

# Adjudicating scientific disputes in climate science: the limits of judicial competence and the risks of taking sides

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## 1 Introduction

*Following a judgment by a Dutch court that the government must step up the fight against climate change, a prominent international lawyer recently proposed that the International Court of Justice rule on climate science so that the scientific disputes in this area can be settled. The intent is to pave the way for climate change litigation around the world and to raise the bar for the international negotiations. This proposal raises questions about both the limits of judicial authority and competence, and the justiciability of climate science. Courts should refrain from examining and ruling on climate science, since they are neither authorised nor competent to rule in scientific disputes. Even if judicial competence is assumed, climate science is not ripe for adjudication. To the contrary, the politicisation of the science and the socio-political construction of scientific consensus in the climate area render any attempt to rule impartially on the key scientific disputes futile and suspect. Whether in the form of an advisory opinion or otherwise, a court judgment would be perceived as taking sides and, thus, would only aggravate an already badly politicised situation. Courts, including the ICJ, should uphold the rule of law and respect the limits of their authority. They should therefore refuse to opine on climate science and refer scientific disputes back to the scientific community, which is where they belong.*

‘Science is a first-rate piece of furniture for a man’s upper chamber, if he has common sense on the ground-floor. But if a man hasn’t got plenty of good common sense, the more science he has, the worse for his patient.’ O W Holmes *The Poet at the Breakfast Table* (1872)

‘The most savage controversies are those about matters as to which there is no good evidence either way. Persecution is used in theology, not in arithmetic.’ Bertrand Russell ‘Unpopular essays, an outline of intellectual Rubbish’ (1950)

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The climate action judgment<sup>2</sup> of a low level court in The Hague has raised the question of whether a court composed of lawyers without scientific training can address complex scientific issues. In this case, the court looked at the Intergovernmental Panel on Climate Change (IPCC) reports, which it conveniently equated with the scientific consensus and the state of climate science. Based on the science, the court ruled that the Dutch Government’s duty of care requires that it offer stronger protection against dangerous climate change by further reducing emissions of carbon dioxide; in other words, the court enforced its interpretation of the scientific consensus on climate science through civil law. As I have argued elsewhere, the Dutch court misinterpreted both the state of the science and the IPCC reports, and erroneously found that the climate policy it dictated to the Dutch Government was ‘scientifically necessary’.<sup>3</sup>

Emboldened by the Dutch ‘victory for the climate’,<sup>4</sup> Philippe Sands, a prominent international lawyer and academic,<sup>5</sup> recently suggested that the International Court of Justice (ICJ) and the International Tribunal for the Law of the Sea (ITLOS)<sup>6</sup> rule on climate science<sup>7</sup> in advisory

<sup>2</sup> For an English translation of the judgment see <http://deeplink.rechtspraak.nl/uitspraak?id=ECLI:NL:RBDHA:2015:7196>.

<sup>3</sup> See L Bergkamp, J C Hanekamp ‘Climate change litigation against states: the perils of court-made climate policies’ (2015) 24(5) *European Energy and Environmental Law Review* 102–114. L Bergkamp ‘A Dutch court’s “revolutionary” climate policy judgment: the perversion of judicial power, the state’s duties of care, and science’ (forthcoming). See also (in Dutch) the articles in the special issue of ‘Nederlands Juristenblad’ (2015) 33 <http://njb.nl/>. Cf <http://www.euractiv.com/sections/sustainable-dev/eu-should-wrest-back-leadership-climate-change-courts-317135>.

<sup>4</sup> I have argued that this victory is likely to backfire. <http://www.energypost.eu/urgenda-judgment-victory-climate-likely-backfire/>.

<sup>5</sup> <https://www.laws.ucl.ac.uk/people/philippe-sands/>.

<sup>6</sup> The ITLOS would provide ‘a more robust (but politically less influential) decision’ on issues such as ‘the prospect of increases in ocean temperatures, sea-level rise and the disappearance and land territory’.

<sup>7</sup> Sands cites only one IPCC report and a UKMO report to support his argument.

opinions.<sup>8</sup> In his view, ‘the single most important thing [the ICJ] could do is to settle the scientific dispute’.<sup>9</sup> He added that ‘the court could also consider whether the science-based “safe” level of 2°C warming ... should now be considered a legal obligation on countries’.<sup>10</sup> The ICJ’s findings on climate science would be ‘authoritative and could well be dispositive on a range of future actions, including negotiations’.<sup>11</sup> To solidify the scientific consensus and suppress contradictory claims, the courts could play a role ‘in finally scotching those claims’.<sup>12</sup> An endorsement of the scientific consensus by the ICJ would be ‘of great authority in proceedings before other international courts and tribunals, and before national courts also’.<sup>13</sup> This way, we would know, once and for all, that ‘the science is settled’.<sup>14</sup> With this ICJ opinion in hand, plaintiff lawyers around the world could file law suits against states and possibly also against corporations.<sup>15</sup> The opinion would also create an ambitious baseline for the international climate negotiations.

For purposes of this analysis, the assumption is that Sands’s plea is not simply an awareness-raising exercise. That was what many in the Netherlands thought when Urgenda launched its climate case, and they were proven badly wrong. Sands appears to be serious, although one of his stated objectives is also raising awareness. In any event, his innovative proposal has drawn international attention, and even been called a plan to ‘wage war on Western industrial civilisation’.<sup>16</sup> Of course, this qualification is an exaggeration, but the proposal does raise a series of issues and its merits require close scrutiny.<sup>17</sup>

This article discusses Sands’s novel idea and the broader issue of the judiciary’s role in deciding scientific disputes in climate science.<sup>18</sup> It discusses the political and social contexts in which climate science is conducted. The analysis demonstrates that an understanding of these contexts and their consequences is critical to judicial assessment of climate science and the possibility of objective, impartial judicial rulings. Since the dominant discourse in climate policy is set by the IPCC and the international efforts to fight climate change, these issues may not have received sufficient attention in the legal community, which is generally not focused on the scientific arena. Consequently, lawyers may not have a thorough understanding of the environment in which climate science is produced and be unaware of the problems that plague this area of learning. If this impression is accurate, lawyers’ lack of understanding presents serious risks. Judges may feel comfortable expressing an opinion where they should be cautious and refrain from ruling.

## 2 The arguments in support of an ICJ opinion

What should we think of Sands’s suggestion of having an international court of law settle the scientific disputes in climate science?<sup>19</sup> He is not the first one to suggest that the ICJ rule on climate science,<sup>20</sup> but his stature gives the concept momentum. Sands does not argue for a separate international ‘science court’, an idea that received traction in the US in the 1970s.<sup>21</sup> The idea of a science court was intended to solve the problem of ordinary courts’ limited inability to address scientific issues, and to legitimise

8 Philippe Sands ‘Climate change and the rule of law: adjudicating the future in international law’ Lecture, UK Supreme Court (17 September 2015) (Sands lecture). I focus on the ICJ, but virtually all of my general comments apply also to the ITLOS.

9 *ibid* 14.

10 <http://www.theguardian.com/environment/2015/sep/18/world-court-should-rule-on-climate-science-quash-sceptics-philippe-sands>; Sands lecture (n 8) 20.

11 <http://www.theguardian.com/environment/2015/sep/18/world-court-should-rule-on-climate-science-quash-sceptics-philippe-sands>; Sands lecture (n 8) 15.

12 <http://www.theguardian.com/environment/2015/sep/18/world-court-should-rule-on-climate-science-quash-sceptics-philippe-sands>.

13 <http://www.kcl.ac.uk/law/newsevents/climate-courts/index.aspx>.

14 See Al Gore’s testimony before Congress (March 2007) <http://www.npr.org/templates/story/story.php?storyId=9047642>.

15 Climate change litigation against states seems to be spreading. Climate action groups in Belgium and the US have launched lawsuits against their governments to force them to beef up their climate policies. Groups in yet other countries are preparing their cases. Grandparents’ and future generations’ climate action movements have been organised in Norway and the UK. See Bergkamp and Hanekamp ‘Climate change litigation against states’ (n 3) 102–114.

16 <http://www.breitbart.com/london/2015/10/05/activist-lawyers-wage-war-western-industrial-civilisation/>.

17 Thoughtful comments have already been made by Robin Guenier, who attended Sands’s lecture. See Robin Guenier ‘Notes on Sands lecture’ (October 2015) <https://ipccreport.wordpress.com/2015/10/09/robin-guenier-on-philippe-sands/>.

18 To a substantial degree, the analysis applies generally to the assessment of science by courts. In the area of climate science, however, many of the issues are amplified.

19 Sands uses no more than two science-based references: (i) IPCC, Climate Change 2014 Synthesis Report ‘Summary for policy-makers’ [http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5\\_SYR\\_FINAL\\_SPM.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf); and (ii) UK Met Office ‘Big changes underway in the climate system’ (September 2015) [http://www.metoffice.gov.uk/media/pdf/8/c/Changes\\_In\\_The\\_Climate\\_System.pdf](http://www.metoffice.gov.uk/media/pdf/8/c/Changes_In_The_Climate_System.pdf).

20 Aaron Korman, Giselle Barcia ‘Rethinking climate change: towards an International Court of Justice advisory opinion’ (2012) *The Yale Journal of International Law Online* <http://www.yjil.org/online/volume-37-spring-2012/rethinking-climate-change-towards-an-international-court-of-justice-advisory-opinion> (‘Although it could not bind states to take specific action, an ICJ advisory opinion would define, for the first time, states’ obligations and responsibilities with respect to emissions under international law. The ICJ’s authoritative advice could help develop new international norms of behavior regulating transboundary harm caused by emissions, and could provide needed clarity on the principles according to which states can negotiate effective solutions’).

21 James A Martin ‘The proposed “science court” (1977) 75 *Michigan Law Review* 1058–91.

scientific input into legislative and regulatory process. A new, separate court composed of both scientists and lawyers would, through a structured adversary proceeding, rule on scientific issues and thereby increase the ‘presumptive validity of the scientific input’ into the policy-making process. The failure of the effort to establish such a science court revealed major erroneous assumptions behind the proposal and enormous problems with its application.<sup>22</sup> Ignoring this debate, Sands now proposes that the ICJ be used for the purpose of settling science.

