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**Article:**

Tobin, P., Schmidt, N., Tosun, J. et al. (1 more author) (2018) Mapping states' Paris climate pledges: Analysing targets and groups at COP 21. *Global Environmental Change*, 48. pp. 11-21. ISSN 0959-3780

<https://doi.org/10.1016/j.gloenvcha.2017.11.002>

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# Mapping states' Paris climate pledges: Analysing targets and groups at COP 21

## Abstract

Prior to the 2015 Paris Conference of the Parties (COP), every state was requested to submit a pledge of their own design. To date, there has been a lack of large-n studies that provide a broad picture of these pledges. We employ Discourse Network Analysis to examine critically the climate pledges of all 162 actors at the Paris COP. Our research offers four main contributions. First, we provide data regarding the mitigation and adaptation components of every national pledge. Second, we identify six types of mitigation targets, and visually cluster every state according to these formats. Third, we argue that the pledges of the Umbrella Group of non-EU developed states, and of the group of oil exporting countries, showed greater internal similarity than the group comprising Brazil, China, India and South Africa. Finally, we critique the method as a means of analysing the new global climate governance context and argue that the method offers an innovative and unique means of understanding this complex policy landscape, when applied in a specific and focused manner.

## Highlights:

- Discourse Network Analysis is used to analyse all 162 Paris climate pledges.
- Extensive data regarding every mitigation and adaptation component is provided.
- Six types of mitigation targets are identified, mapped out and analysed.
- Certain negotiating groups are more internally similar in their pledges than others.
- The method provides an effective means of analysing complex negotiations.

Keywords: climate change; negotiating groups; UNFCCC; COP 21; Discourse Network Analysis.

## 1. Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) remains the foremost arena for developing a global response to climate change (Bäckstrand & Lövbrand, 2015). In particular, the 2015 Paris Conference of the Parties (COP) has been seen as ‘the most successful climate change conference ever’ (Kinley, 2017), albeit arguably inadequate for keeping temperature increases below 1.5°C and thus avoiding the strongest impacts of climate change (Buxton, 2016; Cléménçon, 2016; Morgan, 2016; Spash, 2016; Vandyck et al., 2016). Unlike the stymied and unambitious 2009 Copenhagen COP (Bodansky, 2010; Dimitrov, 2010), prior to the 2015 COP, every state was requested to submit climate targets known as ‘Intended Nationally Determined Contributions’ (INDCs) (Rajamani, 2015; UNFCCC, 2014a). The Paris Agreement’s success is in part due to the integral role of the INDCs, which are ‘anchored into’ the Agreement (Rajamani, 2016). As the main tool for achieving reductions in the future, INDCs warrant systematic scholarly analysis. The introduction of INDCs has re-emphasised the roles of all states in directing climate negotiations, potentially facilitating a more ‘polycentric’ (Ostrom, 2012), or at least, bottom-up (Jordan et al. 2015) climate governance model.

Prior to the creation of this new context, much of the existing comparative literature focused on small-group climate mitigation performance (for example, Blaxekjær and Nielsen, 2015; Tobin, 2017), rather than attempting to provide a broad yet empirically rich analysis of the policy stances taken by every state. The identification of how states position themselves towards climate mitigation on a global scale enables a more comprehensive understanding of contemporary climate policy. This understanding can also be used both as a springboard for future research that explains policy variation, and by practitioners to determine the role assumed by certain states within the global nexus. Within the UNFCCC model, states are members of negotiating groups, divided according to regional and negotiating similarities (UNFCCC, 2014b). Groups facilitate cooperation between states in order to achieve shared goals (Starkey et al., 2008); fragmentation within a negotiating group can affect its

ability to achieve these goals (Betzold et al., 2012). Notwithstanding that many states receive support in the drafting of their INDCs (Levin et al., 2015), by analysing states' INDCs, we can assess the extent to which the members of these groups are unified in their policy stances. Our overarching goal is to determine the extent to which the contents of INDCs can show the existence of otherwise unknown policy-based groups, and demonstrate fragmentation within already-existing formal groups. This information is important, as it will enable future research to determine how coalitions inform policy outputs, and by extension, why more ambitious policies are sometimes achieved, while others are not. Thus, first, we group the states according to their climate mitigation targets, in order to obtain a broad perspective of the policy-based groups that previous research may have missed. Second, we ascertain the inconsistencies that exist within negotiating groups, focusing on the biggest emitters. Accordingly, our research question asks:

To what extent were the INDCs of the Umbrella Group, BASIC (Brazil, South Africa, India and China) Group and OPEC (Oil and Petroleum Exporting Countries) Group internally consistent?

We seek to build on the stocktake analysis of targets produced by Vandyck et al. (2016) in this journal, which identifies the impact of the pledges on energy systems and the economy. To do so, we assess a means for analysing both the breadth and depth of this new climate governance context, with a view to also determining the role played by coalitions in influencing policy outputs. Using Discourse Network Analysis, or 'DNA' (Leifeld & Haunss, 2012; Leifeld, 2013a, 2013b), we analyse each of the 162 INDCs submitted to the UNFCCC. We analyse the statements – known as 'concepts' – contained within each INDC, in order to create visual 'affiliation networks' of actors (countries or groups of countries), as determined by actors' shared targets and policy components.

The article is divided into three main sections. First, we discuss the development of global climate governance at the UNFCCC, noting the importance of both climate mitigation and adaptation to the INDCs. We then discuss the groups of the UNFCCC, identifying the targets submitted by the four groups that comprise the world's biggest greenhouse gas (GHG) emitters – the European Union (EU), Umbrella, BASIC and OPEC states – as being especially deserving of study, having collectively

produced 78.5% of the world's GHG emissions in 2013 (WRI, 2014). Second, we explain the nuances of the DNA method, and identify the types of concepts that were coded within each INDC. In the third section, we present and discuss our results. Our research offers four major contributions:

- i) we provide extensive data regarding the mitigation and adaptation concepts of every actor's INDC;
- ii) we identify six types of INDC mitigation targets, and cluster every state according to these formats, highlighting unexpected and divergent cases in each group. The most common form of target is based on reducing emissions compared to a predicted Business as Usual (BAU) scenario, which may enable such states to increase their emissions in absolute terms, thus exacerbating climate change;
- iii) we argue that the Umbrella Group of non-EU developed states and the OPEC Group show greater internal similarity regarding target formats than the pledges submitted by the BASIC Group;
- iv) we argue that the DNA method offers a range of unique benefits for understanding this complex policy landscape, when applied in a specific and focused manner.

We may reasonably assume that international climate targets will be formulated via the INDC approach for the foreseeable future. In response, we analyse this important and complex context, and critically assess an innovative new method's capacity to capture, represent and compare the differing pledges of a large number of states. Moreover, we provide some clear directions for future research; for example, our analysis highlights the importance of gender politics in the pledges, and the heterogeneity of various negotiation groups. By mapping out every country's pledge, we achieve a wider perspective of the interrelationship of targets, thus contributing significant methodological and empirical insights to the field.

