Global Environmental Change 36 (2016) 89–100

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

Text-mining the signals of climate change doubt

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ARTICLE INFO

Article history:
Received 27 September 2015
Received in revised form 22 November 2015
Accepted 10 December 2015
Available online

Keywords:
Climate change
Scepticism
Text mining
Latent Dirichlet allocation

ABSTRACT

Climate scientists overwhelmingly agree that the Earth is getting warmer and that the rise in average global temperature is predominantly due to human activity. Yet a significant proportion of the American public, as well as a considerable number of legislators in the U.S. Congress, continue to reject the "consensus view." While the source of the disagreement is varied, one prominent explanation centres on the activities of a coordinated and well-funded countermovement of climate sceptics. This study contributes to the literature on organized climate scepticism by providing the first systematic overview of conservative think tank sceptical discourse in nearly 15 years. Specifically, we (1) compile the largest corpus of contrarian literature to date, collecting over 16,000 documents from 19 organizations over the period 1998–2013; (2) introduce a methodology to measure key themes in the corpus which scales to the substantial increase in content generated by conservative think tanks over the past decade; and (3) leverage this new methodology to shed light on the relative prevalence of science- and policy-related discussion among conservative think tanks. We find little support for the claim that "the era of science denial is over"—instead, discussion of climate science has generally increased over the sample period.

1. Introduction

Climate scientists overwhelmingly agree that the Earth is getting warmer and that the rise in average global temperature is predominantly due to human activity (IPCC, 2014; National Research Council, 2010; Oreskes, 2004; Doran and Zimmerman, 2009; Anderegg et al., 2010; Cook et al., 2013). Yet a sizeable segment of the American public rejects this "consensus view" (Weber and Stern, 2011) and U.S. climate policy remains in a state of limbo. As of early 2015, one-third of the American public believes that climate change is *not* primarily caused by human activity and only one in 10 understands that more than 90% of climate scientists agree on the existence and nature of observed global warming (Leiserowitz et al., 2015). What explains this divergence in views among climate scientists and the American public? What factors promote inaction on comprehensive climate change mitigation policy? These questions have garnered considerable attention in disciplines across the social and behavioural sciences.

One prominent explanation investigates the influence of a "well-funded and relatively coordinated 'denial machine'" in shaping the public's understanding of climate science (Begley et al., 2007). While a diverse set of actors promote climate scepticism, conservative think tanks (CTTs) play a central role by providing key counter-claims to challenge climate science and obstructing climate policy (McCright and Dunlap, 2000). CTTs provide a multitude of services to the cause of climate change scepticism: offering material support and lending credibility to contrarian scientists, sponsoring pseudo-scientific climate change conferences, directly communicating contrarian viewpoints to politicians, and, more generally, disseminating sceptic viewpoints through a range of media to the wider public (Dunlap and McCright, 2011). A number of studies also suggest that these organizations are central in obstructing national climate policy (Lahsen, 2008; Oreskes and Conway, 2010) and international climate change mitigation agreements (McCright and Dunlap, 2003). The prominence of CTTs in the contrarian countermovement has prompted calls for an expansion and improvement of data collection efforts on a range of climate movement and countermovement activities (Brulle et al., 2012).

Despite an active interest in CTTs, few studies have systematically analysed the nature and prevalence of contrarian themes. Aaron McCright and Riley Dunlap's influential study offers a notable exception, providing a comprehensive survey of CTT counter-claims from 14 major conservative think tanks over the period 1990–1997. Yet, to our knowledge, there have been no systematic updates to this study over the past 15 years and thus

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http://dx.doi.org/10.1016/j.gloenvcha.2015.12.001
0959-3780/

little is known about how the contrarian discourse has evolved over the last decade. We seek to fill this gap in the literature by (1) compiling the largest corpus of climate sceptic literature to date, collecting over 16,000 documents from 19 organizations over the period 1998–2013; (2) introducing a methodology to measure key themes in the corpus which scales to the exponential increase in content generated by conservative think tanks (CTTs) over the past decade; and (3) leveraging this new methodology to examine the dynamics of policy- and science-related themes over a 16 year period. We argue that understanding the nature and prevalence of CTT misinformation is of both theoretical and practical significance, as an acceptance of the anthropogenic causes of climate change is arguably a necessary condition for progress on reaching a climate agreement and may portend a window for policy action.

2. Literature review

2.1. Theoretical perspectives on the "countermovement"

There is a growing literature on the theoretical processes responsible for driving the political debate on the issue of climate change (see Dunlap and McCright, 2011, 2015 for comprehensive reviews). Drawing heavily on social movement theory, the predominate framework views organized climate scepticism as a "countermovement," which evolved to combat environmental activists' early success in raising awareness on the issue of AGW (Dunlap and McCright, 2015). Brulle (2014) further situates the dynamics of contention on AGW in the context of field frame analysis (Fligstein and McAdam, 2012) and, as such, seeks to provide a coherent societal level explanation for the evolution of dominant frames which define the issue of global warming. Within the context of field frame analysis, the "field" of AGW is contested by forces supporting and opposing the dominant frame (see Meyer and Staggenborg, 1996; Levy and Egan, 2003). Specifically, the environmental movement is viewed as promoting social change, the denial countermovement is viewed as preserving the status quo (i.e., the preservation of the material interests of industry), and both sets of actors are competing to define the dominant field frame. Social change is thus viewed as a conflict to determine how climate change is understood within a wider social, political, and cultural context (Knight and Greenberg, 2011).