### 2.1 Social engineering

The reasons Sands invokes for his proposal have little to do with the application of existing law; it is all about social engineering. Sands notes that the IPCC has spoken ‘without ambiguity [and] doubt’,<sup>23</sup> the ‘scientific evidence appears (to a non-scientist) to be ever more robust’<sup>24</sup> and ‘there is a broad emerging consensus on many of these factual matters’.<sup>25</sup> Despite these developments, the science remains ‘subject to challenge in some quarters, including by scientifically qualified, knowledgeable and influential persons’.<sup>26</sup> Sands finds these challenges inconvenient, apparently because they contribute to ‘legislative inertia’.<sup>27</sup>

An ICJ advisory opinion would be ‘helpful on the science’, ‘generate political will to action by states’,<sup>28</sup> ‘raise consciousness’ and ‘inform the development of an international public consciousness’ on the global concern of climate change.<sup>29</sup> The idea is that such an opinion would contribute to ‘change in attitudes and behaviour’<sup>30</sup> and ‘contribute to a greater sense of solidarity amongst states and other international actors, including the corporate sector’.<sup>31</sup> In addition, the ICJ would help ‘the world understand the science of climate change, and recognise that the room for real doubt has disappeared’.<sup>32</sup> Leaving

aside the question of whether Sands is right as a matter of fact,<sup>33</sup> none of these objectives would appear to fall within the ICJ’s remit.<sup>34</sup>

### 2.2 International law

As far as the law is concerned, Sands refers to the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the 1997 Kyoto Protocol, but he admits that their provisions are ‘crushingly vague’.<sup>35</sup> So how could the ICJ read anything useful into these provisions? Sands is silent on this issue. He invokes ‘general international law’, but concedes that the ‘interrelationship between different sources of legal obligation is not necessarily straightforward, or settled’, without more.<sup>36</sup> Unsurprisingly, the International Law Commission’s principles of state responsibility for international wrongful acts are referenced.<sup>37</sup> Again, Sands fails to provide a hint as to how they would apply to climate change.

### 2.3 ICJ precedent and future

Another legal argument focuses on the ICJ’s opinions. According to Sands, there is ‘a clear line’ in the ICJ opinions ‘from the 1996 advisory opinion on the legality of nuclear weapons’<sup>38</sup> through to the 2014 judgment in the whaling<sup>39</sup> case’.<sup>40</sup> Sands does not develop this theme, however, except for suggesting that the whaling case also involved the assessment of scientific evidence.<sup>41</sup> In its opinion in that case, however, the ICJ stated explicitly that it was ‘not called upon to resolve matters of scientific or whaling policy’ or ‘to pass judgment on the scientific merit’, and that ‘it is not for the Court to settle divergent views about the appropriate policy towards whales and whaling’.<sup>42</sup>

22 Robert S Banks, Luther P Gerlach ‘The science court proposal in retrospect: a literature review and case study’ (1980) 10(2) *Critical Reviews in Environmental Control* 95–131.

23 Sands cites selectively from the IPCC’s 2014 Synthesis Report. Sands lecture (n 8) 5–6.

24 Sands lecture (n 8) 3.

25 *ibid* 14. Here, Sands seems to think science is primarily a collection of facts. The value of science, however, is its ability to predict by identifying laws or causal links.

26 *ibid* 14.

27 *ibid* 18. In 2005, based on a legal analysis, a scholar advocated ‘an internationally negotiated solution to the issue of climate change damage’. Roda Verheyen *Climate Change Damage and International Law: Prevention Duties and State Responsibility* (Martinus Nijhoff Publishers 2005). Apparently, Sands feels that he has waited long enough, and is now entitled to call on the courts.

28 Sands lecture (n 8) 2.

29 *ibid* 10.

30 *ibid* 11.

31 *ibid* 18.

32 *ibid* 15. In other words, Sands already knows what the ICJ opinion should say.

33 Guenier challenges Sands’s assumption that disagreement on the science is the main reason as to why no ambitious international climate agreement has yet been reached; scientific disputes would be ‘of relatively marginal importance’. See Guenier ‘Notes on Sands lecture’ (n 17).

34 See Chapter II, in particular Statute of the ICJ art 36 [http://www.icj-cij.org/documents/?p1=4&p2=2#CHAPTER\\_II](http://www.icj-cij.org/documents/?p1=4&p2=2#CHAPTER_II).

35 Sands lecture (n 8) 13.

36 *ibid* 16.

37 *ibid* 16–17.

38 *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) ICJ Rep 1996 para 105(2)(E). In this case the ICJ ruled that it ‘cannot conclude definitively whether the threat or use of nuclear weapons would be lawful or unlawful in an extreme circumstance of self-defence, in which the very survival of a State would be at stake’, in view of ‘the current state of international law, and of the elements of fact at its disposal’.

39 *Whaling in the Antarctic Case (Australia v. Japan, New Zealand Intervening)* ICJ Rep 31 March 2014 (‘The Court’s task is only to ascertain whether the special permits granted . . . fall within the scope of Article VIII [of the International Convention for the Regulation of Whaling]’).

40 Sands lecture (n 8) 18.

41 *ibid* 15. This issue is addressed in sections 2.3 and 4.3 below.

42 *Whaling in the Antarctic Case* (n 39) 29, para 69.

Instead of supporting Sands's proposition, it explicitly contradicts it. As acceptance of his legal argument requires a big 'leap of faith', Sands resorts to emotional appeals to the ICJ: it would have 'a record on the environment of which it can be proud',<sup>43</sup> its bench would be 'as strong today as at any time', climate change would no longer be an issue 'in which the great powers are at odds' and the ICJ would have to act or be doomed to 'irrelevance'.<sup>44</sup> With this appeal to the ICJ, Sands comes full circle and concludes by stating that: 'amidst the warming of the atmosphere, and the melting of the ice, and the rising of the seas, the international courts shall not be silent'.<sup>45</sup> In short, the ICJ should pontificate on climate science and what it requires, so that dissent be squashed and ambitious climate policies can be put in place around the world through a combination of litigation and international agreements.

## 2.4 Social and procedural justice

Like Urgenda in the Dutch case,<sup>46</sup> Sands makes a case for judicial action to protect humanity and planet earth. Such calls fit into a general trend to emphasise 'social justice' as law's main objective. There is another aspect of justice at stake here, however. To do justice, a court would have to do the opposite of what social justice suggests, ie declare the IPCC consensus right and the minority opinions wrong. What Sands claims for himself (ie that a minority legal opinion be elevated to law), he denies to minority climate scientists, whose claims would be squashed and scotched. Would such partisanship be compatible with the basic obligations of an independent, impartial and legitimate judiciary?

Instead of rendering instant 'social justice', the ICJ would have to examine all sides of the argument critically. The ICJ has a strong interest not only in being impartial but also in being perceived as impartial.<sup>47</sup> As a general rule, the social justice movement gives less weight to due process and procedural justice than it gives to achieving its objectives.<sup>48</sup> For this reason, social justice activists typically have a hard time dealing with the discipline imposed by law, which accommodates a wide range of issues, concerns and interests,

including due process. Under the law, the ends do not necessarily justify the means. Obviously, the use of courts for political purposes is a slippery slope, so any proposals that head in this direction require close scrutiny.

## 2.5 Litigation as a tool

These pleas by a prominent international lawyer are also consistent with a tendency amongst some lawyers to view litigation not as a way to settle legal disputes, but a 'tool' to pursue political objectives, whether or not in the name of some concept of justice.<sup>49</sup> In this perspective, courts should cause 'legal disruption'.<sup>50</sup> In a similar vein, Sands focuses on the legislative role the ICJ could play; it should adopt a forward-looking approach and guide the international community.<sup>51</sup> To mimic the legislative process as much as possible, he recommends also that the ICJ 'open up the process, allowing not only states and international organisations, but also other actors who are stakeholders, including corporations and NGOs, to participate by some effective means'.<sup>52</sup> Should the ICJ indeed perform a legislative task in the area of climate policy?

## 2.6 Legislating from the bench

It is hard to see how this squares with the ICJ's role as a court of law, rather than a legislature; the objective of an advisory opinion is to provide an interpretation of the law, not to legislate. To a very substantial degree, a court is unaccountable and, unlike a government, cannot be voted out or dismissed. Its legitimacy hinges critically on its restraint. The ICJ understands this. If its prior opinions are indicative, the ICJ would reject Sands's proposition in unambiguous terms. It has acknowledged explicitly that it 'cannot legislate'. If 'the present corpus juris is devoid of relevant rules in [the] matter', the ICJ has found, 'the giving of an answer to the question posed would require the Court to legislate'. The ICJ, however, 'states the existing law and does not legislate'.<sup>53</sup>

Arguably, the ICJ, like any court of law, could legitimately serve as 'interstitial legislature', and make small insertions here and there, from time to time, in the vast and intricate fabric of the legal system.<sup>54</sup> Even in filling the

43 Sands lecture (n 8) 18.

44 *ibid* 19.

45 *ibid* 21.

46 '[C]limate change is a huge problem that needs to be dealt with much more effectively, and that states can no longer afford inaction. States are meant to protect their citizens, and if politicians will not do this of their own accord, then the courts are there to help'. See <http://www.urgenda.nl/en/>.

47 For an empirical argument on the ICJ's impartiality see Eric A Posner and Miguel F P de Figueiredo 'Is the International Court of Justice biased?' (June 2005) 34 *Journal of Legal Studies* 599–630.

48 On the precautionary origins and risks of utopia, see J C Hanekamp 'Utopia and gospel: unearthing the good news in precautionary culture' (Dissertation, Tilburg University 2015).

49 See for instance J Peel, H M Osofsky *Climate Change Litigation* (Cambridge University Press 2015).

50 An unpublished paper produced for the conference at which Sands delivered his lecture is entitled 'Adjudicating the future: climate change and legal disruption'.