## **2. The importance of INDCs to the Paris COP**

### **2.1 Background to the Paris COP**

The INDCs that are anchored to the Paris Agreement were a vital innovation because they were submitted by every state. When analysing the contents of states' INDCs, we are interested in actors' policy positions on two broad issues, namely: the mitigation (prevention) of climate change; and adaptation (the response) to climate change. First, climate mitigation has dominated the attention of the UNFCCC negotiations since their creation in 1992, in line with the assumption that significant adaptation measures can be avoided if climate change is mitigated effectively (for analysis, see Schroeder, 2010). The Kyoto Protocol – which entered into force in 2005 – committed developed states and Economies in Transition (from Communism) to a range of explicit emissions reduction targets (McLean & Stone, 2012). This 'Annex I' group of states comprised just 27 members (including the US, which did not ratify the Protocol, and Canada, which withdrew in 2011). Moreover, developing states were excluded from these obligations. Since then, many emerging states, particularly Brazil, South Africa, China, and India – the BASIC states – have seen their emissions rise rapidly (e.g. Rong, 2010; Dubash, 2011; Upadhyaya, 2016) and have thus played an increasingly prominent role in negotiations. For example, these four states' leaders alone joined former US President Barack Obama to thrash out the details of the Copenhagen Accord in 2009 (Bodansky, 2010: 234). As such, the successor to the Kyoto Protocol needed to include developing states in addition to developed states. Second, the Kyoto Protocol neglected the importance of climate change adaptation. Adaptation represents a particularly challenging quandary within the topic of fairness and climate justice. Developing states that have done the least to cause climate change may be the worst affected by it, and be in the weakest economic position to adapt to these impacts (Adger et al., 2003; Hug et al., 2004). Moreover, mitigation efforts have been increasingly perceived as insufficient (Obergassel et al. 2016), and nascent state-level adaptation plans have become established (see Bauer et al. 2012; Massey et al., 2014; Preston et al., 2011).

With both mitigation and adaptation in mind, it was agreed at the 2013 Warsaw COP that each state should submit an INDC in the months before the Paris COP (Rajamani, 2015; UNFCCC, 2014a). Put in more abstract terms, the Warsaw COP created an opportunity structure for the countries, which we expect them to have utilized according to their respective cost-benefit-calculus. Regarding mitigation,

the UNFCCC's instructions for submitting INDCs encouraged all states to make a 'fair and ambitious mitigation contribution, according to their national circumstances' (UNFCCC, 2014a: 3). The format of this mitigation contribution is therefore open for states to determine independently. As developing countries were previously exempt from providing national communications, specific funding schemes were put in place by developed countries to support the INDC formulation process. A representative of the Dominican Republic (06/12/2016) told us: 'We actually had help developing our INDC from the German government [...] from the end of 2014 until October 2015.' A consultant involved in the development of several INDCs (11/11/2016) concurred: 'The drafting of the INDC was supported by different donor organisations. You really need to bring together very different types of agencies and ideally, even private sector companies'. As such, we may assume that the formats of mitigation targets contained within the INDCs will vary significantly. Regarding adaptation, Decision 1/CP.20 asks all parties to either communicate their adaptation planning or include an adaptation concept in their INDCs (UNFCCC, 2014a). We may expect that climate adaptation is more likely to dominate the INDCs of states that are more vulnerable to the impacts of climate change and are less well-equipped to respond to this vulnerability. However, all states may be expected to have made at least some reference to climate adaptation.

## 2.2 The state of the art

The majority of the states that are party to the UNFCCC are members of coalitions or groups. These groups are influential; Castro et al. (2014) find that groups – specifically, developed ('Annex I') states and developing ('non-Annex I') states – influenced negotiation behaviour and amplified the differences between the more and less industrialised countries. The UNFCCC comprises five regional groupings, determined broadly by continent. However, states also participate in further groups that are not regionally determined, and instead are based around common negotiating positions (UNFCCC, 2014b). Blaxekjær and Nielsen (2015) use narrative policy analysis to examine the performance of these negotiation groups at the UNFCCC, finding significant differences between them regarding their stances on key UNFCCC principles, such as the North-South divide and the concept of 'Common But

Differentiated Responsibilities'. These political groups are the object of our investigation, as they are determined by actors' preferences, unlike the geographical groupings that are determined by location (even if geography may play a role in shaping actors' preferences).

Betzold et al. (2012) provide a thorough overview of the existing literature on group behaviour in multilateral negotiations. They note the work of Starkey et al. (2008), who posit that negotiating groups come into existence because, by doing so, each individual member stands to increase their negotiating power and likely subsequent gains; predictably, this process is easier within homogeneous groups (Constantini et al., 2007). With this rationale for coalition-building in mind, we may initially assume that these negotiating groups are, for the most part, internally consistent in their preferences. However, Betzold et al. (2012) show that small island states vary in their focus towards climate mitigation and adaptation in their negotiating stances. Thus, even coalitions with much in common are prone to a degree of fragmentation, particularly when the topic under investigation is as complex as climate policy. In turn, this fragmentation may inhibit the ability of coalition member states to achieve their preferred outcomes, thus rendering them less influential in the creation of the finally-negotiated outcome. Therefore, we examine states' INDCs, to identify previously unidentified policy-based groups, and to determine the degree of unity or fragmentation in the pledges of more formal and assumedly influential groups. This research may then act as a springboard for future research to ascertain the degree to which these groups influenced the vital Paris climate negotiations.

### 2.3 Research Objectives

The submission of INDCs to the Paris COP, in which scores of complex climate pledges were created and will be regularly updated, raises a new methodological challenge: how to map the targets of 162 state actors in an analytically rich yet understandable manner. By attempting to do so, 'hidden' groups may be identified that are based around specific policy positions rather than more formal alliances that may oversimplify similarities between states. To date, analyses of pre-Paris climate policy targets have tended to focus on individual actors, especially those that are the significant or emerging GHG emitters (for example, Bäckstrand & Elgström, 2013; Michaelowa & Michaelowa, 2012). This



approach was especially useful when only a small number of states were formulating targets via the UNFCCC. Other studies have sought to analyse the climate change efforts of particular groups, especially regarding mitigation rather than adaptation, such as those of the Annex II of particularly high-emission developed states (Tobin, 2017). Following the Paris COP, Vandyck et al. (2016) analyse the mitigation goals of every INDC in order to determine the implications of these pledges for energy systems and the economy. However, no study has yet sought to map and analyse the mitigation policy stances of every participating state-level actor at the UNFCCC. We break new ground by analysing in detail the mitigation concepts of all 162 INDCs, in order to provide an analytically rich understanding of the types of targets submitted to the Paris COP, and ascertain the groups that exist according to mitigation policy positions. Such a focus on mitigation rather than adaptation targets is relevant here due to the highly country-specific nature of adaptation policies. Therefore our primary research objective is the mapping of the varying types of INDC climate mitigation target submitted by every state.

From here, having mapped the INDC mitigation pledges, we seek to determine the extent of INDC-based group fragmentation within the groups of major emitters. In particular, as explained below in section 4.2, we focus on the groups that comprise major emitters. By doing so, we can identify the extent to which more formal groups share common pledges regarding a range of different climate change components, beyond mitigation. Such analysis in turn enables a clearer understanding of the degree of unity or fragmentation within these groups to be obtained, in order to subsequently assess their influence at UNFCCC negotiations. We also note the EU's INDC, but cannot assess its fragmentation as only one pledge was submitted on behalf of all 28 member states. As such, our research question asks:

To what extent were the INDCs of the Umbrella Group, BASIC Group and OPEC Group internally consistent?

