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Up and Down With… Polarisation? Intrinsic and Instrumental Polarisation Dynamics in US Climate Policy Debates

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Abstract

Political elites in the US are ideologically divided over climate change. We identify two perspectives: The *intrinsic* view on ideological climate polarisation views climate beliefs as entrenched parts of an actor's identity and posits that ideological positions have factually shifted towards ever more extreme positions over time. The *instrumental* view, in contrast, emphasises that polarisation entrepreneurs mobilise their constituency to participate in the climate policy debate by amplifying ideological differences over climate-related focusing events when they arise, leading to fluctuations in visible polarisation, rather than a steady trend. This study examines which of the two perspectives holds in US Congressional and subnational media debates by analysing time trends of polarisation and phases of structural stability. We distinguish between endogenous events, which can be attributed to the political process, and exogenous focusing events, such as extreme events or those related to the international climate regime, and investigate which type of event tends to be associated with changes in polarisation. Applying two novel time series measures for discourse networks—structural polarisation and the detection of phases of structural stability—to the climate debate during the 112th to 114th Congress (2013–2017) and subnational print media in four swing states, we find that exogenous events are largely irrelevant while endogenous political dynamics increase the polarisation of the debate considerably. We find ups and downs of polarisation corresponding to distinct structural phases in which polarisation is linked to participation. This temporal fluctuation of polarisation around endogenous political events is consistent with the instrumental perspective.

Keywords

climate; discourse networks; environment; issue attention cycle; polarisation

1. Introduction

The US and other democracies have been affected by political polarisation. Several dimensions of polarisation have been highlighted in the literature, including affective (Iyengar et al., 2019), ideological (Fiorina & Abrams, 2008), and structural polarisation (Salloum et al., 2022) among elites (e.g., Fisher, Leifeld, & Iwaki, 2013), the population (e.g., Dunlap et al., 2016), or in the media (e.g., Chinn et al., 2020). Here, we explore ideological polarisation among elites around US climate politics between 2013 and 2017. We introduce a new distinction between *intrinsic* and *instrumental* ideological elite polarisation and argue that focusing events serve different roles in intrinsic and instrumental polarisation. We contribute to the literature on elite climate polarisation by showing that polarisation in the climate discourse network is associated with endogenous political events and resulting issue attention.

1.1. The Intrinsic Perspective on Climate Polarisation

The *intrinsic perspective* on ideological polarisation relates to the deep-seated values and convictions political actors or citizens hold. It posits that a fundamental change has been taking place in their ideological orientations. Polarisation around the issue of climate change is the product of this change. People working in this perspective find climate polarisation to be positional, lasting, and worsening—in short, intrinsic. In this view, ideological positions have factually shifted towards more extreme positions over time, and this change is real in the sense that it concerns attitudes, rather than just strategic signalling. Climate beliefs become entrenched and form part of one's identity. They become a "positional" rather than a "valence" issue (Fraune & Knodt, 2018) and may be additionally cemented by affective polarisation (Iyengar et al., 2019). This trend develops in parallel with polarisation on other issues like immigration or foreign affairs and as part of a general trend towards political polarisation in the US and other Western democracies.

Ample evidence seems to support this intrinsic perspective. For example, Chinn et al. (2020) reported increasingly polarised partisan climate language around climate change in the US Congress over almost two decades in tandem with growing politicisation, underlining the argument that ideological polarisation has been increasing over time. Smith et al. (2024) documented an almost continuously increasing and symmetric wedge between Democratic and Republican voters in the US on emotions, scientific interpretation, and spending priorities related to climate change over almost 50 years. They also measured a steep increase in the share of voters who viewed climate change as a top priority among Democrats between 2012 and 2020, whereas the share remained low and constant among Republican voters. Guber (2017) reviewed the literature on US climate polarisation and saw overwhelming evidence for entrenched and lasting partisan division over climate change, both among elites and voters. Sarathchandra and Haltinner (2021, p. 225) concluded that "about 25% of skeptics are skeptical, at least in part, because they believe that climate change is a hoax or a conspiracy," which points to the intrinsic nature of climate beliefs.

1.2. The Instrumental Perspective on Climate Polarisation

In contrast, the *instrumental perspective* emphasises that political actors have the capacity to play up differences in climate beliefs strategically when it suits them (Jasny et al., 2018). Guber et al. (2021, p. 553) argue that "partisans might actively sow discord and cultivate groups of like-minded supporters in order to best achieve their ends." Sunstein (2009) calls them "polarisation entrepreneurs." For political actors and the

media, events related to climate change can be used to create internal unity, discredit the opponent, or profit otherwise from conflict. Political actors signal ideological positions and react strategically to the opponent's climate-related actions when there is an opportunity to rally a constituency behind them in united opposition. Attitudes about climate-related events are manipulated by political actors and the media to mobilise support for specific actions and policy instruments. Polarisation is the instrumental vehicle enabling this mobilisation. This approach documents how specific interests capitalise on ideological differences to block climate action (Oreskes & Conway, 2011, 2023). Instrumental polarisation works because intra-group messaging leads to more extreme outcomes than inter-group communication (Sunstein, 2009). Polarisation is hence intertwined with issue attention (Downs, 1972) and participation: A polarisation entrepreneur focuses his or her constituency's attention to make them participate in a polarised policy debate.

A corollary of this observation is that, unlike intrinsic polarisation, instrumental polarisation in a policy debate can fluctuate. Policy debates attract participation and, consequently, polarisation after focusing events and go quiet when the attention has faded. For example, election campaigns may stimulate instrumental polarisation. When a suitable event occurs, insurgent political actors, who seek to challenge the incumbent electorally, use the event to their advantage and amplify divisions in that moment.

Ample evidence supports the instrumental perspective. For example, Fisher, Leifeld, and Iwaki (2013) showed how climate policy discussions returned to a more consensual structure overall in the 110th Congress after a more polarised debate in the 109th Congress. Fisher, Waggle, and Leifeld (2013) found that an emerging consensus on the science was driving this aggregate change while polarisation over economic issues and specific policy instruments still prevailed. After Tea Party candidates were very successful in 2010 and Donald Trump was elected in 2016, the issue of the credibility of the science became a focus once again, both in climate politics (De Pryck & Gemenne, 2017; Dunlap et al., 2016; Jasny & Fisher, 2019) and more generally (Webb & Kurtz, 2022). Republican voters similarly took cues from Democratic elites and opposed them (Merkley & Stecula, 2018), which suggests partisan actors react not only to suitable events but also to their constituency, which in turn reacts to the opponent's views and actions. Fisher and Leifeld (2019) argued that elite polarisation shifted away from the national level towards contestation between the Democratic national incumbent administration and Republican subnational incumbents when economies in fossil fuel-dependent states were threatened by the Clean Power Plan (CPP) in 2015 and 2016. Collectively, this evidence implies that polarisation in a policy subsystem can be temporary and reversible and tends to occur in tandem with political focusing events.

