	Sustainable growth. Green. Stable, balanced and sustainable growth. **Green recovery**. **Energy security**. **Low carbon societies**. Fighting climate change. Combat climate change. Common values.
2010	Feedback effects. No regret measures. Sustainable development. Environmentally sound technologies. **'Cradle to grave' emissions**. **Rebound effects**. **Energy security**. **Low carbon technologies**. **Clean energy** sources.
2011	**Anthropocene**. Sustainable transport. **Clean energy**. Sustainable development. Rebound effect. **Energy security**. Business as usual. **Tipping points**. Burden sharing. Stringent target. **Pandora's Box**. **Green growth**.
2012	Transition. Sustainability targets. Climate change community. Stabilise.

5. Results

5.1. What Are the Dominant Themes and Metaphors?

The overarching and consistent discourse constructed by these themes and metaphors is one which reduces climate change to a dichotomous issue. This binary representation of the world has important implications for climate policy, because it represents what it is possible for climate policy to achieve. Climate policy imagined in these documents draws on the idea of a clear division between an impacted and non-impacted world. This division between impacted and non-impacted has been displaced on to the two degree 'dangerous limit', and marginalises discussion of impacts which may manifest prior to this level of warming. This dichotomous discourse is constructed in terms of themes and metaphors such as 'thresholds', 'guard rails', 'tipping points', 'positive feedbacks' 'feedback effects' 'non-linear change' 'crash barriers' and 'runaway greenhouse effects'. The terms 'stabilisation' and 'natural balance' refer to a background set of non-impacted climate conditions which pose no threat to the continuance of existing social and economic activity. Balance is a recurrent theme in these documents. 'Sources and sinks' and 'sources and reservoirs' reinforce the importance of balance, and the prominence of the 'sources' and 'sinks' metaphors remind us of Douglas' cultural analysis of environmental politics, wherein pollution is matter out of place (1966). Climate change hence results from carbon being in the wrong place because of human interference in this movement from source to sink and back again, a symptom of the 'Earth's energy budget being disturbed.'

Talk of 'budgets' inevitably bring economic frames to mind. 'Sustainable development' is the form of economic activity which will allow for 'business as usual' whilst preventing the Earth crossing the threshold into an impacted state. This new era of sustainable

economic development connects with another key dichotomy in climate discourse, 'cost–benefit'. A proper negotiation of these 'cost–benefit' calculations will be necessary for 'stable, balanced and sustainable growth.' The 'low carbon societies', 'low carbon economies' and 'low carbon technologies' which constitute sustainable development suggest the dominant imaginary is one where nothing in the world has changed except the amount of carbon emitted by the activities which define late neo-liberal patterns of economic activity.

The dichotomy articulated through these themes and metaphors invokes images of the climate system as a ledger, and the double entry book keeping method of accountancy. The most obvious discourse metaphor that draws from the ledger metaphor is that of cost–benefit. Double entry book-keeping demands every entry to an account be matched with a corresponding and opposite entry to a different account. Costs can only be justified if there is a corresponding benefit which can be compared in the same units of analysis. Sinks and sources again suggest the proper state of affairs is for carbon leaving a source to be matched with carbon entering a sink, or reservoir.

The sustainable development theme is connected to the idea of a painless 'transition' to low carbon world free of climate impacts. This imaginary contrasts with the stark dichotomy of an 'aggressive global coordination' using 'command and control policies' to support efforts at 'fighting', 'combatting', and 'attacking' climate change. Such responses were required in the face of 'Earth's early warning systems'. These war-like metaphors were contrasted with 'global climate security' and 'energy security'.