### 3. Methods

#### 3.1 Methodological assumptions

We analyse the existence of groups at the Paris COP, according to the policy positions outlined by states in their INDCs. To analyse them, we use a nascent approach, called Discourse Network Analysis (Leifeld & Haunss, 2012; Leifeld, 2013a, 2013b). DNA is designed to facilitate the extraction of network data via qualitative, category-based content analysis, according to the statements – known as ‘concepts’ – found within actors’ statements. As Leifeld and Haunss (2012: 389) state, ‘[o]perationalising policy debates by employing social network analysis is a natural choice, as discourse, especially the alignment of actors by common claims, is essentially a relational phenomenon’. DNA builds upon social network analysis by drawing from political claims analysis (Koopmans & Statham, 1999) to analyse shared concepts. By examining the actors that share similar concepts, we can identify groups or coalitions that otherwise would have been missed. As such, DNA is premised on the assumption that we can assign a set of actors,  $A=\{a_1, a_2 \dots a_m\}$  to a set of concepts,  $C=\{c_1, c_2 \dots c_n\}$ . In addition, this analysis is further complemented by data from forty-nine expert interviews that took place in Brussels in September 2013 and April to June 2015, and from three expert interviews conducted in Marrakech in November and December 2016 via Skype.

#### 3.2 Employing the method

DNA enables the identification of sub-coalitions within a discourse coalition. The inclusion of multiple cleavage lines that are present in the discourse may help to avoid overly reductionist, bipolar understandings of policy positions. This approach enables actor-based analysis of political discourse, and involves two steps: the first involves coding concepts into categories using software called Discourse Network Analyzer; the second uses separate software – in this case, NetDraw (Borgatti, 2002) – to convert these structured data into networks that can then be illustrated visually (Leifeld, 2013; Rinscheid, 2015; Tosun and Schaub, 2017). Once the text of the INDCs is coded, we can create ‘affiliation’ networks that demonstrate how actors are connected via specific categories. The first step is the identification of concepts; we can then highlight the extent to which actors ‘affiliate’ to each

concept. By mapping the states that shared one or more concepts in their INDCs we may identify previously hidden fragmentation, or even find internal sub-coalitions (internal groupings of states, determined by highly similar pledges). After identifying the key concepts of the INDCs, we employ a ‘dual mapping’ approach: we map all actors according to a small number of mitigation concepts; and we map a small number of actors according to all of the concepts (in response to our research question regarding the Umbrella, BASIC and OPEC Groups). This dual mapping approach enables a more holistic understanding of the wider context to be achieved first, before focusing on the unity or fragmentation of key groups of actors later.

### 3.3 The material analysed

We analyse all 162 INDCs submitted to the UNFCCC, up to and including the 1<sup>st</sup> May 2016. 141 INDCs were submitted in English, 12 were in French, 8 in Spanish and 1 in Arabic. All of the INDCs were read in full and their contents were coded manually. Sections of text within each INDC were highlighted and then labelled according to their topic. The INDCs were coded by four different people, such that each coder was a fluent speaker of the language they were coding. The coders of the French, Spanish and Arabic INDCs sent pdfs of the coded INDCs to the English language coder. All of the final coding was entered manually by the first author in a consistent manner. The coding scheme emerged inductively from the data as they were being analysed and was refined as part of the coding process. Thus, we used a grounded approach to identify the key concepts of the INDCs, as part of an inductive and systematic analysis, in order to detect areas for future research.

## 4. Results and discussion

Regarding the different types of climate mitigation targets identified during the coding process, six different concepts were identified across the INDCs. The six types of mitigation target were:

- ‘Absolute reduction compared to baseline year’;
- ‘Emissions target based on per capita figures’;
- ‘Explicit emissions intensity/GDP target’;

- ‘Explicit emissions target based on BAU’;
- ‘Peak, plateau and decline target’;
- ‘No explicit emissions reduction target’.

Only one of these concepts (‘No explicit emissions reduction target’) was mutually exclusive to the other five concepts. In section 4.1 we analyse each of the six types, according to the states that formulated each type of target and the implications of having done so. Appendix A lists all 162 actors according to their mitigation target type.

In addition, we also coded three further concepts to add nuance to our understandings of the mitigation concepts. These concepts reflected whether mitigation concepts included:

- all four sectors (agriculture, energy, industry and waste) identified by the Intergovernmental Panel on Climate Change (IPCC) as being most significant;
- Land-Use, Land Use Change, and Forestry (LULUCF);
- and fluorinated gases (‘f-gases’).

Explaining each of these in turn, first, we selected the number of IPCC sectors as a concept because the number of sectors included within the mitigation target reflects the rigidity of a state’s overall mitigation target (Vandyck et al., 2016: 50-51). If certain sectors are excluded, then further emissions may be increased significantly from that sector, while the state could still claim to have met its mitigation target. Thus, if all four IPCC sectors are included, we may assume that the state has fewer means of increasing its emissions. Next, LULUCF is a major, yet contested, sector for GHG mitigation, and runs separately to the four IPCC sectors (UNFCCC, 2014c). For some states, inclusion of LULUCF within the target may facilitate the achievement of a mitigation target more easily, if, for example, the state possesses forests that are considered a ‘sink’ that reduce net emissions (see House and Grassi, 2017). Some states referred to AFOLU (Agriculture, Forestry and Other Land Use) plus Energy, IPPU and Waste, rather than LULUCF plus Energy, Industry, Agriculture and Waste: In these cases, because the sectors involved remained broadly the same, the actors were marked as including all four IPCC sectors as well as LULUCF. Finally, the inclusion of F-gases was coded

because these gases are the fastest growing source of GHG emissions globally and are highly carbon intensive. For instance, over a hundred-year time horizon, the Global Warming Potential of sulphur hexafluoride is 22,800 times greater than carbon dioxide (IPCC, 2007). As such, by omitting such gases from their climate mitigation target, a state could significantly increase F-gas production, and therefore exacerbate climate change, whilst still meeting an overall mitigation target. For instance, Nigeria's INDC (Government of Nigeria, 2015) warns of 'HFC installations that are being phased out in OECD countries' being dumped within its borders. Only states that included all three forms of F-gases – hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride – listed in the UNFCCC (2014d) 'basket of six' most important GHGs (alongside carbon dioxide, methane and nitrous oxide) were coded as containing F-gases within their target.

Actors were encouraged to communicate their adaptation planning within their INDCs (UNFCCC, 2014a). However, in stark contrast to the range of formats of climate mitigation concepts identified above, several actors did not even mention climate adaptation. Moreover, climate adaptation is a highly context-specific policy area. As such, climate adaptation was coded simply according to whether an actor communicated its adaptation planning within its INDC, rather than the exact nature of the target, as in the case of mitigation concepts. Due to the binary coding of this concept, we do not express these data as a network, but simply as two lists (Appendix B). Of the 162 INDCs, 146 acknowledged or outlined adaptation efforts. Amongst the states that did not communicate adaptation planning, the actors can be divided exactly into two groups. The first group comprises several Annex I states (UNFCCC, 2014e), which includes developed states, such as the EU, Japan, and the US, and Economies in Transition, such as Albania, Kazakhstan and Russia. Annex I states, from a global perspective, possess high (but diminishing) GHG per capita levels, and so, according to the Kyoto Protocol, were the primary targets for emissions reduction. Despite being Annex I states, however, Australia, New Zealand, Norway and Ukraine did communicate their adaptation planning, as they highlighted current adaptation efforts that are listed in existing legislation (see section 4.3.2). Tuvalu (Government of Tuvalu, 2015), a low-lying Pacific island state, did likewise, but stated that 'Tuvalu considers that the focus of INDCs should primarily be mitigation', reflecting its desire to prevent

significant climate change due to its acute vulnerability to rising sea levels. The second group that did not communicate their adaptation planning comprises continental European non-Annex I states, such as Bosnia Herzegovina, Montenegro and San Marino. Again, from a global perspective, these states are responsible for higher than average per capita emissions.