The instrumental perspective relates theoretically to issue-attention cycles (Downs, 1972) but differs in the role of agency. An issue-attention cycle begins when a topic like climate change or a new aspect about the topic is discovered. The media publicise the issue, and political actors and individuals direct their attention towards the issue to solve it. When people recognise the trade-offs and sacrifices involved, public interest and media attention decline in favour of another emerging issue. Unlike issue-attention cycles, the instrumental view of polarisation holds that elite actors strategically lend attention to an issue when an opportunity for polarisation emerges. When there is no more political gain from the same issue, political statements on the issue wane in favour of another contested issue.

The instrumental perspective also differs from the multiple streams framework (Kingdon, 1984), which posits that policy entrepreneurs use "windows of opportunity" during raised public awareness of an issue to

their advantage. While partisan actors use such windows of opportunity to increase partisan division and put pressure on their political opponents, the multiple streams framework argues that windows of opportunity are typically leveraged to keep the policy entrepreneur's pet topic active on the political agenda beyond its original attention window. This perspective differs from the one discussed here in that partisan political actors in the instrumental view have an interest in the polarisation but less so in the issue itself. They are not "policy" entrepreneurs but "vote share" entrepreneurs.

1.3. Reconciling the Two Perspectives

How can the two perspectives be reconciled? There is clear support that polarisation both increases and fluctuates. If both coincide, they must be measured in different ways, at different levels, or among a different set of actors.

One possibility may be different levels of analysis. Individuals may be more prone to intrinsic, lasting belief change while politicians may strategically adapt to the situation. This difference could explain the apparent contradiction between the two perspectives. However, the evidence so far suggests the opposite. Lasting polarised beliefs have been documented also among partisan elites (Egan & Mullin, 2024), while there has been mounting evidence that personal opinion on a range of contentious issues, including climate change, is malleable through personal experience or brief interventions (Chen et al., 2024; Del Ponte et al., 2025; Kalla & Broockman, 2020).

Both perspectives may also apply concurrently, yet with different levels of visibility. Individuals or elites may hold constantly or even increasingly polarised opinions but choose not to voice them until a worthwhile opportunity emerges. Some data collection efforts like attitudinal surveys (Dunlap et al., 2016; Smith et al., 2024) may pick up on latent, underlying opinion while other data collection methods like quantitative text analysis (Guber et al., 2021) or ideological content analysis (Fisher, Leifeld, & Iwaki, 2013; Fisher, Waggle, & Leifeld, 2013) may measure expressed opinion, which becomes activated by polarisation entrepreneurs and then fades into the background again. This possibility was explored in recent work by Henrichsen et al. (2025), who found that responses by identical US-based elite actors on the same attitudinal items systematically differed between surveys, Congressional testimony, and social media due to different audience costs across these arenas. If this distinction holds, we should find that Congressional and media debates display fluctuating polarisation patterns due to event and participation dynamics. This article investigates this question empirically by focusing on the climate policy debates in the US Congress and news media in four US states that were considered "swing states" between 2013 and 2017. Swing states are states in which Democrats and Republicans have a relatively equal chance of winning the majority.

To measure ideological alignment by actors, we use discourse network analysis (Leifeld, 2017). We employ novel computational methods to quantify trends in polarisation over this four-year period, relate them to different discourse network structures over time, and examine which of the two perspectives on polarisation holds in these contexts, guided by two research questions. To that end, we present our first research question:

> RQ1: Do discourse networks in Congress and swing state media debates display increases (i.e., intrinsic perspective) or fluctuations (i.e., instrumental perspective) in polarisation over time?

1.4. Focusing Events Under Intrinsic and Instrumental Polarisation

The instrumental perspective posits that polarisation entrepreneurs utilise focusing events to mobilise participation that prompts visible polarisation. But an open question is which kinds of focusing events are associated with the ups and downs of polarisation.

The policy attention literature defines a focusing event as a sudden, rare, harmful event with immediate public awareness and potential geographical boundaries (Birkland, 1997, p. 22). The literature on advocacy coalitions links exogenous events or "shocks" to belief updating within and between coalitions. Exogenous shocks can include disasters, recessions, or shifts in public opinion (Jones & Jenkins-Smith, 2009). DeLeo et al. (2021) provide a summary of research on focusing events. Much empirical evidence has been provided on the effects of various exogenous events on political discourse. For example, Steffen and Patt (2022) examined the effect of the ongoing Russia–Ukraine war on public support for clean energy policies, and Chen et al. (2024) tested the effect of extreme weather events on climate partisanship.

We distinguish between two kinds of focusing events: endogenous and exogenous events (Sornette, 2006). While the distinction between the two is not always clear-cut, the difference lies in whether a climate-related event is primarily associated with the political process of the jurisdiction (= endogenous) or an outside influence, such as a hydrometerological event like a superstorm or the international climate regime (= exogenous). Focusing events, as described in the policy literature above, are mostly exogenous. An example of an endogenous event could be the debate around a national policy or the involvement of a local or national politician in an international climate treaty or infrastructure project.

We posit that if the instrumental perspective holds, then, contrary to the policy literature, exogenous events should be unrelated to changes in polarisation. Our argument is that a polarisation entrepreneur can only mobilise participation if a salient event is tied to an opposing actor who can be blamed—i.e., if the event is endogenous. If a focusing event is exogenous, there is less scope to assign blame, rally support and drive mobilisation, or draw attention to the issue, making visible polarisation less likely. If no one can be held responsible, the event fails to serve as a rallying point for division. For example, the insurgent Republican Party could react to the incumbent Democratic Party's prior signature of the Paris Agreement (a partly endogenous political action) by increasing polarisation on the issue. In contrast, there would be little incentive to send contrarian messages in opposition to an international, exogenous event without a prior platform announcement by the domestic political opponent. Without political ownership, the event does not offer much strategic value for polarisation.

We would expect intrinsic polarisation to be affected more strongly by exogenous focusing events because individuals should update their beliefs when extreme events are reported—by believing a report or rejecting the scientific evidence, either way increasing attitudinal polarisation in the background.