5.2. What Changes?

The binary nature of the discourses identified above is constant over the time period of this analysis. But do the subjects of these discourses themselves change? Are there other uses of metaphor apparent? Though this is not a content analysis, there is a trend apparent from 2005 onwards for increasing, and related, use of 'energy' and 'carbon' metaphors (Nerlich and Koteyko, 2009; Koteyko et al., 2010). 'Clean energy' first appears in 2005 (the Kyoto Protocol and the EU's Emissions Trading Scheme), alongside terms such as 'green growth'. 'Transitions' makes an appearance in this period. Carbon leakage, carbon markets, low carbon societies, low carbon economies and low carbon technologies are only present in this latter period. Alongside themes and metaphors from this latter period such as 'first-mover advantage', 'cradle to grave emissions' and 'mainstreaming climate change' there is a very strong sense that climate change mitigation is no longer in opposition to the imperative of economic growth, but instead is becoming a driver of growth and a source of competitive advantage. This 'climate friendly' society does not require a revolution, but can be achieved through transition. The issues are no longer existential, but technical, requiring a better understanding of novel policy risks such as 'rebound effects' and 'carbon leakage'. This image of 'leakage' also evokes certain simple actions that can be used to deal with it — climate change becomes a plumbing problem, a problem of technology and money (economy).

To some extent this change reflects the period of 'carbon compromise' running up to 2008 identified by Spencer and Levy, though the move from carbon wars to carbon compromise and carbon compromise to carbon impasse are not so evident. The acceptance of carbon regulation leads to a focus on the control of carbon, a desire to identify leakage and the nature of rebound effects. Clean energy, rather than reference to using less energy, indicates that such regulation will have to take place within a paradigm of continued increases in energy use. The regulation is therefore to be directed to finding how to overturn the historic correlation between GDP and increased emissions. Within this latter period the years 2005–2007, with the adoption of the Kyoto protocol in 2005, the release of the Stern report (2006) and the publication of the fourth IPCC report (2007), offer a much clearer division in the discourses than the 1998–2008 framework. 2005 is the first year the phrase 'clean energy' appears and it appears almost every year thereafter and 2007 is the year that the idea of a low carbon economy first appears. Apart from a mention of a 'green recovery' in 2009 there is no strong sense of a shift in the discourses following the financial crash of 2008 and the 2009 'climategate' affair (Nerlich, 2010). In a sense, the shift in 2005–2007 had already reframed the climate mitigation discourse in line with the demands of GDP growth. Nerlich and Jaspal also note that the language we use to make sense of climate change – language, metaphors, policies, beliefs – respond both rapidly and slowly to the new financial and economic mood (Hulme, 2008a, cited in Nerlich and Jaspal, 2012). An analysis of documents up to 2014 might demonstrate a more noticeable change in the language used.

Koteyko (2012) examined the role of so-called 'carbon compounds' (linguistic combinations of the word carbon with other words) in online discussions of climate mitigation policy and found carbon compounds exploded onto the scene of climate change discourse in around 2004. Examples of carbon compounds identified by Koteyko include phrases such as 'carbon offset', 'carbon footprint', 'carbon trading' and 'carbon credit'. In her article on the spread of 'low carbon' metaphors in industry and trade press, Nerlich (2012) found that 'low carbon technologies', 'low carbon economies', 'low carbon futures' and so on began to be discussed in the early 2000s. The first carbon compound in our data occurs in 2005 with 'carbon pool'. It is not until 2008 that carbon compounds start to proliferate, with terms such as 'carbon leakage', 'carbon sinks' and 'carbon markets' appearing in the texts, indicating a gradual impact of 'market metaphors' (Cojanu, 2008) on policies. This seems to indicate that the high-level policy documents we analysed lagged a few years behind this explosion of and apparent enthusiasm for a carbon language in the media, advertising, as well as in NGOs and government agencies (Carbon Trust etc.).

6. Discussion

The first thing to note is that, as mentioned previously, these results are necessarily illustrative; other researchers analysing the role metaphors play in generating and sustaining particular understandings of climate change and climate policy may look to different documents and, depending on the research questions posed, identify different metaphors and themes. We do not believe that this undermines the validity of the methodologies and results presented in our analysis. Instead, the possibility of alternative results from other metaphor analyses quite correctly demonstrates and reflects the indeterminate and to some extent unbounded nature of the climate change problem. However, it is important to recognise the methodology and analysis relies on interpretive reasoning. Whilst we understand that such an interpretive approach is uncommon within economics, the nature of the problem we are addressing means we align with the rationale provided by Wall in his exploration of the methodological issues facing constructionist accounts of environmental issues, where he claimed that what is sought is not certain and definitive social explanations but "recurring contingencies and causal tendencies which render some explanations more powerful, more saturated with meaning" (1999: 354).