51 Sands lecture (n 8) 16.

52 *ibid* 21.

53 *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) (n 38) 15 para 18.

54 Cf O W Holmes 'The path of the law' (1897) 10 *Harvard Law Review* 457.

small gaps courts need to be careful not to usurp legislative power. Enacting entirely new policies based on open norms, as Sands would like courts to do, however, is the open and illegitimate usurpation of legislative power.<sup>55</sup> Obviously, an ICJ decision on the existence of scientific consensus in climate science and on the specific findings supported by that consensus could be decisive to the outcome of other cases, and exercise significant influence on the international climate process. At the same time, it would appear to be an extremely tricky undertaking.

### 2.7 The problems of precedent and priorities

One such tricky problem is the precedent-setting effect of an ICJ climate science and policy opinion. The ICJ would need to consider carefully the broader implications of the precedent a climate opinion would set in other possible areas. It should not be forgotten that the UN's Sustainable Development Goals list ranks climate change as only one amongst 17 urgent goals (and that does not even include world peace).<sup>56</sup> If the ICJ can issue a climate opinion, why could it not opine on gender equality, the fight against poverty, income inequality, chemical releases and exposure etc? Sands does not address this rather considerable problem.<sup>57</sup>

In fact, any climate ruling would raise serious moral questions about the climate activists' self-centred priorities. Should we seek a ruling from the ICJ on climate change, which poses uncertain and long-tail risks, but not on acute and curable health problems, such as malnutrition<sup>58</sup> and malaria,<sup>59</sup> which cause numerous deaths and widespread human suffering throughout the world every day? Unlike climate science, the science relevant to these problems is mature and largely undisputed. What does the obsession with climate change say about Western morality and priorities? There is a reason why the United Nations ranked

climate change in 13th place on its list of 17 sustainable development goals.<sup>60</sup>

### 2.8 Politics, science and law

The key issue addressed in this article is whether an ICJ ruling on climate science and policy would be desirable at all. There is reason for concern about this proposal. At first impression, if a court were to rubber-stamp the scientific consensus, the possible risk of a sort of 'Galileo trial'<sup>61</sup> without a suspect cannot be excluded, since consensus is no guarantee for truthfulness. Although the 'Galileo' risk can never be avoided, it should caution policy-makers, scientists and, above all, lawyers to keep an open mind, even in the face of apparent widespread consensus. In the case of Galileo, science operated under the oversight of religion. Religion is not the only master that science may have to serve. In modern societies, politics or governments are more likely candidates for this position.

When considering Sands's proposal, it is important for lawyers, in particular judges, to understand that climate science is 'the most politicized science of our time'.<sup>62</sup> Even in the testing of hypotheses, politics and science may be mixed.<sup>63</sup> As the analysis presented below demonstrates, proposals for court rulings on scientific disputes in climate science reflect naivety about climate science and the scientific process, a 'scientific' understanding of human affairs,<sup>64</sup> or an attempt to further politicise climate policy-making.

## Judicial authority and competence

### 3.1 Legal authority

For good reasons, courts of law do not have the authority to opine on scientific disputes, unless doing so is necessary to resolve a legal question over which it has jurisdiction. Article 65(1) of the Statute of the ICJ states explicitly that the Court may give an advisory opinion on 'any legal question', not any scientific question. Of course, a legal question may require that a court first answer a scientific question; for example, to answer the legal question of whether a state violates its duty of care by failing to prevent

55 See, for instance, the Dutch Supreme Court's opinion in a case brought by environmental groups, including Waterpakt, against the state of the Netherlands over its failure to implement the European Union's Nitrate Directive, that the judiciary is not empowered to order the legislature to enact legislation. Waterpakt, Hoge Raad, 21-03-2003, ECLI:NL:HR:2003:AE8462, <http://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:HR:2003:AE8462>.

56 <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

57 For further discussion, see L Bergkamp 'Het Haagse klimaatvonnis: rechterlijke onbevoegdheid en de negatie van het causaliteitsvereiste' (2015) *NJB* 2278–88. See also Bergkamp and Hanekamp 'Climate change litigation against states' (n 3) 102–114.

58 UNICEF-WHO-World Bank Group 'Joint child malnutrition estimates' [http://www.who.int/nutrition/publications/jointchildmalnutrition\\_2015\\_estimates/en/](http://www.who.int/nutrition/publications/jointchildmalnutrition_2015_estimates/en/).

59 'About 3.2 billion people – almost half of the world's population – are at risk of malaria' See WHO, Malaria, <http://www.who.int/mediacentre/factsheets/fs094/en/>.

60 <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

61 <http://law2.umkc.edu/faculty/projects/ftrials/galileo/galileo.html>.

62 Ronald Bailey *End of Doom* (MacMillan 2015).

63 J A Curry, P J Webster and G J Holland 'Mixing politics and science in testing the hypothesis that greenhouse warming is causing a global increase in hurricane intensity' (August 2006) *Bulletin of the American Meteorological Society* 1025–37.

64 See further section 5.3 below.

exposure of workers to asbestos, the scientific issue of the effects of asbestos exposure needs to be addressed. Conversely, if a court is unable to answer an essential preliminary scientific question unambiguously and objectively, it should deny the claim, but this is not an issue of authority.

### 3.2 Political question doctrine

Like, for instance, the US Supreme Court,<sup>65</sup> the ICJ has developed a ‘political question’ doctrine,<sup>66</sup> pursuant to which it will refuse to opine on issues that belong to the political domain. On the other hand, as the ICJ has observed correctly: ‘[t]he fact that [a] question also has political aspects, as, in the nature of things, is the case with so many questions which arise in international life, does not suffice to deprive it of its character as a “legal question” and to “deprive the Court of a competence expressly conferred on it by its Statute”’.

Even if a question has political aspects, the Court ‘cannot refuse to admit the legal character of a question which invites it to discharge an essentially judicial task, namely, an assessment of the legality of the possible conduct of States with regard to the obligations imposed upon them by international law’.<sup>67</sup> The political nature of the motives that may have inspired a request and the possible political implications of an ICJ opinion are not relevant to the ICJ’s jurisdiction,<sup>68</sup> although they are relevant to the exercise of that jurisdiction and the contents of its opinion.

### 3.3 Compelling reasons

Even if the political question doctrine under the applicable law does not prevent a court from exercising jurisdiction, a court will be wary of upsetting the international community and placing the development of the law on an unsustainable path. Under the ICJ’s jurisprudence, even if

the court has the authority to issue an advisory opinion, it may refuse to do so for a ‘compelling reason’.<sup>69</sup> This is a recognition of the authority that an ICJ opinion has, even though it is legally not binding, and the requesting organisation remains free to decide what effect to give to the opinion. In assessing the presence of a compelling reason, the possible political effects of an opinion are not decisive, in particular if there are opposing views on what those effects might be, unless ‘there are ... *evident criteria* by which it can prefer one assessment to another’.<sup>70</sup>

In the case of an ICJ opinion on climate science and policy, the ICJ may well find that such ‘evident criteria’ exist. First, the ICJ would have to take a position in a scientific controversy that is beyond its authority and comprehension. Other reasons could be that the questions posed are not legal questions, that the court cannot decide the dispute on the basis of the current international law, or that it would have to make political and policy decisions that necessarily implicate subjective value judgments and belong to the domain of international and state legislature. Even the possibility that its ruling could have serious unforeseeable political and legal ramifications, such as a legislative response to curb the judiciary’s power, could be a compelling reason. As Guenier said, even if the ICJ might be able to live with the implication of making serious dissenting scientists look foolish, it would probably not risk ‘bringing international law into disrepute’.<sup>71</sup>

### 3.4 Epistemic competence

There is an additional dimension to the issue of judicial authority: judges’ factual competence. Courts are poorly equipped to examine complex, politically charged and controversial scientific issues. Judges generally lack substantial scientific training and may not understand the scientific method. They are not likely to be experts on philosophy of science and the possibilities as well as the limits of science, and may have a hard time sieving through thousands of studies, competing theories and the putative causal links. Judging climate science requires all of these areas of expertise and all of these skills. The judiciary’s institutional setting and the judicial process do not help much to remedy these deficiencies. Courts do not have access to advisory bodies to advise on the relevant scientific

65 ‘A nonjusticiable political question exists when, to resolve a dispute, the court must make a policy judgment of a legislative nature, rather than resolving the dispute through legal and factual analysis.’ See *E.E.O.C. v. Peabody Western Coal Co.*, 400 F.3d 774, 785 (9th Cir. 2005); *Zie ook Marbury v. Madison*, 5 U.S. 137 (1803); and *Baker v. Carr*, 369 U.S. 186 (1962).

66 In the past, this doctrine was questioned by scholars, but since the ICJ’s opinion on nuclear weapons these questions seem to have been resolved. Pomerance, for instance, suggested in 1973 that the request for an advisory opinion imposed political constraints. See Michla Pomerance *The Advisory Function of the International Court in the League and U.N.* (Johns Hopkins University Press 1973) 318–19. Cf Mahasen Mohammad Aljaghoub *The Advisory Function of the International Court of Justice 1946–2005* (Springer 2007).

67 *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) (n 38) 12 at 13.

68 ‘There has been no refusal, based on the discretionary power of the Court, to act upon a request for advisory opinion in the history of the present Court.’ See *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) (n 38) 12 at 13.

69 ‘In accordance with its consistent jurisprudence, only “compelling reasons” should lead the court to refuse its opinion’. ICJ Advisory Opinion (9 July 2004) ‘Legal consequences of the construction of a wall in the Occupied Palestinian Territory’ <http://www.icj-cij.org/docket/index.php?p1=3&p2=4&case=131&p3=4>.

70 *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) (n 38) 15 at 17.