We investigate these conjectures using empirical data by compiling a list of events, partitioning them—to the best of our abilities—into exogenous and endogenous types, and overlaying them onto the polarisation and structural trends observed in a time series generated from discourse networks in Congress and four states. Thus, we present our second research question:

RQ2: Are increases in polarisation associated with endogenous or exogenous focusing events?

2. Data

Henrichsen et al. (2025) found that elite climate ideology varies across political arenas, reflecting audience-dependent filtering of expressed positions. To mitigate such arena effects, we conduct two studies of elite opinion, among legislators and other political actors, in different settings. This comparative approach helps avoid overinterpreting a single outlier case. The study is exploratory and does not advance specific expectations about cross-case differences.

The first study measures polarisation dynamics in the US Congress and relates temporal phases and polarisation peaks to exogenous and endogenous events. The second study measures polarisation dynamics in news articles in leading and ideologically diverse print media in four different US swing states and relates each state's polarisation dynamics to focusing events. This selection allows us to assess the research questions across different contexts (national and subnational), in settings where politicians or journalists set the agenda (legislative agenda setting in Congress vs media logic in print media), and across states that have a history of supporting both Democrats and Republicans in office. This matters because the period of analysis covers debates involving alleged federal overreach regarding the CPP.

Our analysis includes the years from 2013 to early 2017, which coincide with the 113th and 114th Congress and cover the second term of the Democrat-led Obama administration, both before and after the mid-term election in November 2014, which resulted in the Republican Party taking the majority in the Senate in 2015. This selection ensures different political constellations are covered. The selected interval is long enough potentially to see ups and downs in polarisation.

For the first study, we searched the Government Printing Office's FDSys search engine using the terms "global warming," "greenhouse gas," and "climate change" to identify political elites who were engaged in climate discussions in the US Congress and analysed the perspectives they presented in their testimonies. We manually annotated all statements by all political actors who gave Congressional testimony during the time period, which comprised a set of 1,150 testimonies, using the Discourse Network Analyzer software (Leifeld, 2017). We included only formal statements and ignored comments made during the question-and-answer portion of the hearings.

For the second study, we searched the Nexis database specifically for content from the top three newspapers in each of the four swing states selected during the same period (from June 2013 through April 2017). These states were selected because they were experiencing internal conflicts regarding their efforts to transition away from fossil fuels to clean and renewable sources of energy during the period of inquiry. After searching for the following terms in the leads of newspaper articles: "climate change," "global warming," "greenhouse gases," "Clean Power Plan," "energy efficiency," "renewable portfolio standards," "renewable energy," "net metering," and "coal," we identified all speakers who were quoted within these articles and analysed their quotes. We manually annotated all statements by political actors in the resulting set of 5,256 news articles using the software Discourse Network Analyzer.

In both studies, each annotated text portion contained four variables: (a) the name of the speaker, (b) the organisation of the speaker, (c) one of nine possible beliefs covering economic, scientific, governance-related, and policy instrument aspects, and (d) a binary variable indicating whether the speaker

agreed with or rejected the stated belief. The speeches were annotated deductively by a multi-person research team after creating an initial codebook. The codebook was refined during the initial phase of the annotation as part of continuous training and review. For quality control, parts of the resulting annotation were cross-checked by other annotators from the team, and the entire content analysis was validated by the principal investigator. While there is no formal measure of intercoder reliability, the set of variables was clearly specified without much room for speculation. In rare cases of disagreement between a coder and the supervisor, a consensual solution was sought among team members. The data collection followed earlier studies on previous time periods of climate debate in the US Congress (Fisher, Leifeld, & Iwaki, 2013; Fisher, Waggle, & Leifeld, 2013). More details on the exact procedure, including actor types and belief codes, can be found in Fisher and Leifeld (2019) and Henrichsen et al. (2025), who employed the Congressional part of the same dataset to answer different questions.

3. Methods

The analysis uses innovations in discourse network analysis (Leifeld, 2017) to measure structural phases and polarisation across the time span. For each case separately, we created a time series of actor congruence networks and another time series of actor conflict networks (Leifeld, 2017) and applied phase detection methods (Vandenhole et al., 2025) and polarisation measurement developed for this data structure.

3.1. Time Windows of Congruence and Conflict Networks

To create an actor congruence network, we extracted all organisation names from a subset of the annotated dataset and interpreted them as nodes in a network. For all pairs of nodes, we counted how many belief–agreement combinations they co-expressed over the selected subset of the timespan and created an edge between the node pair with the count as its edge weight. We furthermore normalised these edge weights by dividing each count by the average number of different beliefs expressed by the two nodes in the respective pair ("average activity normalisation"; see Leifeld, 2017). To create an actor conflict network, we followed the same procedure but only counted instances where one node expressed a positive view on the respective belief while the other actor expressed a negative view on the same belief. Congruence networks capture expressed belief similarities between actors while conflict networks capture expressed differences in beliefs. Both are common types of discourse networks.

We created several hundred partly overlapping consecutive discourse networks for each case, starting with the first date in the observation period and moving the time axis forward by one week at a time until the end of the observation period was reached. At each weekly iteration, we created a congruence and a conflict network around the current mid-point on the time axis with a pre-specified length. For the state media analysis, we chose a time window of 25 weeks. For Congress, we chose 50 weeks to account for the sparser nature of the data. It is worth noting that this difference matters only for smoothing kinks in the time series curve; it does not affect substantive interpretation. This procedure resulted in 198 discourse networks that overlapped with the previous network by 24 and 49 weeks, respectively, and ensured inherent smoothing of the time series. We applied two separate measures to the two discourse network time series: polarisation measurement and phase detection.

3.2. Polarisation

To measure polarisation, we followed a four-step procedure. First, we devised a polarisation measure for assessing the polarisation of a given partitioning of actor nodes into two equal-sized disjoint sets ("coalitions") given the observed network. The polarisation measure counts how much edge mass must be moved from existing edges to other edges to achieve an ideal type of a perfectly polarised network with the same number of nodes. This ideal type is defined by several criteria: Congruence ties must be present, their weights must be uniformly distributed among all node pairs within coalitions, and these ties must be absent between coalitions; conflict ties must be present, their weights must be uniformly distributed among all node pairs across coalitions, and these ties must be absent within coalitions. The polarisation measure implicitly penalises for unequal group sizes and for small coalitions in the empirical dataset by virtue of the constraint that the disjoint sets are equal-sized and absolute edge mass shifts are counted. Second, we devised a greedy combinatorial optimisation algorithm to find the actor partitioning that maximises polarisation given the observed networks. Third, after finding the optimal partitioning, we extracted its polarisation measure and used it as the polarisation score of the respective time step. Finally, we applied this algorithm to all pairs of discourse networks in the time series to yield a polarisation time series, which we plotted as a continuous curve.