Finally, an unexpected finding of the coding process was that over a third of states referred to the importance of gender and/or women's politics within their INDCs, either in the form of the impact of climate change on women, or the importance of women in facilitating adaptation to climate change. The study of the role of women's politics in responding to climate change is a burgeoning topic in the field (e.g. Arora-Jonsson, 2011; Buckingham & Le Masson, 2017) and it has been argued that because of women's roles as both the agents and the affected of climate change, active engagement with gendered issues in policy documents is necessary for the effective mitigation and adaptation to climate change (Denton, 2002). For example, Nigeria's INDC (Government of Nigeria, 2015) highlights the importance of improving efficiency in household energy consumption for climate purposes; yet, it notes that women are less able to access the financing needed for such a change, despite being the primary agents for using household fossil fuels. As such, the inclusion of gender politics as a concept within this analysis enables us to determine states' comprehension of and ambition on this issue. Thus, 'acknowledgement of gender politics' is the eleventh and final concept coded in the analysis. The list of sixty-five states that referred to women and gender politics is provided in Appendix C; all of them were non-Annex I states.

#### 4.1 Mapping types of climate mitigation target

Figure 1 maps the mitigation targets of all 162 actors, demonstrating the existence of six policy-based groups of states. Twelve states, including China and Mexico, submitted their targets in two formats, thus linking clusters together. Three of the six concepts comprise much larger numbers of actors than the other three. The three larger groups were: the group with explicit targets based on BAU scenarios (82 actors, located at the top-left of Figure 1); the group with absolute reduction targets compared to

baseline years (38 actors, located at the bottom-right of Figure 1); and the group with no explicit emissions reduction target (30 actors, located at the centre-right of Figure 1). Regarding baseline year targets, Nauru stated in its INDC (Republic of Nauru, 2015) the assumption that ‘mitigation contributions from developed countries may be absolute economy-wide emissions reduction targets relative to a base year while the developing countries can communicate policies, measures and actions departing from business as usual emissions.’ That is to say, developed states were more likely to have submitted explicit targets based on historical emissions levels, whereas the targets from developing states were more likely to be based on BAU scenarios. This assumption is broadly, but not exclusively, accurate. We show visually the trends regarding the composition of these largest groups below Figure 1.

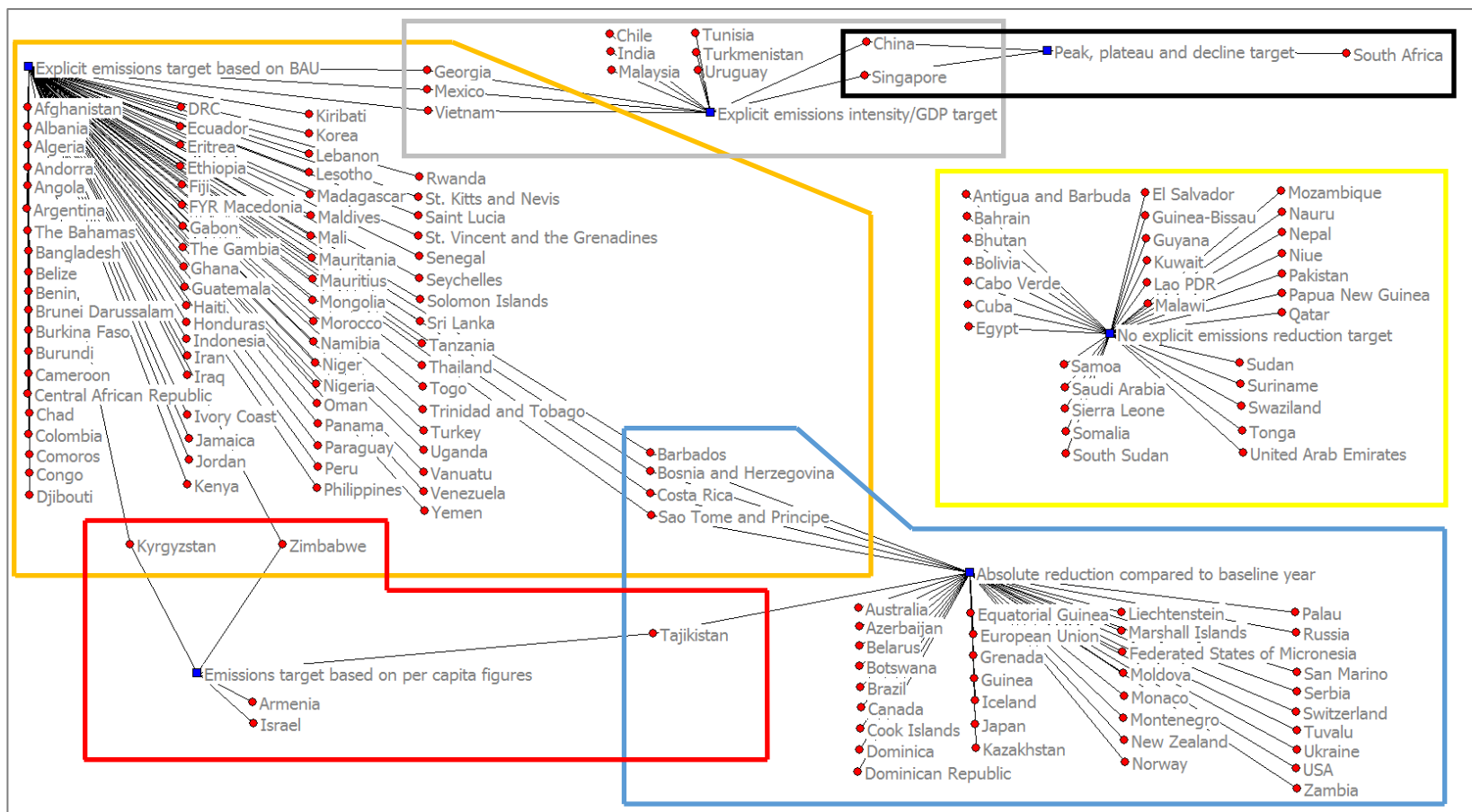


Figure 1: Affiliation network mapping all 162 INDCs according to the format of their mitigation targets.