Those points notwithstanding, our analysis has shown a dichotomous representation of the world is common to the metaphors across all these documents. Perhaps counterintuitively, these dichotomous discourses work to overcome the foundational dichotomy presented by climate science, that between environment and economy, climate versus growth (it is worth noting how this representation once again brings us back to the ledger master metaphor; a change in one side of the ledger must be matched with a corresponding change on the facing page). Attempts to transcend this dichotomy are inscribed into the initial policy responses to climate change. The primary document in global climate policy, the 1992 Framework Convention on Climate Change, recognised the environment/economy dichotomy, but proposed a dialectic of sustainable development which could transcend this tension. Hence the dichotomous metaphors in the global climate policy documents we analysed act to make climate change amenable to policy

intervention within existing economic and social norms. How is this achieved? Firstly, the type of problem that climate change is, and hence the type of responses which are appropriate, accords with the discourses which characterise the other discourses of high politics, which broadly deal with economics and foreign policy. Not only do these other discourses of high politics define what it is possible to imagine about the future, but they also provide the metaphors and concepts in which those aspirations can be framed. Therefore a form of intertextuality appears to be at work in reducing the world to a state of either impacted or not impacted, growth or recession, war or peace. The reduction of climate change to impacted/non-impacted, and the expression of this division through a single number (2 degrees centigrade of warming) validate and perform a targets approach. The danger lies on the other side of the 2 degree line, and hence climate policy becomes a fight against an external threat, the vanquishing of which will allow the world to return to the stable and balanced norm of late neo-liberal economics. This discourse has remained constant throughout the period of analysis, albeit with a tighter focus on carbon management in the latter phase.

These double-entry book-keeping frames are enacted most significantly in the emission governance mechanism of offsetting. Whether at the individual level, where the concerned citizen can pay to have some trees planted to soak up the carbon from their plane flight or at the international level through joint implementation mechanisms, the ability of the wealthiest actors to carry on with high carbon lifestyles draws its legitimacy from the offsetting frame. Without the facility for a nation, organisation or individual to balance the debit from their carbon budget with a credit earned from offsetting those emissions wealthy actors would find their freedom to enjoy a high carbon lifestyle increasingly difficult to justify.

There is a broader, mythical discourse which our analytical frame brings to the fore. Given that this binary division does not represent reality (climate impacts of varying degrees, at various times and at various places are already deemed to have begun (IPCC, 2014)) why divide the world into impacted and non-impacted? We have already talked of the need to anchor our understanding of novel risks in pre-existing concepts and narratives. The discourse of climate change as a threat to be fought in order to preserve the old order is the dominant narrative arc which populates popular culture and draws from the myths which have accompanied civilisation, perhaps even prior to the appearance of the written word. In these stories, the goal is always to return to what we can broadly, or often explicitly recognise, as a business as usual scenario. There are only two possibilities; the existing norms or something much worse. Our current pattern of social and economic activity is the very best we can hope for, and we must fight to maintain it. It is this dichotomy which lies at the root of these policy discourses. It is these framings which are reported on and which spread through the world in media reports and NGO campaigning materials. In reflecting the discourses of popular culture and other policy arenas, these discourses make themselves easily understood by the intended audience, and define the limits of what it is possible to do in response to climate change.