In this polarisation measure, the equal-size constraint prevents unevenly sized David-vs-Goliath solutions with few nodes in one coalition and many in the other. In cases of unequal group sizes with differing political leanings, the equal-size constraint forces some nodes to be assigned to the smaller coalition, even if their ideology matches the larger one. This reflects the principle that polarisation is greatest when opposition is balanced in size ("size parity"; Bramson et al., 2017). The measure is, therefore, intentionally penalised in such cases, enforcing symmetry by design—even as the difference in coalition sizes approaches zero. The equal-size constraint makes the definition of coalitions in polarisation measurement more restrictive than the policy coalitions often identified in discourse networks (Leifeld, 2017).

The requirement of a uniform edge weight distribution in the ideal type penalises internal substructures, such as sub-coalitions or disproportionately influential nodes. In a maximally polarised state, all members of a coalition should contribute equally to intra-group agreement and inter-group opposition—approximating a uniform degree distribution. This uniformity maximises entropy within coalitions by treating all members as equally aligned and indistinguishable in their structural role. Under this interpretation, the ideal type embodies high internal entropy, while the polarisation measure captures the degree of separation between two such high-entropy groups.

Several polarisation measures have been proposed (Aref & Neal, 2021; Mehlhaff, 2024; Salloum et al., 2022). These measures are generally sensitive to network properties such as size, degree distribution, and degree assortativity, and are often normalised to mitigate such effects (Guimerà et al., 2004; Salloum et al., 2022). In contrast, the entropy-based ideal type used here already penalises deviations in degree distribution and assortativity by design. It could also be normalised for size—but we argue it should not. This is because polarisation and participation are inherently confounded: Actors tend to participate more when polarisation is high, for example to assert a counter-position. A small but highly polarised network offers weaker evidence of systemic polarisation than a large polarised network, which reflects broader mobilisation and constituency engagement. Normalising for size would therefore risk overcorrecting and discarding

meaningful variation in participation driven by polarisation itself. For this reason, we retain a size-sensitive version of the polarisation measure, while acknowledging that participation and issue attention remain difficult to disentangle.

3.3. Structural States and Phases

To measure structural states and phases, we followed the five-step procedure proposed by Vandenhole et al. (2025). First, at each time step, we created a single discourse network by subtracting conflict from congruence edge weights, where positive edge weights indicated congruence in excess of conflict and negative weights indicated conflict in excess of congruence between pairs of actor nodes. Second, we computed a distance matrix containing absolute differences between any two subtracted network matrices for all pairs of time points. Third, we employed hierarchical cluster analysis to find clusters of time points exhibiting similar discourse network structure. Fourth, we interpreted the clusters as time periods of relatively stable network structures ("structural states") and coloured the background of the polarisation time series with colours representing the different structural states.

Both novel methods were implemented in version 3.0.11.5 of the Discourse Network Analyzer software and its companion R package rDNA.

We then compiled lists of plausible endogenous and exogenous focusing events with brief descriptions (see Tables 1 and 2) and highlighted them in the time series plots to assess qualitatively whether any changes in polarisation coincided temporally with any endogenous or exogenous events.

4. Results

4.1. Polarisation Dynamics in the US Congress

Figure 1 shows the polarisation of the policy debate in the US Congress as a time series. Table 1 shows endogenous events temporally coinciding with peak polarisation phases across the swing states and in the US Congress. Selected events from Table 1 coinciding with high polarisation are also shown as vertical bars in Figure 1, with red and blue lines representing events associated with the Republican and Democratic Party, respectively. The background colours in Figure 1 indicate structural phases and states detected in the dataset. This analysis was independent of the polarisation analysis, but both results are displayed together and reinforce one another's dynamics.

Turning to Figure 1, we can see that peak polarisation was reached between May and September 2015, with a smaller peak in February 2015. The summer peak was driven by testimony on the CPP, which was released on 3 August 2015 by the Environmental Protection Agency. The Plan was controversial because it required utilities to reduce their carbon emissions, which critics especially from fossil-fuel mining states argued would lead to the closure of coal plants and significant job losses in the coal industry (Fisher & Leifeld, 2019). States that were heavily reliant on coal to fuel their power sector were also critical of the CPP. Temporally, this peak in polarisation also coincided with the announcement of Donald Trump's candidacy to become president of the US on 16 June 2015. During this time, Trump made speeches about his support for expanded fossil fuel extraction.

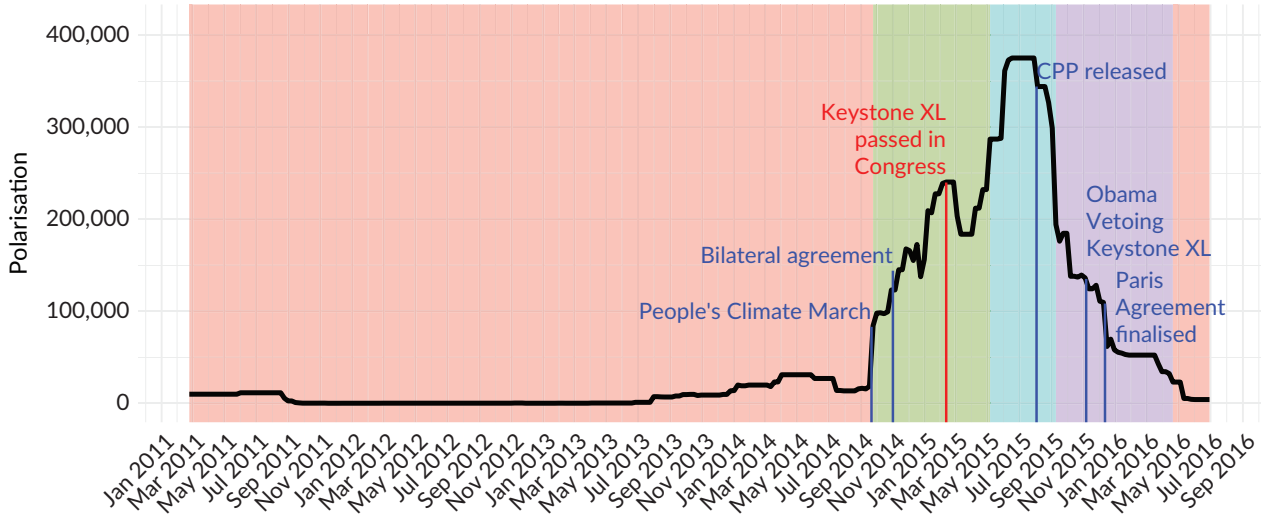

Figure 1. Structural states and polarisation over time in the US Congress. Note: Vertical lines indicate selected key events coinciding with phases of high polarisation, and they are associated with Democrats (blue) or Republicans (red) and are listed with details in Table 1.