#### 4.1.1 BAU targets

The actors with mitigation targets based on BAU scenarios are primarily non-Annex I states; 76 out of the 82 states were from the G77. The eight states with BAU targets that were not from the G77 were Albania, Andorra, FYR Macedonia, Georgia, Korea, Kyrgyzstan, Mexico and Turkey (although, Georgia, Kyrgyzstan and Mexico also submitted their mitigation targets in an additional format). The deadline year for BAU scenarios differed between states; for instance, while most selected 2030, Indonesia chose 2020, and Gabon selected 2025. BAU targets are likely to necessitate less extensive emissions reductions than those targets based on absolute emissions reductions compared to a baseline year. For example, Oman's BAU scenario predicts significant emissions growth until 2030, yet its target only seeks to reduce this BAU growth by 2%. Another example is the INDC of FYR Macedonia, in which 'BAU' is defined as a scenario in which 'existing measures' – that is to say, any form of climate mitigation currently underway – are not included. Thus, FYR Macedonia's BAU scenario is arguably more carbon intensive than its current activity would suggest it will be, making its 30% emissions reduction target on BAU levels an easier task to pursue. As such, BAU targets may be commonly assumed to be less ambitious than an absolute reduction target that is based on a historical baseline year. Relatedly, Keohane and Victor (2016) suggest that the uncertainties in BAU targets may be larger than the actual cuts in emissions achieved. Highlighting the preponderance of developing states within this group of BAU targets, only two members of the Organisation of Economic Co-operation and Development (OECD) submitted their targets based on BAU scenarios, namely Turkey and the Republic of Korea. Turkey was the third-poorest member of the OECD by GDP per capita in 2015, after Chile and Mexico (OECD, 2016), which may explain the state's limited capacity and willingness to reduce emissions. However, the inclusion of the Republic of Korea in this list is a surprise considering its reputation as a leader in Green Growth (Lee, 2013; Death, 2015) and member of the progressive block of states towards climate change (Falkner et al., 2010).

#### 4.1.2 Absolute reduction targets based on a baseline year

The bloc of 38 actors that submitted their targets as absolute reductions compared to baseline years was dominated by developed states. The EU, for example, acting on behalf of its 28 member states,

pledged to reduce emissions by 40% by 2030 compared to 1990 levels. All nine members of the Umbrella Group of non-EU developed states submitted mitigation targets in this format (as explored further in section 4.2.2). Four of the five members of the traditionally ambitious Environmental Integrity Group (EIG: Liechtenstein, Mexico, Monaco, the Republic of Korea, and Switzerland) submitted such targets, with the Republic of Korea the only exception, as noted above. Thus, the majority of Annex I developed states submitted targets in this format. Indeed, Article 4(4) of the Agreement encouraged developed states to ‘continue taking the lead by undertaking economy-wide absolute emission reduction targets’. As such, we find a significant split between developing and developed states in the formats of their INDCs, as is explicitly encouraged by the wording of UNFCCC documentation, which encourages a binary demarcation between ‘developed’ and ‘developing’ states. This finding suggests that the principle of Common But Differentiated Responsibilities – fundamental to the creation of the UNFCCC but increasingly challenged by groups of developed actors (see Blaxekjær & Nielsen, 2015) – is underpinned and strengthened by the formats of climate mitigation targets that were submitted to the Paris COP.

However, not all of the 38 absolute emissions targets based on baseline years were submitted by developed states. 11 of the 38 absolute targets were submitted by states from the Alliance of Small Island States (AOSIS) negotiating group, despite having not been encouraged to submit such extensive commitments (UNFCCC, 2014a). This commonality suggests that despite their low current emissions, AOSIS states are sufficiently threatened by the impacts of climate change that they are willing to reduce their emissions in absolute terms, perhaps in the hope of encouraging higher-emitting states to do likewise. Similarly, several African states submitted such mitigation targets, as did Brazil, in contrast to the other members of the BASIC Group (see section 4.2.1 below).

#### 4.1.3 States lacking explicit mitigation targets

The group of 30 states that did not submit explicit emissions reductions targets are diverse, and comprise several OPEC members, some carbon sinks, various members of AOSIS, and a number of Sub-Saharan states. The four OPEC members in this group (Kuwait, Qatar, Saudi Arabia, and the

United Arab Emirates (UAE)) are dependent upon high-carbon fossil fuel exports to support their economies, which may explain their failure to submit mitigation targets (the OPEC Group is explored in more detail in section 4.2.3). In stark contrast to the OPEC member states, carbon sinks take in more GHGs than they produce (UNFCCC, 2014c). For example, Bhutan, Guyana, Niue and Suriname each explicitly stated that they are carbon sinks, and thus cannot reduce their emissions. Therefore, the group of states without explicit emissions reduction targets should not be considered as comprising exclusively climate laggards. Indeed, as Suriname (Republic of Suriname, 2015: 2) stated starkly in its INDC, ‘Suriname has been providing a key ecosystem benefit to the world long before the issue of climate change was widely recognized and accepted. A service for which Suriname has not been paid’. Several AOSIS states and Sub-Saharan states make up the remainder of this group of targets. These states produce limited greenhouse gas emissions, and as such, any reductions by these states would have minimal impact on global emissions, whilst being potentially costly, or challenging to existing standards of living. It is of little surprise that several such states did not include an explicit emissions reduction target in their INDCs.

#### 4.14 Carbon intensity, per capita, and peak, plateau and decline targets

The three smaller groups of states comprised targets that are based on carbon intensity (11 states, top-centre of Figure 1), per capita figures (5 states, bottom-left of Figure 1), and ‘peak, plateau and decline’ (PPD) targets (3 states, top-right of Figure 1). First, by submitting a target based on carbon intensity, eleven states, including BASIC states China and India, will seek to increase the size of their economies – and emissions production – but decouple the environmental impact of their economic growth. India (2015: 1) states this objective explicitly: ‘Nations that are now striving to fulfill [sic] this ‘right to grow’ of their teeming millions cannot be made to feel guilty of their development agenda as they attempt to fulfill [sic] this legitimate aspiration.’ Thus, these eleven states may increase overall emissions without breaking their mitigation pledges, representing a possible source of future global emissions growth. Second, regarding the states that submitted targets according to per capita emissions, one may assume that these states are expecting continued growth in their population figures. Such population expansion would facilitate the achievement of such a mitigation target. As

such, even if absolute emissions increase – thus exacerbating climate change – these mitigation targets may still be achieved. Finally, South Africa, Singapore and China formulated PPD targets (the latter two states having also expressed a target based on carbon intensity). As these states do not commit to declining their emissions before 2030, their targets may still be achieved in the event of significant emissions growth. Thus, either through PPD or intensity targets, three of the four rapidly-industrialising BASIC states will be able to increase their emissions until at least 2030 (see below).

#### 4.2 Sub-groups within the groups of major emitters

The EU submitted a shared INDC and so its internal policy similarity cannot be assessed using DNA. However, it is useful to examine briefly the EU because of its significance as a major emitter, its pre-existing status as a climate leader (Kilian & Elgström, 2010), and, more practically, because of the nature of its INDC. The EU's target of a 40% GHG emissions reduction on 1990 levels by 2030 represents arguably the most ambitious target submitted at the Paris COP. Reflecting this stance, one European Commission employee (22/04/2015) told us that the target 'is by far the most ambitious target... and we have done that despite being hit by the worst economic crisis since the Second World War.' The inclusion of all four IPCC sectors by the EU consolidated this strong contribution. However, the EU did not include details on how LULUCF would contribute to its emissions reductions targets, thus opening up the EU to charges of hypocrisy, having encouraged other actors to submit INDCs that were as transparent as possible. In stark contrast to its mitigation ambitions, however, and in contrast to several members of the developed Umbrella Group, the EU omitted adaptation planning from its target (Fleig et al., 2017). One country delegate (06/12/2016) involved in creating the EU INDC stressed that officials debated 'whether to include a reference to adaptation strategies. The EU made a submission subsequently on its action on adaptation, but made clear that it was separate from the INDC'. As such, this polarised INDC – highly ambitious regarding mitigation and silent on adaptation – is a useful contextual reference point when analysing the INDCs of the other groups. These groups are the high-emitting non-EU developed members of the Umbrella Group; the BASIC Group of rapidly-industrialising emerging major economies; and the OPEC Group, which

comprises states most economically dependent on fossil fuels (see for example, Christoff, 2010; Dike, 2013; Qi, 2011; Rong, 2010; Torney, 2015).