71 See Guenier ‘Notes on Sands lecture’ (n 17).

issues, and cannot adequately manage scientific fact-finding sessions and hearings.<sup>72</sup>

Furthermore, unlike governments, courts cannot quickly or regularly adapt their opinions to reflect the latest science. Courts are passive and reactive, not active and proactive; they adjudicate only the claims submitted to them. If no claim is submitted, a court-made policy will stay as is, even if the scientific basis for the policy has changed dramatically. Judicial policy-making would produce an entrenched, counter-productive and costly basis for risk regulation in any area. In the area of climate change, this is an even more significant problem because climate science changes rapidly. The Oslo Principles on Global Climate Change Obligations recognise that the science ‘is constantly evolving and improving’ and therefore require that ‘lawmakers, policymakers and tribunals ... inform themselves of and base their actions ... on prevailing scientific knowledge and opinion’.<sup>73</sup> Court-made policies, however, are not able to keep up with this constantly evolving science.

#### 4 Judicial devices to come to grips with science

To mitigate its epistemic limitations, a court could deploy some formal devices.<sup>74</sup> Only in rare cases could judges attempt to work out for themselves what the science says. In most cases, judges would have to admit that they lack the necessary training and skills, so this would not be a viable option. Even if they are scientifically literate and numerate, however, this is no guarantee of a complete understanding of the complex issues in the case of climate science. Accordingly, this device would create a risk that judges might misunderstand the science or omit to examine less widely publicised or visible parts of the science. Courts need to resort to other methods.

##### 4.1 Scientific evidence submitted by the parties

Instead of attempting to assess the science itself, a court could examine the scientific evidence submitted by the parties before it. The main risk of relying entirely on the science submitted by the parties is that the record is incomplete. The parties to the legal proceedings may have incentives not to submit a full scientific record and be ‘economical with the truth’. Laws often do not effectively

restrict the selective use of evidence, including scientific evidence. Consequently, where the record before the court excludes legitimate dissenting opinions, the court is not presented with the complete picture and may be misled.

In a case involving climate science, a court could not rely solely on the evidence submitted by the parties, because that evidence is likely to be incomplete. The record is likely to be incomplete not only because the body of climate science is vast and varied, but also because states will not want to submit the evidence that does not help them to achieve their political objectives. We have seen this behaviour in the *Urgenda* case: for reasons of political convenience, the state of the Netherlands agreed with virtually all scientific evidence submitted by *Urgenda*. The state felt that it could not challenge the science submitted by *Urgenda*, since it had used the same science as a basis for its existing policies.<sup>75</sup> Thus, the ICJ or any other court would have to open the process to obtain a clear picture on the state of climate science.

##### 4.2 The use of experts

Another device involves the use of experts. Where the court deems it necessary, it may appoint expert witnesses to advise it. If there is a broad range of issues and a broad range of opinions, as in the case of climate science, this would quickly become an unmanageable project, however. The selection of experts would raise unpredictable and potentially dangerous issues, and may well force a court to make scientific judgments about the validity and relative merits of competing theories and the like.

Under its Statute, the ICJ may ‘at any time, entrust any individual, body, bureau, commission, or other organization that it may select, with the task of carrying out an enquiry or giving an expert opinion’.<sup>76</sup> Even in complex cases, however, the ICJ rarely appoints neutral experts to advise it, and has been criticised for failing to do so both in dissenting opinions and in the literature.<sup>77</sup> In response to such criticism, it has been argued that: ‘increased recourse to expert knowledge under Article 50 would result in a delegation of the judicial function to unaccountable experts’. Instead, the use of a ‘pre-trial procedure involving co-operation with specialist international organisations’ has been recommended.<sup>78</sup> It is unclear how this alternative

72 Pursuant to its Rules of Court, the ICJ may decide to hold public hearings, but such hearings cannot perform the function of broad and in-depth scientific explorations. <http://www.icj-cij.org/documents/index.php?p1=4&p2=3&p3=0>.

73 Oslo Principles on Global Climate Change Obligations <http://www.osloprinciples.org/principles/>.

74 Carl F Cranor *Toxic Torts: Science, Law and the Possibility of Justice* (Cambridge University Press 2006).

75 See Bergkamp and Hanekamp ‘Climate change litigation against states’ (n 3) 102–114.

76 ICJ Statute art 50 <http://www.icj-cij.org/documents/?p1=4&p2=2>.

77 For references to the dissenting opinions and literature see D Peat ‘The use of court-appointed experts by the International Court of Justice’ (2013) 84(1) *British Yearbook of International Law* 271–303 doi:10.1093/bybil/bru024.

78 *ibid*.

would help to resolve the ICJ's epistemic inferiority in climate change cases; if the organisation involved is the IPCC, as discussed further in section 6.5 below, political manoeuvring is likely to dominate the procedure.

### 4.3 Cross-examination of expert witnesses

In Sands's view, the ICJ's opinion in the *Whaling* case supports his proposal for an opinion on climate science. In the *Whaling* case, the ICJ allowed cross-examination of the experts called by the state parties.<sup>79</sup> The relevance of this case to a climate science ruling, however, is tenuous and solely procedural. The whaling dispute between Australia and Japan arose under the International Convention for the Regulation of Whaling, which restricts commercial whaling subject to an exception for 'scientific research'.<sup>80</sup> The question before the ICJ was whether the killing, taking and treating of whales by Japan was for purposes of scientific research and thus was eligible to be authorised by special permits.<sup>81</sup> According to Australia, Japan's scientific research programme was 'merely a guise' under which to continue commercial whaling. Thus, the key issue in this case was the proper construction of the convention's concept of 'scientific research' and whether Japan's whaling was 'for purposes of' such research. These are clearly legal issues on which the ICJ can opine.

Insofar as Sands recommends that the ICJ should hear scientists and experts from the full range of scientific perspectives and should ensure rigorous cross-examination, he makes a useful contribution. To be able to form an opinion on a scientific issue, courts need to interrogate experts from across the spectrum. Cross-examination and presentation of contrary evidence, as the US Supreme Court opined, is the appropriate means by which evidence based on valid principles may be challenged.<sup>82</sup>

### 4.4 Interim conclusions

Courts' relative inability to remedy their epistemic shortcomings and acquire the understanding needed to grasp complex scientific problems such as climate change should caution against any inclination to decide complex and ambiguous scientific issues, even if doing so is necessary to rule on related legal issues. The simple devices available to courts are unlikely to work in the area of climate science. If a court is unable to answer the scientific question, it should deny the claim.

In the case of the ICJ, it should state that international law 'has nothing to say'<sup>83</sup> on climate science and policy, and refer the issue back to the international community of states. In a legal system, the first question to answer is *not* 'what is decided', but 'who decides', and the answer to this question is a matter of system design, not opportunism. Courts, by and large, are unaccountable and cannot be discharged for making improper decisions. They earn their legitimacy and credibility through their restraint and respect for the limits of their authority. Most climate activists seem to miss this fundamental point.

## 5 Science and law: diverging standards and rules

A further problem is that the standards applied by scientists may differ from those that must be applied by courts. As a result, a fact established in science may not be treated as a fact in law, unless it has been confirmed that the scientific fact meets the applicable legal standards. In addition, the experts themselves may have to meet legal standards. The relevant law is the law of evidence, including the burden of production and proof as well as the standard of proof, and the substantive law of causation. As the *Urgenda* case has demonstrated, a court can easily lose sight of this issue and treat authoritative scientific facts as facts in law without verifying whether they meet the applicable legal standards.<sup>84</sup>

### 5.1 The law of evidence

In his proposal for an ICJ opinion, Sands skips over these problems, except where he suggests that the IPCC findings he cites 'indicate that we have gone well beyond the classical standards on the burden of legal proof, whether it be balance of probabilities, or beyond reasonable doubt'.<sup>85</sup> On what basis he says this is entirely unclear. Apparently, he believes that whatever the IPCC says should be treated as the truth as a matter of law. Needless to say, that would be a partisan way of dealing with the evidence. If the ICJ were to follow his recommendation, it would instantly lose all legitimacy and credibility as an impartial legal institution.

There is nothing in the law of the evidence of the ICJ and of any civilised nation known to me that requires that scientific findings of an international organisation that has no formal fact-finding or rule-making authority be treated as the truth or as undisputable facts as a matter of law. In

79 Sands lecture (n 8) 15.

80 <https://iwc.int/convention>.

81 *ibid* art VIII para 1. See *Whaling in the Antarctic Case* (n 39) 41–42, para 127.

82 *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993). Cf *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999).

83 Cf Sands lecture (n 8) 2.

84 See Bergkamp 'Het Haagse klimaatvonnis' (n 57) 2278–88.

85 Sands lecture (n 8) 6.

some cases, after careful examination of a field of science, a court could conclude that scientific facts established by an international organisation should be presumed to be accurate, but any such presumptions should always be rebuttable by other evidence. In the case of the IPCC reports, there is no reason to believe that all statements set out therein are free from bias and political influence.<sup>86</sup> At best, a court could treat the IPCC findings, insofar as they are scientific facts, as relevant evidence subject to further scrutiny.

## 5.2 Causation in science and in law

Causal requirements, ie the conditions under which a cause–effect relation is assumed to exist between two variables, differ greatly between various fields of science,<sup>87</sup> and between science and law. In science, a broad distinction is made between correlation and causation, but there are also close relations between the two.<sup>88</sup> Statistics have important things to say about the probability that a finding is true or false,<sup>89</sup> but there are numerous pitfalls.<sup>90</sup> In law, a

broad distinction is made between ‘cause in fact’ and ‘cause in law’. In Anglo-Saxon jurisdictions, cause in fact is often described as the ‘but for’ test;<sup>91</sup> in civil law jurisdictions, this is the *conditio sine qua non* test,<sup>92</sup> ie cause as a necessary condition for a consequence. The exceptions to this requirements are limited.

