to the multilateral approach. Of course, whether minilateralism can ever hope to provide a more realistic answer to the global climate problem is a question that requires further investigation and goes beyond the scope of their study (see ref. 3).

Hjerpe and Nasiritousi's research has certain limitations that should be noted. The short time horizon of the survey — just two years, between 2013 and 2014 — does not allow for meaningful conclusions about trends in practitioners' views. Should the forthcoming Paris COP21 fail to produce a strong outcome, as expected, we may see government delegates' interest in minilateral forums picking up. By the same token, a breakthrough deal in Paris that puts the multilateral mitigation strategy back on track could lead to a dramatic decline in practioners' interest in such alternatives.

As the authors acknowledge[2], their survey suffers from considerable selection bias. Attendees at climate COPs have usually invested a great deal of time and energy in the UNFCCC negotiations, and it is therefore hardly surprising that government officials should express a "preference for state-led, multilateral forums", according to Hjerpe and Nasiritousi. Actors operating outside the UNFCCC context may take a different view.

The UNFCCC process has come in for a lot of criticism in recent years, but Hjerpe and Nasiritousi's research suggests there is no viable alternative at the moment. The search may be on for alternative forums, but no minilateral club has as yet garnered enough support to be a legitimate alternative to the multilateral regime. ❐

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CARBON PLEDGES

Alliances and ambitions

Some countries have pledged to become carbon neutral, while others' emissions continue to rise. Differences in their political attributes could explain the discrepancy in ambitions.

Andrew Kythreotis

Countries will come together this December for the latest round of international climate negotiations in Paris. But countries' ambitions are likely to vary widely. So, why are some nations more willing to commit to larger emissions reductions than others?

That question is the subject of a recent article by Julia Flagg in *Environmental Sociology*[1], where she examines why nine nations have pledged to be carbon neutral.

Flagg argues that political alliance building has been integral to the emergence of the carbon-neutral pledges. She says pledge states have better governance scores, more environmental non-governmental organizations, smaller populations and lower income inequality. These conditions, she argues, facilitate greater collective action.

Using world society theory, particularly the work of Meyer and colleagues[2], Flagg explains how states have been embedded in a global culture where a script or blueprint of how they should act on the global stage has been created. These states are reluctant to diverge from this script and adhere to particular norms, such as the need for environmental protection, with other states creating a check through international political pressure. Hence, there can be a spill-over effect of other nations adopting similar pledges. Such pledges can have their provenance in the global south — interesting, given that international climate governance under the United Nations Framework Convention on Climate Change (UNFCCC) has been historically dominated by the global north.

World systems theory, using the ideas of Wallerstein[3], argues that nations' actions are a reflection of their position in the world economy. This hinders action being catalysed by the global south because such countries would blame the global north for emitting the most and causing the problem in the first place. Hence, only developed economy states might be expected to adopt carbon-neutral pledges.

But this has not been the case. Flagg says this is because these two theories do not explain local actions in individual countries. Rather, state-in-society theory explains how local actions can shape domestic policy, which then has an influence on how states act on the international stage. Flagg arrives at four hypotheses regarding pledge and non-pledge states, summarized in Box 1.

Many would agree with these attributes of states, and that countries dependent on extractive industries, such as the United States, Russia and Canada, are unlikely to make carbon-neutral pledges. The track record of these states in relation to the Kyoto Protocol process seems to validate Flagg's first hypothesis.

But the key question is how the characteristics of carbon-neutral pledge states can be translated to the current

Box 1 | Flagg's attributes of carbon-neutral pledge and non-pledge states.

1. States dependent on extractive industries are less likely to make carbon-neutral pledges.
2. States dependent on industries such as tourism are more likely to make carbon-neutral pledges.
3. Corrupt states led by small elites tend to ignore public good and so are less likely to make carbon-neutral pledges.
4. More environmental non-governmental organizations would result in greater access to elite decision-makers making it more likely that the state will make a carbon-neutral pledge.

architecture of the international climate governance regime. Solutions that improve the current international regime have been the focus of many prominent climate change policy scholars[4,5]. It is not a matter of which states belong to a particular political alliance, such as those that pledge carbon neutrality, it is rather the future actions of these alliances within the current international governance regime. Pledges only mean something if they are translated into firm political action[6].