We suggest our analysis has important implications for climate change communication. If we accept these organisational discourses are an important journalistic source and therefore shape downstream climate change discourses (i.e. Demeritt, 2001: 322), then it is possible that the dichotomous construction of climate change performed by these discourses prevents positive public engagement by blocking the emergence of alternative subjectivities. The war metaphors make clear you are either with us or against us. For those who accept the findings of the climate science, there is no alternative to the binary impacted — non-impacted imaginary, wherein climate change becomes a problem at two degrees of warming (see Shaw, 2013 for a critical analysis of the two degree concept). All effort is to be directed at avoiding the passing of this threshold through the adoption of new technologies, harnessed through a marketisation of carbon. The existing metaphors give life to a particular narrative. Our analysis has shown the narrative is a very powerful one which draws on the mythical structure of stories which, in one form or another, prevail in our popular culture and political discourse. Nonetheless, other narratives are possible and people are story-telling creature. This suggests that there is nothing about climate change itself which makes a democratic, accessible debate impossible. The absence of different voices in the climate change debate is a political choice. What our research shows, which has not been apparent in other research on public communication of and engagement with climate policy, is that for those other stories to have any political traction it is not sufficient to work within only the public sphere. Alternative framings of our climate change futures must have organisational presence if they are to contribute to the building of effective mitigation policy.

What we have not been able to demonstrate is the extent to which the metaphors are deployed consciously and strategically. If it is possible to demonstrate such purposiveness at all, it would require in-depth interviews with the relevant actors and authors, assuming those actors would be willing to be involved in such research.

7. Conclusion

In his book *Metaphors for Environmental Sustainability* Larson (2011) points out that "[t]he way we speak about the natural world is not a transparent window, because it reflects the culture in which we live and its priorities and values" (p. ix). In this study we have shown how the metaphors used to talk about climate change in high-level policy documents reflect the culture and values of modern Western societies, in particular their economies. In our case the metaphors of the balance sheet seem to have been superimposed onto the older metaphor of the balance of nature.

Our analysis revealed a dichotomous representation of the world running through the majority of the themes and metaphors. The metaphors we identified were connected by an overarching discourse metaphor of double entry bookkeeping. Climate change policy discourses draw on historic constructions of environmental problems which assume two opposing value systems, a pristine nature versus economic growth. The world has two states under climate change, impacted and not impacted. Mitigation policies must be justified through a cost–benefit analysis. Climate change is a problem in the Earth's energy budget caused by carbon being out of place, as a result of misappropriation of carbon between sources and sinks. Climate change is other, an external threat to be fought before the world is impacted. This metaphor in itself draws from mythical narratives, of heroes fighting foes in order to protect the existing order. These narrative arcs are prevalent in popular culture and have a universal and timeless appeal (see Propp, 1971; Lakoff, 1991). Therefore, the manner in which climate policy discourses deploy metaphors present in these perennial narratives anchors climate change within familiar storylines. These discourses also construct climate change in a manner which makes it amenable to policy making. The constancy of this dichotomous metaphor over the twenty year time period and across the different documents suggests whatever changes in the public discourse or policy trajectory that have been identified in other research are not apparent in the discourses we identified in these documents. The discourse on climate change in the high-level policy documents we studied is overall a quite conservative one and one closed to change; it is not flexible, dynamic and open to different frames or different voices. At this policy level we can therefore not detect the competing imaginaries and the change in imaginaries that Levy and Spicer (2013) observed over time. Instead, what we see is one monolithic and static imaginary that makes climate change amenable to policy making which might however be more imaginary and mythical than real or realistic.

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References

Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. Qualitative Research in Psychology 3 (2), 77–101.

Cameron, L., Maslen, R., Todd, Z., Maule, J., Stratton, P., Stanley, N., 2009. The discourse dynamics approach to metaphor and metaphor-led discourse analysis. Metaphor Symb. 24 (2), 63–89.

Carvalho, A., Burgess, J., 2005. Cultural circuits of climate change in UK broadsheet newspapers, 1985–2003. Risk Anal. 25 (6), 1457–1469.

Carvalho, A., Peterson, T., 2012. Reinventing the political. In: Carvalho, A., Peterson, T. (Eds.), Climate Change Politics: Communication and Public Engagement. Cambria Press, Amherst, New York, pp. 1–28.

Cojanu, V., 2008. The 'market' metaphor and climate change: an epistemological application in the study of green economics. Int. J. Green Econ. 2 (3), 284–294.

Conca, K., 2012. The Rise of the Region in Global Environmental Politics. Glob. Environ. Polit. 12, 127–133.