To prevent the misuse of science in the law,<sup>93</sup> courts have to ensure that the causal conditions that have been applied by the scientists meet the law’s causal requirements. For instance, scientists might conclude that there is a cause–effect relation between two variables based solely on correlation, even relatively weak correlation, and a ‘weight of the evidence’ approach.<sup>94</sup> A court, however, is likely to be required under the applicable law to apply more robust and demanding causation and evidentiary requirements.<sup>95</sup> Specifically with respect to the ICJ, assessment of scientific facts against legal standards is even trickier, as the Court traditionally applied lenient rules out of respect for the state parties and for reasons of flexibility.<sup>96</sup> Recently, the ICJ has begun to apply stricter and more detailed rules, which has created tension between the formal common law and informal civil law traditions and, thus, between the ICJ’s judges.<sup>97</sup>

## 5.3 Science, scientism and law

The relation between science and law has long puzzled lawyers. Difficulties in engaging with the science has led to both over- and under-valuation of science in deciding legal questions. Climate activists rely heavily on science, at least the part that supports their calls. In the *Urgenda* case, the court found more ambitious emission reduction ‘scientifically necessary’.<sup>98</sup> Sands seems to be thinking along the same lines. The belief that science can dictate values,

86 Self-selection bias may affect both climate science and the IPCC reports if climate science attracts a disproportionate number of scientists that are genuinely concerned about the future of humanity and Planet Earth. Given that no quality assurance process is able to eliminate all bias, these inclinations may result in their findings being exaggerated and the threats being portrayed as more serious than they in fact are. Evidence of such self-selection bias has been provided by the IPCC’s scientific leadership itself. The first IPPC chairman has stated that: ‘[i]f we want a good environmental policy in the future, we’ll have to have a disaster’, which was mistakenly, but in the context not unreasonably, translated to: ‘[u]nless we announce disasters, no one will listen’. See ‘Me and my God’, Sir John Houghton talks to Frances Welch (10 August 1995) (an interview about his faith and moral outlook, in which he also said that God uses disasters). For his response to the erroneous interpretation of his statements see <http://www.telegraph.co.uk/comment/letters/7944874/Trident-shouldnt-lead-to-more-defence-cuts.html>. More recently, in his resignation letter, the former IPCC chairman made the following, maybe more revealing statement: ‘For me the protection of Planet Earth, the survival of all species and sustainability of our ecosystems is more than a mission. It is my religion and my dharma’. Thus, it should not surprise that some element of duty or emotion might play a role in the IPCC’s findings, statements and reporting. Political influence is discussed further in section 6.5 below.

87 See eg Richard Horton ‘What is medicine’s 5 sigma?’ (2015) 385 *The Lancet* 1380. Cf J L Mackie *The Cement of the Universe: A Study of Causation* (Clarendon Paperbacks 1974); W C Salmon *Scientific Explanation and the Causal Structure of the World* (Princeton University Press 1984).

88 J Pearl ‘Correlation and causation: the logic of co-habitation’ (2012) 26 *European Journal of Personality* 401–402.

89 D B Rubin ‘Causal inference using potential outcomes’ (2005) 100(469) *J. Amer. Statist. Assoc.* 322–31; D B Rubin ‘Statistics and causal inference: comment: which ifs have causal answers?’ (1986) 81(396) *J. Amer. Stat. Assoc.* 961–62; P W Holland ‘Statistics and causal inference (with discussion)’ (1986) 81(396) *J. Amer. Statist. Assoc.* 945–70; R Stone ‘The assumptions on which causal inferences rest’ (1993) 55(2) *Journal of the Royal Statistical Society* 455–66.

90 An example is the prosecutor’s fallacy, ie conditional probability. Cf J Thompson ‘Trial by probability: Bayes’ Theorem in court’ <http://webcache.googleusercontent.com/search?q=cache:3RL37nFUgCsJ;https://www.uwstout.edu/mcs/upload/Trial-by-Probability.pdf+&cd=7&hl=en&ct=clnk&gl=us>.

91 H L A Hart, T Honoré *Causation in the Law* (2nd edn Clarendon Press 1985). Cf G Calabresi ‘Concerning cause and the law of torts: an essay for Harry Kalven, Jr.’ (1975) 43(1) *University of Chicago Law Review* 69–108; R A Epstein ‘Causation – in context: an afterword’ (1987) 63 *Chicago Kent Law Review* 654–80.

92 Cf M Faure (*G)een schijn van kans: Beschouwingen over het statistisch causaliteits-bewijs bij milieugezondheidschade* (Maklu 1993).

93 D L Faigman *Legal Alchemy: The Use and Misuse of Science in the Law* (WH Freeman 1999).

94 For a discussion of precautionary science see L Bergkamp, L Kogan ‘Trade, the precautionary principle, and post-modern regulatory process: regulatory convergence in the transatlantic trade and investment partnership’ (2013) *European Journal of Risk Regulation* 493–507.

95 See Bergkamp ‘Het Haagse klimaatvonnis’ (n 57) 2278–88.

96 For an overview of some of the issues from a practitioner’s viewpoint see <http://www.lcil.cam.ac.uk/events/lcil-friday-lecture-facts-evidence-and-causation-practice-icj-robert-volterra>. Cf Anna Riddell, Brendan Plant *Evidence Before the International Court of Justice* (British Institute of International and Comparative Law 2009).

97 Riddell and Plant *Evidence Before the International Court of Justice* (n 96).

98 For an English translation of the judgment see <http://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RBDHA:2015:7196&keyword=urgenda>.

norms and policies is known as ‘scientism’.<sup>99</sup> Scientism involves a failure to understand the limits of science, a belief that empirical science is the only source of true knowledge and provides a superior, complete view of the world.<sup>100</sup> This exaggerated belief in science is harmful to both science and law, however, because it oversells science and undersells law. Courts of law have recognised science’s limits. In a case on the fluoridation of drinking water, which was ‘scientifically necessary’ to combat caries, the Dutch Supreme Court found that scientific necessity was an insufficient basis, and required specific legislation.<sup>101</sup> Not science, but the legislature was to decide on the policy.

Science is helpful to understanding the natural world. However, science cannot supply values or norms for human action. With respect to values (as values), natural scientists cannot claim any special expertise or ability,<sup>102</sup> and values are much closer to the domain of law. It has even been suggested that science is unable ‘to refute any normative position or to help one choose among contending normative orientations’.<sup>103</sup> Conversely, as Stehr opines: ‘[i]t is dangerous to blindly believe that science and scientists alone can tell us what to do’.<sup>104</sup> Science informs the application of law but is not law and cannot dictate law.<sup>105</sup>

#### 5.4 Interim conclusions

Science is often relevant to answering legal questions. A court cannot simply endorse any scientific conclusion, but has to examine independently whether the conclusion is based on the standards and rules that the court is required to apply; in other words, a court has to apply its own standards to determine whether the scientific conclusions hold up under the law. In evaluating the evidence on climate change, it would have to call on scientists from across the spectrum of climate science and beyond, not only those

that are affiliated with the IPCC or supported by a powerful state government.

Again, there is an issue as to whether a court would be capable of performing this task in the area of climate science. For the ICJ, with its under-developed system of fact-finding process, there is reason to be sceptical about its ability to conduct the kind of scrutiny that climate science requires. In the remainder of this article, the main focus is on the question as to why climate science requires a high level of scrutiny.

### 6 Judicial assessment of climate scientific consensus

We have seen that, in the case of climate science, courts should be careful in deploying any of the scientific incompetence—mitigation devices, because each of them would present substantial risks of the court being misled and treating scientific conclusions as legally valid and irrefutable. A specific issue a court would probably have to address is how to treat the alleged scientific consensus in climate science. Indeed, Sands refers to a ‘broad emerging consensus’ to reinforce his claims.<sup>106</sup>

Before exploring the notion of scientific consensus in more detail, it should be noted that scientific consensus is generally not an issue of the admissibility of evidence. In its *Daubert* judgment,<sup>107</sup> the US Supreme Court explicitly rejected the consensus or ‘general acceptance’ test<sup>108</sup> for the admissibility of scientific opinions to replace it with requirements regarding sound scientific methodology, validity and relevance. Thus, consensus is likely to present an issue in relation to the relative degree of credibility or reliability assigned to scientific evidence. As discussed below, however, no generic assumptions can be made about consensus science, and a case-by-case analysis is required, in particular in relation to ‘policy-relevant’ climate-related claims.

#### 6.1 The legal value of consensus

A court may be tempted to treat scientific findings as facts in law if there is ‘consensus’ about such findings amongst scientists, since consensus science can be presented in an authoritative manner. On the other hand, a court should realise that consensus may be very far from unanimity and refer merely to the largest minority amongst a group of scientists. At a more fundamental level, consensus does not

99 Scientism has also infiltrated the law. See George L Priest ‘The new scientism in legal scholarship: a comment on Clark and Posner’ (1981) 90(5) *The Yale Law Journal* 1284–95.

100 Cf Friedrich August von Hayek ‘The pretence of knowledge’ Lecture to the memory of Alfred Nobel (11 December 1974) [http://www.nobelprize.org/nobel\\_prizes/economic-sciences/laureates/1974/hayek-lecture.html](http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1974/hayek-lecture.html); Allan Bullock, Stephen Trombley (eds) *The New Fontana Dictionary of Modern Thought* (Harper Collins 1999) 775.

101 *Fluoridering van drinkwater* (1973) NJ, 386, met noot A R Bloembergen <http://open.navigators.kluwer.nl/vrom/nj-1973-386-fluoridering-drinkwater-mist-wettelijke-grondslag/#.Ve8OWU0w85s>.

102 An exception is social scientists who examine values as ‘facts’.

103 Edward Bryan Portis *Max Weber and Political Commitment: Science, Politics, and Personality* (Temple University Press 1986) 75.

104 N Stehr ‘Democracy is not an inconvenience’ (2015) 525 *Nature* 449–50. For a comment in line with Sands’s thinking see J Ren and others ‘Climate justice more vital than democracy’ 2015) 526 *Nature* 323.

105 For a discussion of value judgments in science see further section 6.3 below.

106 Sands lecture (n 8) 14.

107 *Daubert v. Merrell Dow Pharms., Inc.* (n 82). Cf *Kumho Tire Co. v. Carmichael* (n 82).