#### 4.2.1 The BASIC Group

Figure 2 shows the affiliation network of the BASIC states, according to the eleven INDC concepts identified in the coding process. Brazil and China share only one similarity – communication of adaptation planning – otherwise, the formats of the two actors’ INDCs are entirely different. Empirically, this finding provides new evidence to clarify previous research that acknowledged similarities and differences within the group, but was uncertain over whether the resultant negotiating position of the group would be unified or fragmented (Qi, 2011; Rong, 2010). The Brazilian and South African INDCs show the greatest similarity within the group, possessing four concepts in common, while the Brazilian and Chinese INDCs are the most different. India shares two common concepts with each of the other three states. Due to the Group comprising only four members, it is difficult to argue that sub-groups exist; however, the INDCs of Brazil and South Africa represent the closest example of a sub-group amongst the BASIC states (circled in Figure 2). Thus, we find that the BASIC Group did not assume a common policy position regarding the formats of its INDCs. Eight different concepts were identified across the four states (out of the eleven coded in this study), which is a greater number of concepts than found in the Umbrella and OPEC groups, despite the BASIC Group comprising fewer states, suggesting that from a policy perspective, the BASIC group is relatively fragmented. More research is therefore needed to see if this empirical finding affected the group’s ability to influence negotiations (e.g. see Betzold et al., 2012; Constantini et al., 2007; Starkey et al., 2008).

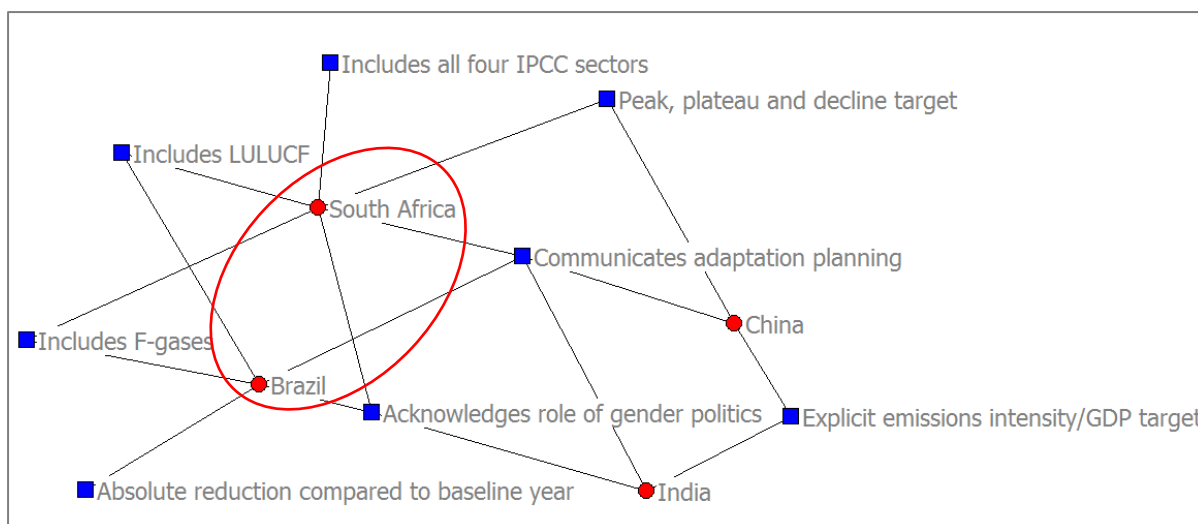


Figure 2: Affiliation network of the BASIC Group, highlighting the degree of similarity within the group according to shared INDC concepts.

#### 4.2.2 The Umbrella Group

While the identification of sub-groups in the BASIC Group is challenged by its small size, in contrast, the Umbrella Group comprises nine members. All nine states submitted mitigation targets as absolute reductions compared to a baseline year, reflecting greater internal similarity of format than in the BASIC Group, and underlining the status of the Umbrella Group as comprising developed states that have the economic capacity and historical responsibility to reduce emissions in absolute terms. However, three sub-groups do appear within the Umbrella Group, which are divided by continent; a North America sub-group, an Asia sub-group, and a Europe-Australasia sub-group. More research is needed to identify the factors that influenced this geographical differentiation, and how these differences influenced the states' behaviour at the Paris COP. Figure 3 shows that the INDCs submitted by the US and Canada only included three of the eleven concepts identified as part of this study – an absolute emissions reduction target compared to a baseline year, with the inclusion of the four IPCC sectors and F-gases – which were also shared by all of the other members. As such, we may argue that the US and Canadian INDCs represent the 'minimalist' stance within the group. Kazakhstan, Russia and Japan shared an additional concept, the inclusion of LULUCF, thus making their targets more specific and comprising fewer means of increasing emissions before 2030. Lastly,

Australia, New Zealand, Norway and Ukraine also communicated existing adaptation planning; the other five states made no reference to adaptation whatsoever. Thus, compared to the BASIC Group, which comprised eight concepts across just four states, the Umbrella Group shared just five concepts across nine states, reflecting a much less fragmented set of INDCs.

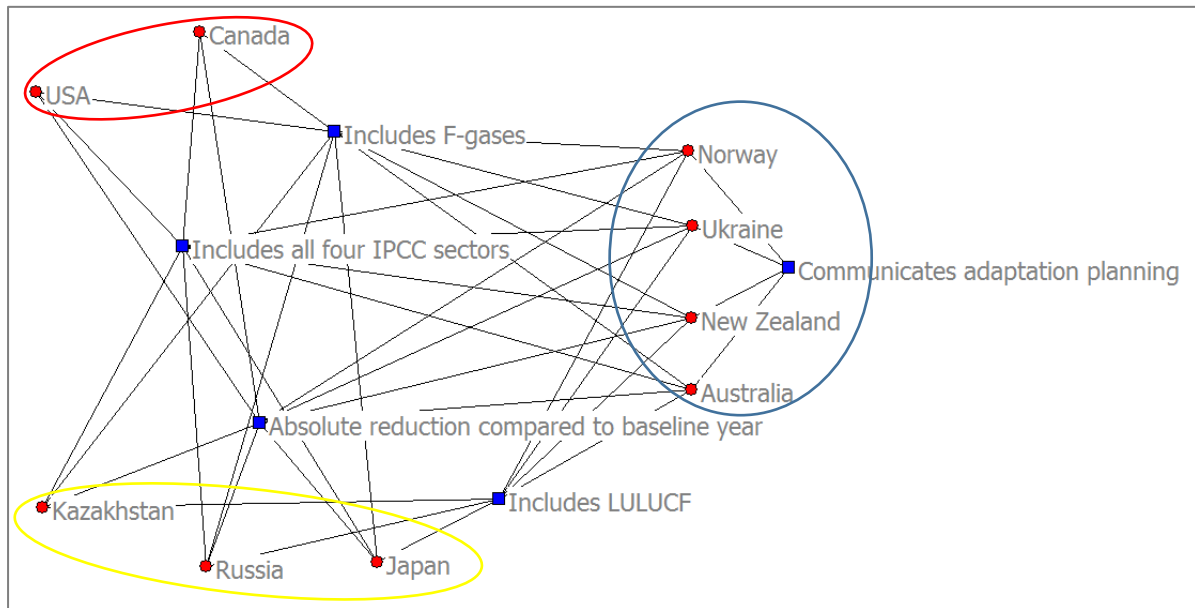


Figure 3: Affiliation network of the Umbrella Group, highlighting the degree of similarity within the group according to shared INDC concepts.