Dahan, A., 2013. Historic overview of climate framing. Working Paper (HAL: halshs-00855311: http://halshs.archives-ouvertes.fr/halshs-00855311/ version 1, Accessed 13 September, 2013).

Davies, J., 2011. Challenging Governance Theory. From Networks to Hegemony. Policy Press, Bristol.

Demeritt, D., 2001. The construction of global warming and the politics of science. Ann. Assoc. Am. Geogr. 91 (2), 307–337.

Douglas, M., 1966. Purity and Danger. Routledge, London.

Geden, O., 2013. Modifying the 2 °C Target. Climate Policy Objectives in the Contested Terrain of Scientific Policy Advice, Political Preferences, and Rising Emissions. German Institute for International and Security Affairs, (http://www.swp-berlin.org/en/publications/swp-research-papers/swp-research-paper-detail/article/climate_modifying_the_2_c_target.html, Accessed 12th October, 2013).

Gupta, J., 2010. A history of international climate change policy. WIREs Clim. Chang. 1 (5), 636–653.

Hampton, G., 2009. Narrative policy analysis and the integration of public involvement in decision making. Policy Sci. 42, 227–242.

Hart, C., 2008. Critical discourse analysis and metaphor: toward a theoretical framework. Crit. Discourse Stud. 5 (2), 91–106.

Hellsten, I., Porter, A., Nerlich, B., 2014. Imagining the future at the global and national scale: a comparative study of British and Dutch Press coverage of Rio 1992 and Rio 2012. Environ. Commun. (in press) (Online first: http://dx.doi.org/10.1080/17524032.2014.911197).

Herring, H., 2008. Rebound effect. http://www.eoearth.org/view/article/155666/ (Accessed 21st October 2014).

IPCC, 2007. Climate change 2007: synthesis report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf, Accessed 18th November, 2013).

IPCC, 2014. Climate Change 2014 Synthesis Report. Summary for policymakers (http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_SPM.pdf, Accessed 9th November 2014).

Jordan, A., Rayner, T., Schroeder, H., et al., 2013. Going beyond two degrees? The risks and opportunities of alternative options. Clim. Pol. 13 (6), 751–769.

Koteyko, N., 2012. Managing carbon emissions: a discursive presentation of 'market-driven sustainability' in the British media. Lang. Commun. 32, 24–35.

Koteyko, N., Thelwall, M., Nerlich, B., 2010. From carbon markets to carbon morality: creative compounds as framing devices in online discourses on climate change mitigation. Sci. Commun. 32 (1), 25–54.

Lakoff, G., 1991. Metaphor and war: the metaphor system used to justify war in the Gulf. Manuscript. http://georgelakoff.files.wordpress.com/2011/04/metaphor-and-war-the-metaphor-system-used-to-justify-war-in-the-gulf-lakoff-1991.pdf (accessed 29 April, 2014).

Lakoff, G., Johnson, M., 1980. Metaphors We Live By. Chicago University Press, Chicago.

Larson, B., 2011. Metaphors for Environmental Sustainability: Redefining our Relationship With Nature. Yale University Press, New Haven.

Levy, D., Spicer, A., 2013. Contested imaginaries and the cultural political economy of climate change. Organization 20, 659–678.

Liverman, D.M., 2009. Conventions of climate change: constructions of danger and the dispossession of the atmosphere. J. Hist. Geogr. 35 (2), 279–295.

Liverman, D.M., 2011. Review symposium: why we disagree about climate change (Mike Hulme 2009). Prog. Hum. Geogr. 35, 134–136.

Luers, A.L., Sklar, L.S., 2013. The difficult, the dangerous, and the catastrophic: managing the spectrum of climate risks. Earth's Future 2. http://dx.doi.org/10.1002/2013EF000192.

Machin, A., 2013. Negotiating Climate Change: Radical Democracy and the Illusion of Consensus. Zed Books, London.

Marx, K., 1953. cited in Prawer, S.S. (2011). Karl Marx and World Literature. Verso, London.