108 *Frye v. United States*, 293 F. 1013 (1923).

exhaust science. In politics, consensus is required to achieve results and progress. In science, however, the debate is never closed, although it may be dormant for some time. Even a widely accepted scientific theory can be falsified at any point in time, without notice. Science does not need consensus, and too strong an emphasis on consensus may even harm scientific creativity or the way science is presented to policy-makers.<sup>109</sup> A field of enquiry can prosper in the absence of consensus. Competing theories and schools of thought may help to move science forward. In some cases, a minority opinion supplies the better theory or explanation.<sup>110</sup> Observation, not consensus, 'is the ultimate and final judge of the truth of an idea'.<sup>111</sup>

In short, consensus is not necessarily irrelevant, but consensus needs to be understood to determine how much weight it should be given and how it compares with other scientific opinions. Unthinkingly rubber-stamping consensus science is not a good practice. In a court room, a claim that there is scientific consensus raises several questions. First, what is the basis for the claim that there is consensus? In other words, how do we know there is consensus at all, and how strong is the evidence supporting the consensus? As part of this analysis, to ensure that only opinions of experts possessing the required expertise are included, a sound decision has to be made about *whose views count*. After an investigation, a court might conclude that there is no adequate evidence to support the claim of consensus, or even that a problem or question is 'beyond expertise'.<sup>112</sup> Secondly, what is the nature and extent of the scientific consensus? This examination covers issues such as precisely on which findings and facts there is consensus and why, and on which findings and facts there is disagreement and why. Thirdly, how was the consensus produced, ie in what kind of environment? Of course, consensus that is based not on persuasive argument but on silencing dissent by inappropriate means is not worth anything. Similarly, if an area of science is politicised, consensus may not signal the state of the science, but political dominance instead. In short, if scientific consensus is invoked and may play a role in the proceedings, courts should first analyse and understand the consensus.

109 Curry argues that 'consensus distorts climate science'. See J Curry 'The IPCC's "inconvenient truth"' <http://judithcurry.com/2013/09/20/the-ipccs-inconvenient-truth/>.

110 In the area of medical law, the 'respectable minority' doctrine 'precludes liability when physicians are divided among two or more respectable schools of thought, and the defendant satisfies the tenets of one'. See Philip G Peters 'The quiet demise of deference to custom: malpractice law at the millennium' (2000) 57 *Wash. & Lee L. Rev.* 163 <http://scholarlycommons.law.wlu.edu/wlulr/vol57/iss1/5>.

111 Richard P Feynman *The Meaning of It All* (Addison-Wesley Books 1963).

112 See written evidence submitted by Robin Guenier (IPC0024) [http://data.parliament.uk/writtenevidence/WrittenEvidence.svc/EvidenceHtml/4191#\\_edn7](http://data.parliament.uk/writtenevidence/WrittenEvidence.svc/EvidenceHtml/4191#_edn7).

## 6.2 The substance of consensus

Contrary to what the general perception of lawyers may be, climate science in the policy arena is characterised by scientific advisers acting as 'issue advocates', rather than 'honest brokers'.<sup>113</sup> It has become hard to entangle science and politics, and robust scientific opinions and 'group think'.<sup>114</sup> The substance of the scientific consensus is also affected by these tendencies. A particularly exacting exercise for a court will be to determine how the scientists know what they claim to know, ie what the evidence is for their beliefs. In the empirical sciences, a court should analyse the combination of observations, data, experiments, models and theories, and the reasoning that has resulted in the scientific findings and claims. Assumptions, contingencies, extrapolation and the like require special attention, as well as variability (including natural) uncertainty, complexity and ambiguity. The courts should distinguish 'hard' objective claims and findings from 'soft' claims and findings, and actively look for subjective or value judgments that may have influenced the fact-finding and science.

## 6.3 Subjective and value judgments

Indeed, scientific evidence and expert judgments may imply subjective or value judgments.<sup>115</sup> As the father of modern social science, Max Weber, has taught us: 'statements of fact are one thing, statements of value another, and any confusing of the two is impermissible'.<sup>116</sup> Identifying value

113 R A Pielke *The Honest Broker: Making Sense of Science in Policy and Politics* (Cambridge University Press 2007).

114 I L Janis *Groupthink: A Psychological Study of Policy Decisions and Fiascoes* (Houghton Mifflin Company 1982). Groupthink is a psychological phenomenon characterised by the following eight possible symptoms of groupthink: (i) illusion of invulnerability, which creates excessive optimism that encourages taking extreme risks; (ii) collective rationalisation – members discount warnings and do not reconsider their assumptions; (iii) belief in inherent morality – members believe in the rightness of their cause and therefore ignore the ethical or moral consequences of their decisions; (iv) stereotyped views of out-groups – negative views of 'enemy' make effective responses to conflict seem unnecessary; (v) direct pressure on dissenters – members are under pressure not to express arguments against any of the group's views; (vi) self-censorship – doubts and deviations from the perceived group consensus are not expressed; (vii) illusion of unanimity – the majority view and judgments are assumed to be unanimous; and (viii) self-appointed 'mindguards' – members protect the group and the leader from information that is problematic or contradictory to the group's cohesiveness, view, and/or decisions. In other words, the process is dominated by a singular, uniform view on what is declared to be 'the truth'.

115 R Rudner 'The scientist qua scientist makes value judgments' (1953) 20 *Philosophy of Science* 1–6. Cf R C Jeffrey 'Valuation and acceptance of scientific hypotheses' (1956) 22 *Philosophy of Science* 237–46.

116 Ralf Dahrendorf 'Max Weber and modern social science' in Wolfgang J Mommsen, Jürgen Osterhammel (eds) *Max Weber and His Contemporaries* (The German Historical Institute/Allen & Unwin 1987) 577. Cf M Weber *Political Writings* (Cambridge University Press 1994).

judgments hidden in the scientific evidence is a court's main task in examining the science. Assumptions, conditions, contingencies, probabilities, theories, scenarios, pathways, statements and conclusions included in scientific evidence and expert judgments may be based, imply, reflect or simply be subjective or value judgments.<sup>117</sup> For instance, the concept of 'dangerous climate change', which is key to climate policy-making and to Sands's argument,<sup>118</sup> is not a scientific concept. The IPCC acknowledges as much:

Defining what is dangerous interference with the climate system is a complex task that can only be partially supported by science, as it inherently involves normative judgments. There are different approaches to defining danger, and an interpretation ... is likely to rely on scientific, ethical, cultural, political and/or legal judgments.<sup>119</sup>

This acknowledgement confirms that value judgments are required to set climate policy. Science alone cannot dictate policies, let alone court opinions.

In climate science and climate modelling, value and subjective judgments inevitably play a significant role, because climate science is characterised by probabilities<sup>120</sup> and an unusually high level of uncertainty at various levels of the causal chain.<sup>121</sup> Courts therefore will have to drill down into the science and the models employed by climate scientists to flush out at which points assumptions are made, conditions are inserted, variables are added or omitted etc, which may involve subjective or value judgments. In other words, 'attention should be paid to the spaces within climate modeling where values play a role, to the kinds of values or "nonepistemic" considerations that play a role, and to the effects that these values have upon the overall performance of [climate]

models'.<sup>122</sup> Obviously, performing this necessary task would present an enormous challenge for any court.

#### 6.4 Process of consensus formation

In terms of the process, courts should examine the institutional environment and process in which the pertinent scientific consensus (or other advice) is produced.<sup>123</sup> In other words, it should examine the 'politics' of the relevant science and scientific claims or advice. Science is not free from politics, and the organisational, institutional and procedural context may exercise strong influence on the dominance of scientific theories.<sup>124</sup> In other words, not all instances of scientific concurrence are created equal. In a sense, all scientific consensus is 'socially constructed'<sup>125</sup> but, as noted above, that does not mean that the weight a court of law should attach to scientific consensus is always the same, irrespective of the way the consensus has been achieved.

Consequently, there may be substantial differences in the process that leads to the consensus. At one extreme, a process of objective, interest-free deliberation of scientific findings and theories, in an environment free from politics and possible sanctions for adopting any legitimate scientific position, may result in broad concurrence of scientists around a particular scientific theory and specific facts and findings. In such cases of 'spontaneous' scientific consensus, a court of law does not run much risk in relying on the consensus position. At the other extreme, however, the process that leads to the consensus is heavily politically charged, as well as strongly value-laden, the environment in which the scientists operate is polarised and characterised by competing non-scientific interests and scientists are exposed to possibly significant consequences attached to taking a scientific position that deviates from the consensus position. Climate science consensus is closer to the latter end of the range and this has consequences for the legal assessment of the climate change consensus.

To understand why climate consensus building has not been left solely to the merits of scientific argument, the incentives and disincentives to consent or dissent should be examined. A full treatment of this complex issue is beyond this article's scope, but there are grounds for suspicion. In terms of incentives, owing to the asymmetry in funding opportunities, it is much easier for climate scientists endorsing the consensus view to obtain the

117 See Rudner 'The scientist qua scientist makes value judgments' (n 115) 1–6. Cf R C Jeffrey 'Valuation and acceptance of scientific hypotheses' (n 115) 237–46.

118 Sands lecture (n 8) at 4 ('dangerous anthropogenic interference with the climate system') and 20 ('dangerous climate change').

119 IPCC, Fourth Assessment Report, Working Group III: 'Mitigation of climate change' (2007) 1.2.1 [https://www.ipcc.ch/publications\\_and\\_data/ar4/wg3/en/ch1s1-2-2.html](https://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch1s1-2-2.html).

120 The IPCC uses a large number of simulations available from a broad range of models. IPCC Fourth Assessment Report, Climate Change 2007: Working Group I: 'The physical science basis' [https://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/spmsspmp-projections-of.html](https://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspmp-projections-of.html).

121 According to Biddle and Winsberg: '[s]cientists cannot assign probabilities to hypotheses about climate change – or, more specifically, estimate the uncertainties of climate predictions – in a manner that is free from "non-epistemic" considerations, because "non-epistemic" considerations invariably influence the choices of prediction tasks, and the choices of prediction tasks invariably influence the estimation of both structural model uncertainty and parameter uncertainty'. See Justin Biddle, Eric Winsberg 'Value judgments and the estimation of uncertainty in climate modeling' in P D Magnus, Jacob Busch (eds) *New Waves in Philosophy of Science* (Palgrave Macmillan 2010) 172–97.