#### 4.2.3 The OPEC Group

Like the Umbrella Group, the OPEC Group is less fragmented than the BASIC Group, as it comprises only seven different concepts across twelve members (Figure 4). Unlike the Umbrella and BASIC Groups, however, the OPEC Group includes four INDCs that included no explicit emissions reduction target – those of UAE, Qatar, Kuwait and Saudi Arabia – while Libya did not submit an INDC and so is not included in the analysis. Saudi Arabia’s INDC (Kingdom of Saudi Arabia, 2015: 3), for example, promised little more specific than ‘ambitious plans to diversify its economy away from heavy reliance on income generated from a single resource’. However, as one consultant (11/11/2016) stated ‘[i]t could be seen as positive that they indeed submitted an INDC.’ Although the omission of an explicit emissions target may reflect a lack of ambition from these four states, eight OPEC states

submitted targets based on BAU scenarios. As discussed above, while BAU targets may be less likely to ensure significant overall reductions when compared with absolute targets, these BAU targets do at least represent a commitment to act on climate change by eight states that are highly dependent on fossil fuels.

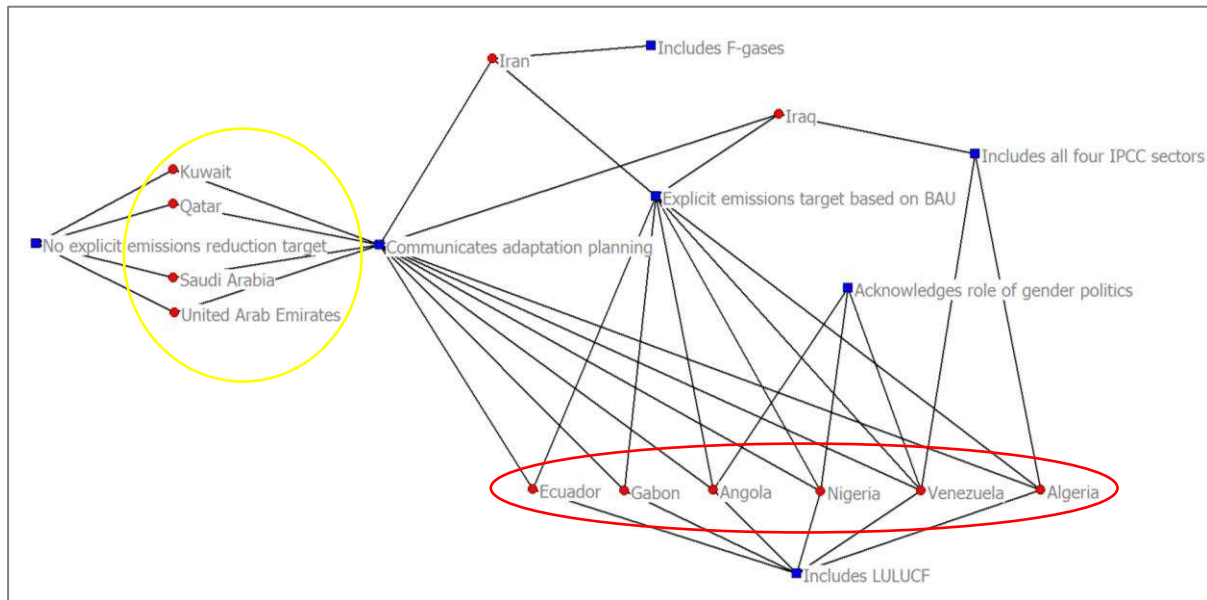


Figure 4: Affiliation network of the OPEC Group, highlighting the degree of similarity within the group according to shared INDC concepts.

Two main sub-groups in the OPEC Group may be identified; a sub-group that only communicated their adaptation planning and no mitigation target, and a sub-group of more comprehensive INDCs. This second sub-group comprised six states; Ecuador, Gabon, Angola, Nigeria, Venezuela and Algeria. The sub-group shared three common concepts (adaptation planning, a BAU mitigation target, and the inclusion of land use change or LULUCF), and also included at least one of the three mitigation concepts (F-gases, LULUCF, or all four IPCC sectors). Again, like the Umbrella Group, there appears to be a geographical element at play in the OPEC Group; the less ambitious sub-group comprises four neighbouring Gulf states, while the sub-group of more comprehensive INDCs comprises the OPEC members that are outside the Middle East. Iran and Iraq are not included in either sub-group, having submitted targets somewhere ‘in between’ the level of detail provided by their fellow group members.



#### 4.3 The utility of using DNA networks for analysing complex policy negotiations

DNA offers several important benefits when seeking to analyse highly complicated multi-actor negotiations. Affiliation networks provide an effective means of mapping a large number of actors in an empirically informative yet visually understandable manner. Two forms of affiliation networks were created: the mapping of all actors according to a small number of concepts (Figure 1); and the mapping of a small number of actors according to all of the concepts (Figures 2, 3 and 4). This dual mapping approach enabled a more holistic understanding of the wider context to be achieved, and the informal policy-based groups that existed, before focusing on the policy fragmentation of key groups of actors. While these networks are still complex, they are much more understandable than reading the thousands of pages of INDCs submitted to the Paris COP, and thus may be useful for practitioners as well as the academic community. As such, DNA has been shown to provide an effective means of analysing the highly complex policy positions of a large-n quantity of states.

However, the method possessed some limitations when used in a large-n context. Great care must be taken throughout the coding process to ensure that no piece of text is neglected, for fear of reducing the accuracy of the final networks. Furthermore, networks such as Figure 1 would be complex to understand without clear demarcation of sub-groups, which in turn is highly time-intensive, as every actor in the network must be arranged and positioned manually using separate software (NetDraw). Finally, it should be noted that DNA also offers the capability to create ‘congruence’ networks, which map actors’ greater or lesser similarities across concepts by linking these actors with thicker or thinner lines respectively. This form of DNA network was not found to be useful for analysing the UNFCCC, and was therefore not included in this analysis, as interconnecting 162 INDCs resulted in a network of thousands of thick and thin lines that were indistinguishable from one another. As such, when DNA is applied in a specific and focused manner, it can provide greater clarity to highly complex contexts, provided that the method is linked to explicit research questions. More research is encouraged in order to identify additional methods that can offer in-depth analysis to large-n investigations, particularly considering the increasing political importance of including all actors at climate mega-conferences.

## 5. Conclusion

The landscape of international climate governance is undergoing change, as indicated by the UNFCCC moving away from the approach of the Kyoto Protocol that consisted of defining and specifying deadlines for mitigation targets. The Paris Agreement has established a system in which states are expected to become more pro-actively involved in climate governance, and which fosters cooperation between states and mutual policy learning. For the latter to take effect, the five-yearly stocktake of the states' progress made towards meeting the climate commitments as expressed in the INDCs will be key. From this perspective, the INDCs can rightfully be regarded as important tools for climate governance in the post-Kyoto era. The INDCs can potentially serve as the main instrument for transforming the cooperation within the UNFCCC from vertical into horizontal governance, which should make the UNFCCC more flexible, but also more legitimate.