Table 1. Endogenous focusing events in US climate politics temporally coinciding with phases of high polarisation.

Date	Short label	Description
2 Jun 2014	CPP announced	The Environmental Protection Agency unveiled the Clean Power Plan (CPP) to reduce carbon emissions from power plants by 30% by 2030.
23 Jul 2014	OH Senate Bill 310	Ohio Governor John Kasich (D) signed Senate Bill 310, which froze Ohio's renewable energy standards for two years.
21 Sep 2014	People's Climate March	The People's Climate March took place in New York City.
23 Sep 2014	UN Climate Summit	The UN Climate Summit convened in New York, where President Obama reaffirmed US commitments to reducing emissions.
4 Nov 2014	Midterm elections	Republicans gained control of the US Senate in the midterm elections, intensifying polarization over climate policy.
12 Nov 2014	Bilateral agreement	The US and China announced a bilateral climate agreement in Beijing, where both nations committed to emissions reductions.
11 Feb 2015	Keystone XL passes Congress	The Republican-controlled Congress passed a bill approving the construction of the Keystone XL Pipeline.
30 Apr 2015	NC ITC Extended	The North Carolina governor signed the bill extending the clean energy Investment Tax Credit for two years.
5 Jun 2015	NV Senate Bill 374	The Nevada Legislature passes a bill that asks the Public Utility Commission to review net metering policies in the state.
16 Jun 2015	Trump announces candidacy	Donald Trump announced his intention to run for president.
3 Aug 2015	CPP released	Obama formally released the CPP, which put the US on the path to reduce emissions and be able to ratify the Paris Agreement when it was finalised.
5 Aug 2015	NC H571 passed	This bill limits the implementation of the CPP in the state of North Carolina.

Table 1. (Cont.) Endogenous focusing events in US climate politics temporally coinciding with phases of high polarisation.

Date	Short label	Description
13 Oct 2015	Democratic presidential debate	The first Democratic presidential debate of the 2016 election cycle took place in Las Vegas (Nevada).
6 Nov 2015	Obama Vetoes Keystone XL	President Obama vetoes the Keystone XL
1 Dec 2015	Congress blocks CPP	The House of Representatives passed a companion resolution to block the implementation of the Clean Power Plan
12 Dec 2015	Paris Agreement finalised	The Paris Agreement was finalised at the end of the two-week COP-21. The Obama administration contributed significantly through active participation and diplomatic efforts.
18 Dec 2015	Obama Vetoes CPP-blocking Resolution	President Obama vetoes the Congressional Resolution that was passed to block the implementation of the Clean Power Plan
22 Dec 2015	NV PUC net metering change	The Nevada state Public Utility Commission reduced the rate that residential solar power generators received for their energy generation.
9 Feb 2016	CPP stayed	The CPP was stayed by the US Supreme Court, preventing its implementation.
3 Sep 2016	Paris Agreement ratified	The US and China ratified the Paris Agreement.
8 Nov 2016	Trump's election victory	Donald Trump won the presidential election.
8 Nov 2016	FL Amendment 1	Florida's Amendment 1, which would limit sales of solar power only to utilities, failed to reach the 60% vote threshold and pass in the general election.
20 Jan 2017	Trump takes office	Donald Trump was inaugurated as the 45th president of the US.

Notes: In Figures 1 and 3, events coinciding with high polarisation are highlighted as blue or red vertical lines.

The first phase, until October 2014, and the last phase, after April 2014, correspond to the same network structure and are thus partitioned into the same structural state and both coloured in red. The three phases/structural states in between (yellow, blue, and purple) correspond to different visible polarisation levels, with the summer 2015 peak in polarisation being singled out as a separate phase.

Turning to Figure 2, we see the aggregated networks corresponding to the first four phases. Phase 3, the peak polarisation phase in the summer of 2015, indeed shows significant polarisation in the network. Phases 2 and 4 from Figure 1 exhibit strong polarisation, but less than Phase 3. Despite the visual separation of the two coalitions, polarisation in these time periods is less pronounced than in Phase 3 because the two coalitions are each much smaller than in Phase 3. Arguably, at equal levels of conflict between two groups, a time period that has more participants on both sides of the conflict deserves a higher polarisation score, and this fact is reflected in the higher polarisation score for Phase 3.

In the network for Phase 3, a group of red and purple nodes at the bottom of the network diagram displays cohesive belief congruence ties in excess of conflict. Red nodes are Republican legislators, and purple nodes are business actors, for example from the energy industry. A slightly larger cohesive group of nodes in the middle of the network is dominated by blue nodes, which represent Democratic legislators in Congress,