122 See Biddle and Winsberg 'Value judgments and the estimation of uncertainty in climate modeling' (n 121) 172–97.

123 Cf Justus Lentsch (ed) *The Politics of Scientific Advice: Institutional Design for Quality Assurance* (Cambridge University Press 2011).

124 CFT Kuhn *The Structure of Scientific Revolutions* (Enlarged 2nd edn, University of Chicago Press 1970).

125 T Jagtenberg *The Social Construction of Science: A Comparative Study of Goal Direction, Research Evolution and Legitimation* (Springer 2012).

financial means to build a successful academic group.<sup>126</sup> Scientists that accept the IPCC's way of thinking about climate change and the scientific consensus also enjoy other benefits, such as better opportunities to have their papers published in prestigious journals, better access to the public media, more invitations to speak at international meetings and conferences, and an attractive international career (including travel), most of which they would have to forego if they rejected the consensus science.<sup>127</sup>

Conversely, dissenting scientists may be exposed to substantial disincentives and subject to social sanctions. For instance, they may find it more difficult to obtain the resources necessary for their research owing to a lack of funding for 'sceptical' science, or to get their research published owing to biased peer review. They may not receive invitations to speak at conferences, and be scientifically 'marginalised'. The Campaign Against Climate Change operates a 'Climate Sceptics Hall of Shame' on the internet,<sup>128</sup> and the Obama campaign entertained the idea of shaming climate sceptics in Congress.<sup>129</sup> In February 2015, US Members of Congress sent inquisitorial letters to universities employing scientists deemed to be climate sceptics, seeking access to information on all sources of outside funding.<sup>130</sup> It has even been suggested that 'climate deniers' be subjected to criminal investigations<sup>131</sup> and to the death penalty.<sup>132</sup> As Godwin's law predicts,<sup>133</sup> 'climate deniers' have also been compared with Nazis and culpable of causing the 'next genocide'.<sup>134</sup> In short, scientists should think twice before adopting a critical stance on the climate consensus.

126 For an argument that scientists cater to media demand for science that can be translated into 'alarmist declarations', which then causes politicians to feed the scientists more funds see Richard S Lindzen 'Science in the public square: global climate alarmism and historical precedents' (2013) 18(3) *Journal of American Physicians and Surgeons* 70–73.

127 Cf Marcel Crok *De staat van het klimaat: een koele blik op een verhit debat* (Amsterdam 2010).

128 [http://www.campaigncc.org/climate\\_change/sceptics/hall\\_of\\_shame](http://www.campaigncc.org/climate_change/sceptics/hall_of_shame).

129 <http://www.theguardian.com/environment/2013/apr/25/obama-for-america-shame-climate-sceptics>.

130 <http://www.wsj.com/articles/richard-s-lindzen-the-political-assault-on-climate-skeptics-1425513033>.

131 <http://cleantechnica.com/2015/09/23/scientists-urge-rico-investigation-of-corporate-climate-deniers/>.

132 <http://www.frontpagemag.com/point/170948/progressive-professor-demands-death-penalty-global-daniel-greenfield>.

133 Godwin's *Law of Nazi Analogies* states that: 'as an online discussion grows longer, the probability of a comparison involving Nazis or Hitler approaches one'. See <http://www.wired.com/1994/10/godwin-if-2>. Leo Strauss called this kind of reasoning 'reductio ad Hitlerum', a form of association fallacy. See Leo Strauss *Natural Right and History* (The University of Chicago Press 1953).

134 Such comparisons have been made by activists for at least several years, but are now also being made by respectable academics. See T Snyder 'The next genocide' *New York Times* (12 September 2015) <http://www.nytimes.com/2015/09/13/opinion/sunday/the-next-genocide.html?ref=opinion&r=>.

## 6.5 The political nature of climate consensus

In the area of climate science, scientific consensus is produced in a process managed by the IPCC.<sup>135</sup> The IPCC was established pursuant to the 1992 UNFCCC, prior to climate scientists having reached any solid conclusions about the contribution of greenhouse gases to climate change. Consequently, as one climate scientist has observed: '[t]he "policy cart" was clearly leading the scientific "horse"'.<sup>136</sup> The IPCC's mission is 'to assess on a comprehensive, objective, open and transparent basis<sup>137</sup> the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of *human-induced*<sup>138</sup> climate change, its potential impacts and options for adaptation and mitigation'.<sup>139</sup> Thus, the IPCC's focus is on the human contribution to climate change, not on all possible causes of climate change, which limits the scope of its scientific assessments. Furthermore, the IPCC's mission is not carefully to map the state and limits of the science and the diversity of scientific opinions, as that would not help policy-makers. Instead, the IPCC is 'a partnership which is helping to *unify the scientific and policy-making communities* of the world to lay the foundation for *effective, realistic and equitable action* on climate change'.<sup>140</sup> Although it is required to be 'neutral' and 'objective', there is no effective mechanism to enforce these standards, which are subordinate to the objective of producing effective and equitable climate action. Expectedly, the process is formally political, as '[c]onclusions drawn by IPCC Working Groups and any Task Forces are not official IPCC views until they have been accepted by the Panel in a plenary meeting'.<sup>141</sup>

Pursuant to a set of principles governing its work, 'review is an essential part of the IPCC process'. Because the IPCC is an inter-governmental body, 'review of IPCC documents should involve both peer review by experts and

135 Latour has argued that science must be studied 'in the making'. See B Latour *Science in Action: How to Follow Scientists and Engineers Through Society* (Harvard University Press 1987).

136 J A Curry 'Statement to the Committee on Science, Space and Technology of the United States House of Representatives' Hearing on 'The president's U.N. Climate pledge' (15 April 2015).

137 'Only recently, under pressure from critics, has the IPCC made its review process entirely transparent to the public.' See Spencer Weart 'Climate change impacts: the growth of understanding' (2015) 68(9) *Physics Today* 46 doi: 10.1063/PT.3.2914.

138 Note that this implies an explicit choice and scientific limitation: natural influences on the climate and natural variability are not the key focus.

139 [http://www.ipcc.ch/organization/organization\\_history.shtml](http://www.ipcc.ch/organization/organization_history.shtml). Emphasis added.

140 Report of the Second Session of the Intergovernmental Panel on Climate Change (IPCC), Nairobi (28 June 1989) <https://www.ipcc.ch/meetings/session02/second-session-report.pdf>.

141 Principles Governing IPCC Work [https://www.ipcc.ch/organization/organization\\_procedures.shtml](https://www.ipcc.ch/organization/organization_procedures.shtml).

review by governments'. Major decisions are made by the full Panel in plenary meetings. The main bodies of the IPCC (the Bureau, the Working Group Bureaux and the Bureaux of any Task Forces) must 'reflect balanced geographic representation with due consideration for scientific and technical requirements'.<sup>142</sup> Contributions to the IPCC's work 'should be supported as far as possible with references from the peer-reviewed and internationally available literature, and with copies of any unpublished material cited'.<sup>143</sup> The IPCC bodies are required to 'use all best endeavours to reach consensus'.<sup>144</sup> In practice, to meet the policy demand for actionable scientific advice, the IPCC was forced to take positions on key scientific issues based on consensus, or at least the public perception of consensus. As a result, scientific deliberation within the context of the IPCC is not free and unencumbered. Rather, the IPCC had to 'walk the tightrope of being scientifically sound and politically acceptable'.<sup>145</sup>

The direct government involvement and the trade-offs between scientific excellence and political considerations have created a fertile ground for bias.<sup>146</sup> According to Tol, the IPCC's Working Group 3 'has become more political and less academic', and 'overall quality has declined. In some countries, political affiliation seemed to override academic standing as a selection criterion for authorship, whilst in WG3 the most influential positions went to those who tend to support the environmentalists' agenda'. He also argued that in one report 'large parts of the literature' had been ignored, '[p]rocedures were violated' and the working group concerned failed 'to live up to its academic duty'.<sup>147</sup> The InterAcademy Council, which, following the 'Climategate' controversy, was charged with conducting an independent review of the IPCC's procedures and governance structures, found a mismatch between the growing challenges and the IPCC's institutional structures

and capacities to cope with them, and made a series of recommendations to improve the IPCC's processes of assessment and quality assurance. It pointed to 'the dangers of "group think" or consensus building as a general proposition'.<sup>148</sup> Despite accusations of 'infiltration of green advocacy groups into the IPCC',<sup>149</sup> the IPCC still has not implemented an effective conflict of interest policy.<sup>150</sup> Since the IPCC holds 'a natural monopoly on climate-knowledge-for-policy', Tol has argued that it should 'be strictly regulated'.<sup>151</sup> To date, the IPCC has not been regulated by binding and enforceable rules. As Beck has observed, the IPCC leadership acts 'in an overtly political manner while simultaneously claiming to be disengaged from politics'. She poses the rhetorical question 'why the prevailing form of leadership [is] not openly challenged by participating scientists and governments'.<sup>152</sup>

The IPCC's output is massive. Its Fifth Assessment Report includes three Working Group reports totalling thousands of pages and tens of thousands of references.<sup>153</sup> It is safe to assume that only a small number of experts read all of the IPCC output, excluding, of course, the references, and even fewer understand all of it. From a political perspective, the 'Synthesis Report' and especially the 'Summary for Policy-makers' are the key documents. Accordingly, these texts are authored by a small team including the IPCC chairman, and the final version is negotiated with the participating governments and

142 *ibid.*

143 *ibid* Annex A s 4.2.3. Note that the use of non-peer-reviewed materials may be inconsistent with the US Information Quality Act. See Lawrence A Kogan 'Revitalizing the Information Quality Act as a procedural cure for unsound regulatory science: a greenhouse gas rulemaking case study' Washington Legal Foundation Critical Legal Issues Working Paper Series No 191 (February 2015).