While field frame analysis offers a useful framework for theorizing on societal level conflict between movement and countermovement, it provides little insight into the actors, interests, and tactics of those responsible for "creat[ing] a paralyzing fog of doubt around climate change" (Begley et al., 2007). Fortunately, a well-developed literature systematically describes the core elements of the countermovement. Viewed largely as an extension of the conservative movement in the U.S., organized climate denial was born out of the deep pockets of conservative foundations and corporate interest groups committed to promoting free-market principles and rolling back government intervention in all aspects of the economy (Brulle, 2014; Dunlap and McCright, 2011). Consistent with a policy platform committed to economic growth, the conservative movement instituted a number of direct challenges to key environmental policies enacted during the 1970s (Dunlap, 1987). Yet, after suffering public defeats on environmental issues during the 1980s and early 1990s, conservatives quickly learned that directly challenging key environmental policies was fraught with risks (Bonds, 2003; Dunlap, 1987) and, as such, "shifted to a more subtle form of power characterized by non-decision-making and agenda setting" (Dunlap and McCright, 2015, p. 306). When global warming made its way onto the political agenda in the late 1980s, interest opposed to action on AGW implemented a campaign to "manufacture doubt" about the credibility of individual scientists and exaggerating scientific uncertainties (Union of Concerned Scientists, 2007; Oreskes and Conway, 2010; Greenpeace, 2010; Dunlap and McCright, 2011).

It is within the shift from direct to indirect challenges to environmental policy that the full importance of CTTs in the denial countermovement comes into view. First, relying on their image as the "alternative academia" or "counter-intellegentsia" and their ability to marginalize mainstream academia (Medvetz, 2012), CTTs play a lead role in constructing viewpoints that challenge the orthodox position on climate science and policy (Beder, 2001; Austin, 2002; Jacques et al., 2008; Dunlap and Jacques, 2013). CTT-affiliated contrarian scientists and commentators have generated and disseminated numerous counter-claims against climate science and policy action through various forms of media, including books, op-eds, newsletters, policy studies, speeches and press releases (McCright and Dunlap, 2000; Jacques et al., 2008; Dunlap and Jacques, 2013). Second, as the engine of information in the "denial machine," CTTs are the agents actually responsible for "framing the field" of AGW. Communications research repeatedly emphasizes the sensitivity of public perceptions to how an issue is framed within the wider information space (Lakoff, 2014; Scheufele and Tewksbury, 2007). And given the inherent complexity of climate change, "interpretive storylines" surrounding the issue are ripe for manipulation by parties on either side of the debate (Nisbet, 2009). As such, CTTs arguably provide the "'connective tissue' that helps hold the denial countermovement together" (Dunlap and McCright, 2015, p. 312).

Against this backdrop, a general picture is beginning to emerge on the dynamic process responsible for manufacturing uncertainty and controversy on AGW (Pooley, 2010; Oreskes and Conway, 2010; Washington and Cook, 2011; Mann, 2013). Specifically, extant literature suggests the following process: (1) conservative foundations and corporate groups provide the material base for pressing contrarian interests (Brulle, 2014); (2) CTTs transform this material base into information, generating the narrative of climate denial (McCright and Dunlap, 2000); (3) the conservative "echo chamber"—conservative media, sceptical blogs, and sympathetic policy makers—mediate and amplify key counterclaims (Dunlap and McCright, 2011); and (4) conservative politicians susceptible to the anti-climate messages seek to stymie policy changes in Congress (McCright and Dunlap, 2003). Nevertheless, despite a general understanding, considerably more research is needed to fully specify the linkages between key actors in the denial countermovement and longitudinal data is necessary to test dynamic theories of organized climate scepticism (Dunlap and McCright, 2015). The remainder of this study seeks to achieve this latter goal by generating time-series data of the sceptical discourse espoused by CTTs.

2.2. Past measures of the contrarian discourse

Studies interested in measuring the prevalence of contrarian claims focus almost exclusively on the *level* of contrarian information present in media coverage of global warming. These studies have yielded important insights into the prevalence of skepticism within newspapers (e.g., (Boykoff and Boykoff, 2004; Painter and Ashe, 2012; Schmidt et al., 2013)), opinion pieces in print media (Hoffman, 2011; Elsasser and Dunlap, 2013; Young, 2013), television (Boykoff, 2008; Hart, 2008; Feldman et al., 2012), and "new media" (O'Neill and Boykoff, 2011; Holliman, 2011; Knight and Greenberg, 2011; Sharman, 2014; Elgesem et al., 2015). However, few studies systematically analyse the *content* of contrarian information and even fewer focus specifically on CTTs. To date, McCright and Dunlap (2000) offers the most comprehensive survey of CTT counter-claims on climate change. The authors content analyse a sample of 224 documents