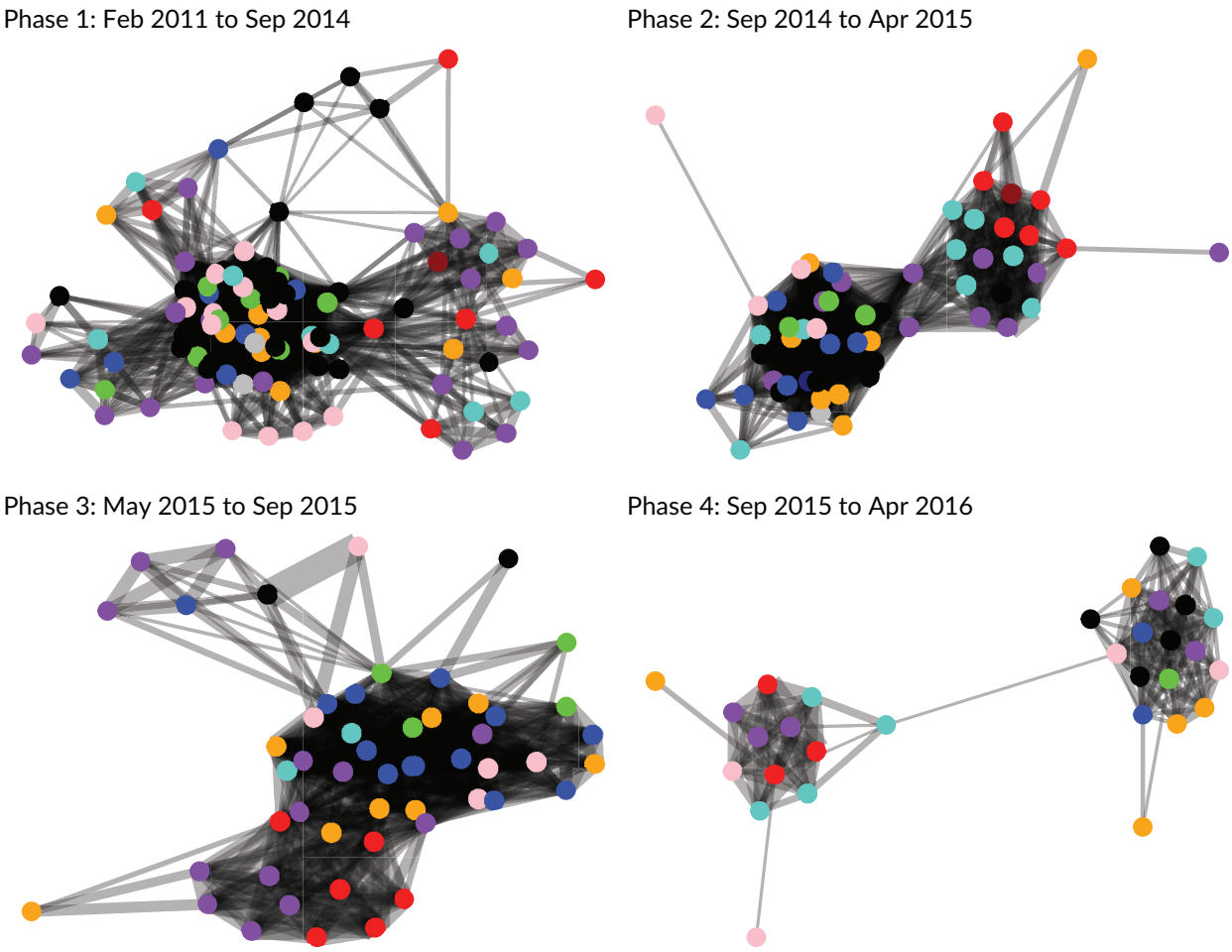

Figure 2. Discourse networks in the US Congress, corresponding to the first four phases shown in the first panel of Figure 1. Notes: Line width represents connection intensity; connections indicate belief congruence in excess of conflict between two actor nodes; red nodes = Republican legislators; blue nodes = Democratic legislators; purple nodes = business actors; orange nodes = NGOs excluding environmental groups; green nodes = environmental groups; pink nodes = government agencies and departments; cyan = subnational government actors; black nodes = scientific actors; grey nodes = others.

supported by environmental NGOs (green nodes) and the executive branch of government, which represents the Obama Administration (pink nodes). There is a visual separation between the two coalitions, though both also show some connectivity, indicating belief overlap on some issues. The strong polarisation measured in this network is mostly due to the significant amount of within-group agreement, lack of within-group conflict, and the presence of between-group conflict. In other words, the coalitions are cohesive while there is substantial disagreement between coalitions.

The first phase, corresponding to the long low-polarisation period highlighted in red in Figure 1, in contrast, exhibits visibly lower polarisation in the network in the first panel of Figure 2. While there is a substantial amount of congruence in excess of conflict within the Democratic legislator-led cluster in the middle, the periphery of the network consists of approximately six large disjoint groups with business involvement and sometimes Republican legislator involvement.

The 2014 part of Phase 2 shown in Figure 1 is also mostly concerned with debating the CPP. The debates included discussion of the content of the Plan, along with Congressional testimony regarding the broader question about the science of climate change, particularly whether climate change is caused by greenhouse gas emissions. This component of the debate provides a link between the Congressional CPP debate, the events unfolding outside of Congress in the political arena, as well as debates in many states around the US, which we will turn to in the following section.

Somewhat disconnected from the immediate contents of the Congressional debate, several political developments listed in Table 1 temporally coincided with this phase. Polarisation began shortly before the UN Climate Summit in New York City (23 September 2014, only two days after the People's Climate March in the same location, highlighted in Figure 1 in blue). At the UN Climate Summit, President Obama (Democrat) reaffirmed US goals to reduce emissions. During the midterm elections, Republicans gained control of the US Senate and vowed to fight the CPP. They proposed and passed their joint resolution that would block the CPP in 2015 once both houses of Congress were under Republican majority. President Obama vetoed the Resolution in December 2015. The second blue event marks a bilateral climate agreement between the US and China, which was criticised by Republicans.

In addition to the resistance to the CPP in Congress, we see further polarisation during this second phase caused by disagreement over the Keystone XL Pipeline, which came to a head in early 2015 when both houses of the Republican-controlled Congress passed a bill approving the pipeline. At the end of February, President Obama vetoed the bill. The debate in Congress focused directly on the issue of the pipeline but contained highly polarised discussions on various economic and scientific policy beliefs as well as policy instruments.

Phase 4 marks a relative decline in polarisation, though the network diagram shows that this decline is, in part, due to a lack of involvement of actors on both sides of the debate. The nexus between participation and polarisation offers a possible link to the political attention literature discussed in the introduction. Polarisation is high when there is significant attention, which is associated with participation by actors on both sides. However, it is equally if not more plausible that issue attention is caused by polarisation and fragmented actor involvement. In any case, political actions and reactions, rather than exogenous events, seem to be the focusing events associated with high polarisation. During Phase 4, there was a relative stalemate between the Obama Administration and the Republican-led Congress as the 2016 election cycle got underway. But the debate in Congress still had the CPP as its anchor point, although policy beliefs on the science of the issue and policy instruments more generally were also heavily discussed and contributed to climate polarisation.

The results shown here broadly support the instrumental view of climate polarisation outlined in the introduction. First, polarisation did not monotonically increase. It decreased again even before the CPP was stayed by the Supreme Court on 9 February 2016 and during a period where Congress and the government were under the control of different political parties. Even in the summer of 2016, which was during the election campaign period, polarisation in Congress was low. This finding suggests a decoupling of polarisation in legislative speech and testimony from election campaigning on climate issues, despite Trump's later repeal of the CPP and reversal of various climate policies during his first three months in office in the spring of 2017.