This analysis has offered several important findings that help us to understand the rationale underlying the INDCs submitted by the UNFCCC member states in the run-up of COP21. Our primary goal was to identify and map the primary mitigation and adaptation concepts of the INDCs submitted to the Paris COP. Six types of mitigation target were identified, with almost half of all states creating BAU pledges. The prevalence of these BAU pledges may enable global emissions to rise in absolute terms, thus exacerbating climate change. The overwhelming majority of actors (146 out of 162) included adaptation components within their pledges. We found that DNA and NetDraw are useful tools for carrying out this mapping exercise. Our research question asked to what extent the INDCs of the BASIC Group, Umbrella Group, and OPEC Group were internally consistent. We could show that the latter two groups showed greater internal similarity as negotiating groups than the more fragmented BASIC Group.

Despite the methodological, empirical and theoretical insights we provide towards the INDCs as the primary forum for contemporary global climate mitigation and adaptation efforts, there are limitations

in the insights we could offer in this study. We encourage further research to be conducted into why so many states formulated concepts related to gender politics, and the commonalities and differences regarding this topic across the INDCs. Observers participating in COP21 noted that some countries contracted external consultants to draft their INDCs. Given that this holds true, a promising avenue for future research would be to examine whether the similarities among some INDCs stem from the involvement of external consultants. More generally, it appears rewarding to concentrate on which national and international agencies participated in the formulation of the INDCs. Moreover, research is encouraged to analyse the causal factors that have led to the creation of sub-groups within the negotiating groups, but it is an important finding of this article that the three political groups explored here appear to be influenced by geography as well as politics.

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## Appendix A

Below, the states are arranged according to the type of climate mitigation target in their INDCs.

### Target Based on BAU:-

Afghanistan; Albania; Algeria; Andorra; Angola; Argentina; Bahamas; Bangladesh; Barbados; Belize; Benin; Bosnia and Herzegovina; Brunei Darussalam; Burkina Faso; Burundi; Cameroon; Central African Republic; Chad; Colombia; Comoros; Congo; Costa Rica; Djibouti; DR Congo; Ecuador; Eritrea; Ethiopia; Fiji; FYR Macedonia; Gabon; Gambia; Georgia; Ghana; Guatemala; Haiti; Honduras; Indonesia; Iran; Iraq; Ivory Coast; Jamaica; Jordan; Kenya; Kiribati; Korea; Kyrgyzstan; Lebanon; Lesotho; Madagascar; Maldives; Mali; Mauritania; Mauritius; Mexico; Mongolia; Morocco; Namibia; Niger; Nigeria; Oman; Panama; Paraguay; Peru; Philippines; Rwanda; São Tomé and Príncipe; Senegal; Seychelles; Solomon Islands; Sri Lanka; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Tanzania; Thailand; Togo; Trinidad and Tobago; Turkey; Uganda; Vanuatu; Venezuela; Vietnam; Yemen; Zimbabwe.

### Absolute reduction compared to a baseline year:-

Australia; Azerbaijan; Barbados; Belarus; Bosnia and Herzegovina; Botswana; Brazil; Canada; Cook Islands; Costa Rica; Dominica; Dominican Republic; Equatorial Guinea; EU; Grenada; Guinea; Iceland; Japan; Kazakhstan; Liechtenstein; Marshall Islands; Micronesia; Moldova; Monaco;



Montenegro; New Zealand; Norway; Palau; Russia; San Marino; São Tomé and Príncipe; Serbia; Switzerland; Tajikistan; Tuvalu; Ukraine; The US; Zambia.

No explicit target:-

Antigua and Barbuda; Bahrain; Bhutan; Bolivia; Cabo Verde; Cuba; Egypt; El Salvador; Guinea-Bissau; Guyana; Kuwait; Lao; Malawi; Mozambique; Nauru; Nepal; Niue; Pakistan; Papua New Guinea; Qatar; Samoa; Saudi Arabia; Sierra Leone; Somalia; South Sudan; Sudan; Suriname; Swaziland; Tonga; UAE.

Target based on emissions intensity/GDP:-

Chile; China; Georgia; India; Malaysia; Mexico; Singapore; Tunisia; Turkmenistan; Uruguay; Vietnam.

Target based on per capita figures:-

Armenia; Israel; Kyrgyzstan; Tajikistan; Zimbabwe.

Target based on peak, plateau and decline:-

China; Singapore; South Africa.

## Appendix B

The following states communicated their adaptation planning in their INDCs:-

Afghanistan; Algeria; Andorra; Angola; Antigua and Barbuda; Argentina; Armenia; Australia; Azerbaijan; Bahamas; Bahrain; Bangladesh; Barbados; Belarus; Belize; Benin; Bhutan; Bolivia; Botswana; Brazil; Brunei Darussalam; Burkina Faso; Burundi; Cabo Verde; Cambodia; Cameroon; Central African Republic; Chad; Chile; China; Colombia; Comoros; Congo; Cook Islands; Costa Rica; Cuba; Djibouti; Dominica; Dominican Republic; DR Congo; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Ethiopia; Fiji; Gabon; Georgia; Ghana; Grenada; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; India; Indonesia; Iran; Iraq; Israel; Ivory Coast; Jamaica;

Jordan; Kenya; Kiribati; Korea; Kuwait; Kyrgyzstan; Lao; Lebanon; Lesotho; Liberia; Madagascar; Malawi; Malaysia; Maldives; Mali; Marshall Islands; Mauritania; Mauritius; Mexico; Micronesia; Moldova; Monaco; Mongolia; Morocco; Mozambique; Myanmar; Namibia; Nauru; Nepal; New Zealand; Niue; Niger; Nigeria; Norway; Oman; Pakistan; Palau; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Qatar; Rwanda; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Samoa; São Tomé and Príncipe; Saudi Arabia; Senegal; Seychelles; Sierra Leone; Singapore; Solomon Islands; Somalia; South Africa; South Sudan; Sri Lanka; Sudan; Suriname; Swaziland; Tajikistan; Tanzania; Thailand; The Gambia; Togo; Tonga; Trinidad and Tobago; Tunisia; Turkmenistan; Tuvalu; UAE; Uganda; Ukraine; Uruguay; Vanuatu; Venezuela; Vietnam; Yemen; Zambia; Zimbabwe.

The following actors did not communicate their adaptation planning in their INDCs:-

Albania; Bosnia-Herzegovina; Canada; European Union; FYR Macedonia; Iceland; Japan; Kazakhstan; Liechtenstein; Montenegro; Russia; San Marino; Serbia; Switzerland; Turkey; The US.

### Appendix C

The states that included concepts relating to the role of gender politics were:

Angola; Barbados; Benin; Brazil; Burkina Faso; Burundi; Cambodia; Cameroon; Central African Republic; Chad; Comoros; Costa Rica; Dominica; Dominican Republic; DR Congo; Eritrea; Ethiopia; Gambia; Georgia; Ghana; Guatemala; Guinea; Haiti; Honduras; India; Indonesia; Ivory Coast; Jordan; Kenya; Kiribati; Lesotho; Liberia; Malawi; Mali; Mauritius; Mexico; Morocco; Myanmar; Nauru; Nepal; Niger; Nigeria; Panama; Paraguay; Peru; Philippines; Senegal; Seychelles; Sierra Leone; Somalia; South Africa; South Sudan; Sri Lanka; St Vincent and the Grenadines; Sudan; Swaziland; Tajikistan; Tonga; Uganda; Vanuatu; Venezuela; Vietnam; Yemen; Zambia; Zimbabwe.