Mautner, G., 2008. Analyzing newspapers, magazines and other print media. In: Wodak, R., Krzyzanowski, M. (Eds.), Qualitative Discourse Analysis in the Social Sciences. Palgrave Macmillan, Basingstoke, pp. 30–51.

Nerlich, B., 2010. 'Climategate': paradoxical metaphors and political paralysis. Environ. Values 14 (9), 419–442.

Nerlich, B., 2012. 'Low carbon' metals, markets and metaphors: the creation of economic expectations about climate change mitigation. Clim. Chang. 110 (1–2), 31–51.

Nerlich, B., Jaspal, Rusi, 2012. Metaphors we die by? Geoengineering, metaphors, and the argument from catastrophe. Metaphor Symb. 27 (2), 131–147.

Nerlich, B., Koteyko, N., 2009. Compounds, creativity and complexity in climate change communication: the case of 'carbon indulgences'. Glob. Environ. Chang. 19, 345–353.

Newell, P., Pattberg, P.H., Schroeder, H., 2012. Multi-actor governance and the environment. Annu. Rev. Environ. Resour. 37, 365–387.

Painter, J., 2013. Climate Change in the Media: Reporting Risk and Uncertainty. Reuters Institute for the Study of Journalism, Oxford.

Pidgeon, N.P., Fischhoff, B., 2011. The role of social and decision sciences in communicating uncertain climate risks. Nat. Clim. Chang. 1, 35–41 (April).

Pragglejaz Group, 2007. MIP: a method for identifying metaphorically used words in discourse. Metaphor Symb. 22 (1), 1–39.

Propp, V., 1971 [1928]. Fairy tale transformations, in: Matejka, L., Pomorska, K. (Eds. and transl), Readings in Russian Poetics. MIT Press, Cambridge, Mass., pp. 94–116.

Schön, D., 1993 [1979]. Generative metaphor: a perspective on problem-setting in social policy, in: Ortony, A. (Ed.) Metaphors and thought, second ed. Cambridge University Press, Cambridge, pp. 137–163.

Schlesinger, M., Lau, R.R., 2000. The meaning and measure of policy metaphors. Am. Polit. Sci. Rev. 94 (3), 611–626.

Schön, D., Rein, M., 1994. Frame Reflection: Toward the Resolution of Intractable Policy Controversies. Basic Books, New York.

Shaw, C., 2013. Choosing a dangerous limit for climate change: public representations of the decision making process. Glob. Environ. Chang. 23, 563–571.

Stern, N., 2006. Stern Review on the Economics of Climate Change. HM Treasury, (http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/sternreview_index.htm, Accessed 3rd April 2014).

Stevenson, H., Dryzek, J.S., 2012. The discursive democratization of global climate governance. Environ. Polit. 21 (2), 189–210.

Thibodeau, P.H., Boroditsy, L., 2011. Metaphors we think with: the role of metaphor in reasoning. PLoS One 6, e16782. http://dx.doi.org/10.1371/journal.pone.0016782.

van der Sluijs, J., van Eijndhoven, J., Shackley, S., Wynne, B., 1998. Anchoring devices in science for policy: the case of consensus around climate sensitivity. Soc. Stud. Sci. 28, 291–323.

Vanderheiden, S., 2008. Atmospheric Justice. A Political Theory of Climate Change. Oxford University Press, Oxford.

Wall, D., 1999. Earth First! And the Anti-roads Movement. Routledge, London.

Washer, P., Joffe, H., 2006. The "hospital superbug". Social representations of MRSA. Soc. Sci. Med. 63 (8), 2141–2152.

Wells, A., 1987. Social representations and the world of science. J. Theory Soc. Behav. 17 (4), 433–445.

Whitmarsh, L.E., O'Neill, S., Lorenzoni, I., 2013. Public engagement with climate change: what do we know and where do we go from here? Int. J. Media Cult. Polit. 9 (1), 7–25.

Wodak, R., 2008. Introduction: discourse studies — important concepts and terms. In: Wodak, R., Krzyzanowski, M. (Eds.), Qualitative Discourse Analysis in the Social Sciences. Palgrave Macmillan, Basingstoke, pp. 1–24.