It has also been argued that greater collective political assertiveness on climate mitigation is just around the corner because more countries are becoming democratic[7]. However, Wallerstein's world systems theory argues that the way in which states act on the international stage is principally underpinned by economic rather than cultural or ideological factors.

If liberal democracy is founded on the economic self-determination and sovereignty of individual states (which is also enshrined in the United Nations Charter) there is a fundamental paradox. If individual states have a particular economic interest, then they would naturally gravitate towards a mutually benefitting extra-territorial alliance where domestic economic interests could be attained. For over 20 years now, international climate governance — the UNFCCC, the Kyoto process and the annual Conference of the Parties — has been dominated by such economic arguments. These economic arguments continually transcend bounded state territories through political alliances[8].

So while Flagg's four hypotheses for states hold true, the study does not address the main overarching issue in international climate politics: that these pledge states could just be one more grouping in the tranche of political alliances in the paradoxical international climate governance 'game'. The international climate governance regime either needs to change, or the self-interested attitudes of the majority of nation states that comprise the member parties of the UNFCCC treaty must alter.

The former is complex, the latter nigh on impossible — though pledge states cannot be criticized for a lack of effort ahead of the next battle in Paris in December. ❐

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WARMING TRENDS

Saharan desert warming

A key element of the West African monsoon is changing faster than in the surrounding areas but the reason is unknown. Now research assesses the specific behaviour of the temperature over the Saharan desert.

Christophe Lavaysse

The West African monsoon is less well known than the Indian one but its seasonal cycle of precipitation provides the water resources for the ~320 million people living in the region. In summertime, a thermal depression in response to the seasonal surface warming in the lower troposphere is located over the Sahara desert. This low pressure, combined with the relative high pressure over the Guinean coast, produces a low-level pressure gradient that corresponds to the main component of the West African monsoon system — a driver of regional precipitation. Put more simply, the warmer the Sahara, the stronger the thermal depression, and the more intense the monsoon flow[1]. Therefore, assessing and understanding the evolution of temperature over the Sahara desert is an important step in identifying the future trend of the West African monsoon. Writing in the *Journal of Climate*, Kerry Cook and Edward Vizy[2] analyse the recent warming of the Sahara and its cause.

Previously the low pressure over the Sahara desert and the latitudinal position of the monsoon were linked in reanalysis products (Fig. 1), and this feature has been also captured by climate models[3]. In this context, the recent observed recovery in Sahelian rainfall[4] is consistent with an intensification of the temperature over the Sahara. In the CMIP5 climate models, a robust tendency to warming over the region is seen — and is 10–50% larger than global warming. It should be noted that the dispersion among the models in simulating the surface air temperature were larger over these areas[3]. In terms of precipitation, for this century, most of the climate models predict wet conditions in the Sahel, but the large spread of the models suggests uncertainties in the intensity and sign of the trend[5]. Analysis of the increase in precipitation over the Sahel indicates that it is through the direct effect of the increase in greenhouse gas concentrations on net radiation at the surface, and so through the increase in temperature[6]. In addition, it has been suggested that the trends were amplified by anomalous night-time longwave heating of the surface due to the increase in integrated water vapour[7].

The work by Cook and Vizy assesses the increase in temperature over the Sahara for 1979–2012 in detail by comparing linear trends in temperature. Several datasets (three reanalysis products and two observational) are used to account for the uncertainties due to the sparse ground-based observations over the desert. The annual warming trend in the Sahara exceeds the global and tropical warming rates by, on average, a factor of 2.5 and 4, respectively. The same increase in temperature is observed throughout the year over the desert without seasonal amplification. This increase is concentrated in the lower part of the troposphere (under 500 hPa). However, the spatial distributions of this increase are very different across the datasets. The origins of these spatial differences are not discussed in the paper, and should be addressed in future work. This spatial distribution influences the thermal gradient, which in turn will affect the wind direction and intensity, and so the monsoon flow. In addition, the assumption of a linear trend can misstate the observed tendency[8], so the validity of this hypothesis should be investigated in future research.