Second, several events were associated with varying levels of polarisation in Congress. The events most clearly associated with high polarisation in legislative speech or testimony were related to the CPP and the Keystone

XL Pipeline, two partisan projects. In other words, endogenous events gave the largest impetus for polarisation, while it seems less plausible that exogenous events caused any of these polarisation patterns. Table 2 shows a list of exogenous focusing events. A number of exogenous events occurred during the analysis period, such as the release of the first and second parts of the IPCC 5th Report in September 2013 and March 2014, the Super Typhoon Haiyan in November 2013, which raised international awareness, but was framed more as a humanitarian crisis in the US, the polar vortex in January 2014, which prompted media coverage related to climate change, as well as the UN climate conferences (COP-19, COP-20), but they all occurred during time periods where polarisation in the Congressional debate was low. Scientific aspects were discussed in Congress, but they coincided with the two key partisan debates. COP-21, i.e., the Paris Meeting, in December 2015, falls into the polarisation period but is classified as an endogenous event given the fact that US President Obama's political leadership was instrumental in the adoption of the Paris Agreement.

Table 2. Exogenous focusing events in US climate politics.

Date	Short label	Description
27 Sep 2013	IPCC 5th report WGI	The IPCC released the first part of its 5th Assessment Report.
8 Nov 2013	Super Typhoon Haiyan	Super Typhoon Haiyan devastated the Philippines.
11 Nov 2013	COP-19	COP-19 begins in Warsaw, Poland. The conference provided the groundwork for the Paris Agreement.
6 Jan 2014	Polar vortex	An extreme cold wave due to a "polar vortex" affected much of the US.
31 Mar 2014	IPCC 5th report WGII	The IPCC released the second part of its 5th Assessment Report.
12 Apr 2014	IPCC 5th report WGIII	The IPCC published the third part of its 5th Assessment Report.
1 Dec 2014	COP-20	The UN climate conference (COP-20) was held in Lima, Peru.
4 Oct 2016	Paris Agreement ratified	The Paris Agreement reached the threshold for global ratification.

Note: WG = Working group.

4.2. Polarisation Dynamics in the Media Debates of Four US States

Figure 3 displays structural states/phases and polarisation with focusing events in the same manner as Figure 1, but for the media debates in the four swing states. Like before, the phase detection algorithm picks up on varying levels of polarisation and classifies them into distinct structural states.

Although not a top coal-producing state, Ohio extracts coal and natural gas. It is the only fossil fuel-extracting state in our selection of cases. Ohio was also the most coal-consuming state in our selection. Ohio's media polarisation curve had the highest peak around two endogenous events: the CPP announcement by the Environmental Protection Agency during the Obama Administration in June 2014, and a specific state-level event, Senate Bill 310 in Ohio in July 2014, which froze Ohio's renewable energy standards for two years, representing state-level backlash against the CPP.

Florida does not produce fossil fuels, and only 20% of its electricity was generated by coal-burning power plants in 2015 (U.S. Department of Energy, 2015). Nonetheless, it has a similar media polarisation curve to Ohio. In addition to the events at the national level, the peak in 2014 also coincides with significant debate about how the CPP would affect the state, along with the close race for governor. Florida experienced two more peaks in polarisation. One of them temporally coincided with the Paris Agreement in December 2015

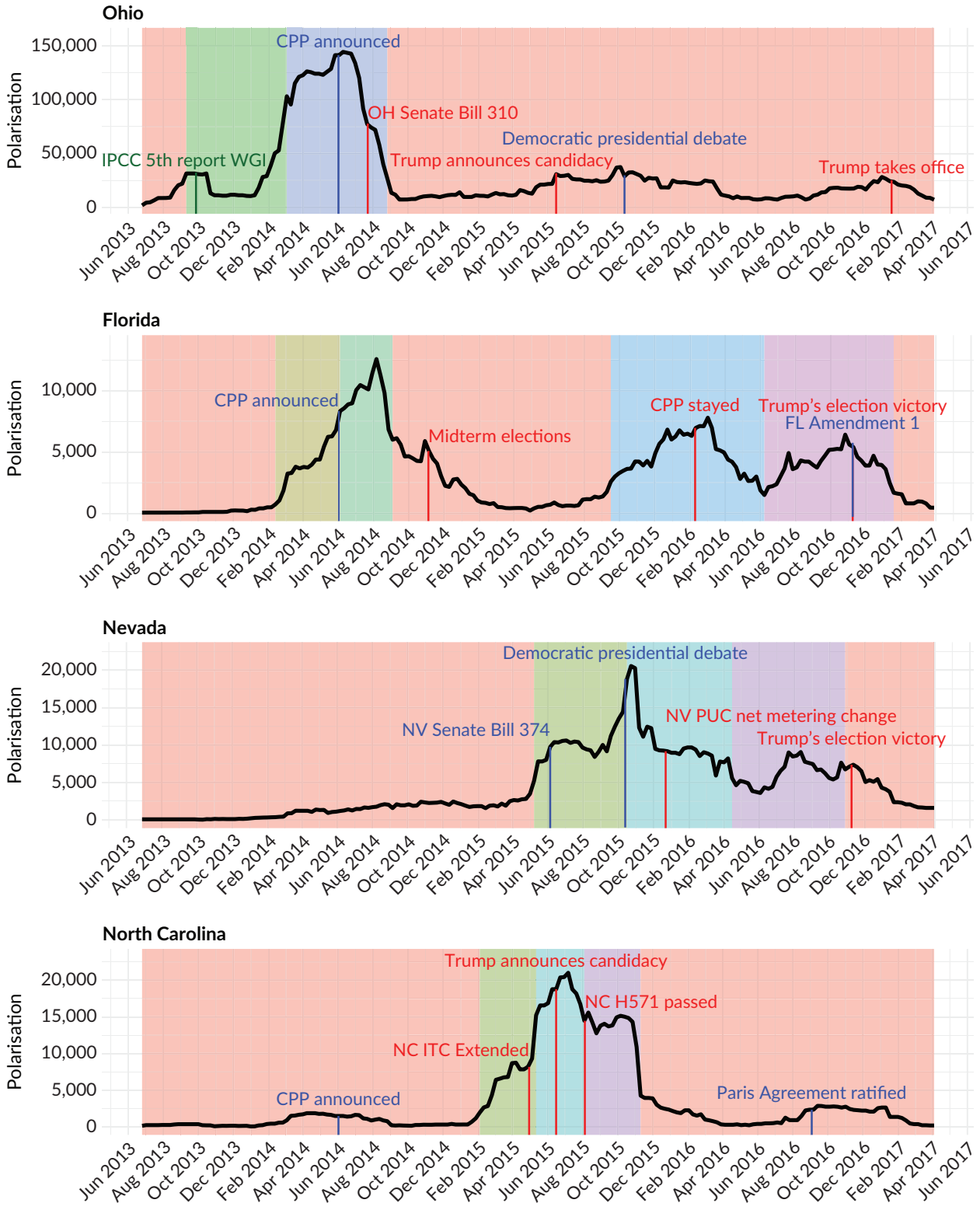

Figure 3. Time series of structural states and polarisation in four US states. Notes: The black curve represents polarisation; vertical lines indicate selected key events coinciding with phases of high polarisation, and they are associated primarily with Democrats (blue), Republicans (red), or international scientific assessments (green) and are listed in Tables 1 and 2; background colours indicate different structural states.

and the decision to stay the CPP. The other peak was associated with the defeat of state Amendment 1, which would have limited solar power sales, along with Trump's campaign and the presidential election in November 2016.

North Carolina's polarisation time series differs from the other curves. The media debate is polarised throughout 2015 with two peaks but no significant polarisation during the other years of the observation period. The polarisation peaks are associated with the response to the Dan River coal ash spill, which released toxic chemicals into the waterways of the state. It coincides with the period when Duke Energy, which was responsible for the spill, pleaded guilty to violating the national Clean Water Act, announcing that it would close the remaining coal ash ponds, and then the federal Environmental Protection Agency updating its requirements for the discharge of toxic chemicals associated with coal ash in late 2015 (Patel, 2016).

In Nevada, there were also periods of moderate polarisation. However, since the state was on track to meet its requirements under the CPP, having already transitioned away from coal as a source of most electricity generation, the polarisation was driven predominantly by debates over who benefits from solar power generation. The peak at the end of 2015 is driven by debates around net-metering in the state after the Nevada legislature passed a law requiring the state Public Utility Commission to examine the electric rate structure, which led to a decision for residential solar power generators to receive a lower rate for their energy. In September 2016, the state accepted a deal that restored the original rates for solar power generators (Shallenberger & Bade, 2016).

Ohio is the only case where moderate to high levels of polarisation temporally coincide with two exogenous events: the release of two sections of the IPCC's 5th Assessment Report. Like in the US Congress, our state-level analysis provides very little evidence in favour of associating exogenous events with increases in polarisation in the policy debate, while polarisation is temporally more likely linked with partisan or endogenous political events. The evidence presented from these four swing states supports the instrumental view of polarisation, where polarisation is not constantly high or ever increasing, but strategically amplified by key actors. In the case of these four media debates, the media had an interest in playing up polarisation ("media logic"; see Esser, 2013), perhaps in addition to partisan actors, while in the case of the US Congress, partisan actors had an interest in amplifying polarisation when opportunities arose. In both types of venues and data sources (see also Henrichsen et al., 2025), there was little temporal association between exogenous focusing events like international scientific reports or extreme weather and heightened polarisation in the debate. Elite polarisation in climate policy debates is political, not attitudinal.

5. Conclusion

The aim of the study was to measure elite polarisation in US climate policy debates and link it to endogenous ("instrumental polarisation") or exogenous focusing events ("intrinsic polarisation"). We contribute to the literature on elite climate polarisation (Chinn et al., 2020; Egan & Mullin, 2024; Fisher, Leifeld, & Iwaki, 2013; Fisher, Waggle, & Leifeld, 2013; Guber, 2017; Guber et al., 2021; Jasny & Fisher, 2019; Merkley & Stecula, 2018), group polarisation in networks (Aref & Neal, 2021; Salloum et al., 2022) and ideology (Bramson et al., 2017; Mehlhaff, 2024), and the dynamics of issue attention and policy entrepreneurship (Birkland, 1997; Downs, 1972; Kingdon, 1984).

Expressed elite polarisation on climate change in the US displayed considerable temporal variation over a four-year period both in subnational print media and Congressional testimony. Phases of high polarisation coincided with endogenous, political events in the sense that one side reacted to prior actions by the other side, while exogenous and hydrometerological focusing events mostly occurred during phases of low observed elite polarisation. This pattern is consistent with a view of climate polarisation as an instrument partisan actors choose to activate for electoral gains when an endogenous opportunity presents itself.

This view suggests that there is an important element of public and political attention in climate polarisation. Like in issue-attention cycles (Downs, 1972) and windows of opportunity (Kingdon, 1984), attention to the issue—and associated observable polarisation—cycles up and down. However, unlike the previous studies, the up cycles are not caused by exogenous focusing events; they are manufactured internally. This finding suggests that instrumental polarisation acts as a new theoretical mechanism for issue-attention cycles and multiple streams in established policy fields: Partisan actors do not *follow* the news and attention cycle; they *manufacture* conflict and attention when it serves a particular political purpose. Research on issue-attention cycles needs to distinguish between attention as a cause and a consequence. Future research on issue-attention entrepreneurship should also complement our approach by measuring the interests and motivations of political actors directly.

Our findings are compatible with the possibility that actors hold continuously (or even increasingly) polarised opinions but choose not to express them, which we call intrinsic polarisation. While we find support for the instrumental, rather than the intrinsic, view in elite policy debates, the two perspectives should be reconciled by factoring in the difference between expressed speech and the beliefs actors hold but do not find opportune to express. Initial results indicate that actors strategically choose what to say where (Henrichsen et al., 2025), and this conclusion may extend to the dynamics of political opportunities for amplifying conflict. Future research should assess elite opinion during times of low expressed polarisation. The return of the Trump Administration to office in 2025 and its efforts to limit climate policies and remove the US from the Paris Agreement once again creates an opportunity for replication with a similar case but more recent data.

The definition of polarisation should be expanded to account for mobilisation and the resulting participation it generates. While some scholars have called for normalising polarisation by network size (Salloum et al., 2022), which can be a sensible adjustment in some contexts, we argue that participation must not be separated from systemic polarisation when political actors actively mobilise support and thereby amplify polarisation. Ignoring this relationship would risk underestimating the extent of polarisation. Future research should also explore this nexus between polarisation, mobilisation, issue attention, and participation.

Finally, the two novel methods for discourse networks introduced here shed light on political discourse dynamics. They work well together and promise data-driven analyses of temporal trends in ideological networks. Here, they were applied to public discourse, rather than privately held opinions. Future research should also apply these tools to longitudinal observations of privately held opinions.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

The data are available from the authors upon request.

LLMs Disclosure

The authors used ChatGPT 4 by OpenAI to generate suggestions for focusing events listed in Tables 1 and 2. The authors reviewed and edited the text as needed and take full responsibility for the content of the publication.

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