144 Principles Governing IPCC Work (n 141).

145 <http://link.springer.com/article/10.1023/A:1005312331477>.

146 It has also been suggested that 'seepage from public debate into the scientific process' may produce bias. See Stephan Lewandowsky, Naomi Oreskes, James S Risbey, Ben R Newell and Michael Smithson 'Seepage: climate change denial and its effect on the scientific community' (2015) 33 *Global Environmental Change* 1–13 (discussing 'the interpretation of temperature trends from the last 15 years'). What is true for 'climate change denial' of course, is also true for 'climate change activism'.

147 Richard S J Tol 'Biased policy advice from the Intergovernmental Panel on Climate Change' (2007) 18(7/8) *Energy & Environment* 929–36.

148 It found, for instance, that 'many of these scientific databases as well as significant unpublished and non-peer-reviewed literature are not in the public domain'. See InterAcademy Council *Climate Change Assessments: Review of the Processes and Procedures of the IPCC* (InterAcademy Council 2010).

149 J Curry 'The IPCC's "inconvenient truth"' (n 109). Cf D Laframboise *The Delinquent Teenager Who Was Mistaken for the World's Top Climate Expert* (Ivy Avenue Press 2011).

150 There are now conflict of interest policies in place at the overall and Working Group levels, but their scope is limited, they are lenient, and effective enforcement is not ensured. Cf IPCC Working Group I 'Conflict of interest, guidance note for holder of functions and offices' (October 2010). IPCC *Conflict of Interest Policy* 33rd Session (May 2011); IPCC *Conflict of Interest Policy* 34th Session (November 2011); IPCC *Conflict of Interest Policy* 35th Session (June 2012); IPCC *Conflict of Interest Policy* 34th Session (November 2011); IPCC *Implementation of the IPCC Conflict of Interest (CoI) Policy* 40th Session (October 2014) [https://www.ipcc.ch/organization/organization\\_procedures.shtml](https://www.ipcc.ch/organization/organization_procedures.shtml).

151 R S J Tol 'Regulating knowledge monopolies: the case of the IPCC' Economic and Social Research Institute, Dublin Working Paper No 350 (September 2010). Cf Henderson's statement that 'the status that the IPCC has acquired, as an established monopoly provider of information and advice to governments, should be held in question'. See David Henderson 'Evidence submitted to the House of Lords Select Committee on Economic Affairs' (21 January 2005).

152 Silke Beck 'Between tribalism and trust: the IPCC under the "public microscope"' (2012) 7(2) *Nature and Culture* 151–173.

153 [https://en.wikipedia.org/wiki/IPCC\\_Fifth\\_Assessment\\_Report](https://en.wikipedia.org/wiki/IPCC_Fifth_Assessment_Report).

approved by them. It is widely referenced.<sup>154</sup> This summary, however, may not be relied on as an exclusive source, because it may deviate from the full scientific reports in important respects.<sup>155</sup> Reflecting the politics of compromise inherent in the IPCC's consensus process, the IPCC has been unable to reflect the state of knowledge in clear terms.<sup>156</sup>

In many respects, the IPCC's functioning and processes have been found deficient. To the ICJ, the 'persistence and extent of North–South inequalities in [IPCC] authorship, revealing the dominance of US and UK institutions' should be a concern. The alleged dominance of the US and the UK, the 'under-representation of experts from the South' and 'insignificant participation of scholars from the humanities' should also be major concerns.<sup>157</sup> Other problems with the IPCC process include inadequate assessment of the literature, experts not being put on the subjects they know best, the 'top-down' approach (global/regional), the prioritisation of 'speed over quality' and the 'exaggerated confidence' the IPCC expresses in its conclusions.<sup>158</sup> Chapters of the IPCC compete for attention and authors thus dramatise their findings.<sup>159</sup> A main scientific basis for the IPCC's findings is climate modelling, but the accuracy of these models is disputed<sup>160</sup> and scientists

have called them 'useless arithmetic'.<sup>161</sup>

The 2013 IPCC model evaluation report states that: '[a]lthough crucial, the evaluation of climate models based on past climate observations has some important limitations. By necessity, it is limited to those variables and phenomena for which observations exist'.<sup>162</sup> The modelling concept has not been validated. Consequently, there is substantial uncertainty in climate science with respect to the facts that matter to policy-makers. In the summaries, however, the issue of uncertainty is relegated to the background.<sup>163</sup> In its Fifth Assessment Report, for instance, the IPCC expresses increased confidence in its conclusion that the increase in global average surface temperature is caused by the anthropogenic emissions and forcings, notwithstanding the fact that the empirical data<sup>164</sup> are moving in the other direction.<sup>165</sup>

The politicisation of the IPCC consensus formation and reporting process is further reinforced by the substantial vested interests in climate science and ambitious climate policy. These interests are material as well as ideological. Vast amounts of money are spent on academic and other research and consulting work etc.<sup>166</sup> Obviously, these funds generate incentives to produce research that requires further research. As a result, there has been a boom in climate science.<sup>167</sup> However, there is also an important ideological component. Using climate policy as a prime example, Pieterman and Hanekamp refer to the 'vested interests in fear and precaution' as the 'precautionary coalition'. This coalition would include academia, environmental NGOs, mass media and supranational political bodies, and be guided by the 'Thomas Theorem': 'when people think something is real, it will become real in its consequences'.<sup>168</sup>

154 'The SPMs are the most widely referenced element of each WG report, largely because their text is negotiated and formally approved by IPCC-member governments.' See C Carraro and others 'The IPCC at a crossroads: opportunities for reform' (2015) 350(6256) *Science* 34–35. For inside reports on the IPCC in action by an investigative journalist see Laframboise *The Delinquent Teenager Who Was Mistaken for the World's Top Climate Expert* (n 149); Donna Laframboise *Into the Dustbin: Rachendra Pachauri, the Climate Report & the Nobel Peace Prize* (Ivy Avenue Press 2013).

155 See eg R S J Tol 'The impacts of climate change according to the IPCC' University of Sussex Working Paper Series No 78-2015.

156 Ralf Barkemeyer and others 'Linguistic analysis of IPCC summaries for policymakers and associated coverage' (12 October 2015) *Nature Climate Change* (advance online publication) DOI: 10.1038/NCLIMATE2824; Tol 'The impacts of climate change according to the IPCC' (n 155).

157 E Corbera and others 'Patterns of authorship in the IPCC Working Group III report' (September 2015) *Nature Climate Change* DOI: 10.1038/NCLIMATE2782.

158 It has been asserted that the IPCC 'engages in exaggerated science and has become a political tool'. See John McLean 'How politics clouds the climate change debate' *Brisbane Times* (3 January 2014) <http://www.brisbanetimes.com.au/comment/how-politics-clouds-the-climate-change-debate-20140102-307ja#ixzz2pZDoQ0f5>.

159 See Tol 'The impacts of climate change according to the IPCC' (n 155).

160 The IPCC itself now admits that: '[m]ost, though not all, models overestimate the observed warming trend in the tropical troposphere over the last 30 years, and tend to underestimate the long-term lower stratospheric cooling trend'. See G Flato, J Marotzke, B Abiodun and others 'Evaluation of climate models' in T F Stocker, D Qin, G-K Plattner and others (eds) *Climate Change 2013: The Physical Science Basis* Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2013).

161 Orin H Pilkey, Linda Pilkey-Jarvis *Useless Arithmetic: Why Environmental Scientists Can't Predict the Future* (Columbia University Press 2009) 203: '[N]o models can predict with useful accuracy the rates of shoreline erosion, the rates of sea level rise, and the impact of CO<sub>2</sub> reduction'.

162 See Flato, Marotzke and Abiodun and others 'Evaluation of climate models' (n 160) 755.

163 J A Curry, P J Webster 'Climate science and the uncertainty monster' (2011) *Bulletin of the American Meteorological Society* 1667–82.

164 John C Fyfe, Nathan P Gillett and Francis W Zwiers 'Overestimated global warming over the past 20 years' (2013) 3 *Nature Climate Change* 767–69.

165 J Curry '95% (?)' <http://judithcurry.com/2013/09/27/95/>. This discrepancy may be due to the fact that for the IPCC the theoretical warming due to anthropogenic CO<sub>2</sub> is a given, <http://wattsupwiththat.com/2013/11/21/from-90-to-95-confidence-level-how-ipcc-claims-can-be-at-the-same-time-consistent-and-absurd/>.

166 For US data see Federal Climate Change Expenditures Report to Congress, Washington DC (August 2013).

167 William N Butos, Thomas J McQuade 'Causes and consequences of the climate science boom' (2015) 20(2) *The Independent Review* 165–96.

168 J C Hanekamp, R Pieterman 'Risk communication in precautionary culture: the precautionary coalition' (2009) 28 *Human & Experimental Toxicology* 15–20.

The political nature of the climate consensus is confirmed by the predictable response to new scientific publications. According to one author, many scientists' evaluations of the scientific merit of a paper arguing that '20th century climate variations were unexceptional in millennial perspective' correlated perfectly with their public expressions of support or opposition to the Kyoto Protocol'.<sup>169</sup> In this regard, scientists may resemble lay persons, who, at least in the US, fall into two basic camps. Those with an 'egalitarian' and 'communitarian' mind-set are generally suspicious of industry, want government regulation, and tend to see the risks of climate change, whilst people with a 'hierarchical' and 'individualistic' outlook respect industry, dislike government intervention and tend to reject warnings about climate change.<sup>170</sup> Their preferences, in turn, may merely reflect the scientific pretence of the 'policy-relevant' climate socio-scientific complex.<sup>171</sup>

## 6.6 Interim conclusions

Whilst it apparently influences the thinking of low level judges with no scientific training, the emphasis on scientific consensus in climate science is not likely to move the debate forward. It harms not only the scientific process, but also the process of public opinion formation and policy configuration. At law, as elsewhere, consensus is a relative concept and needs to be explored further, as discussed in section 6 above. Where a court has to engage the science, rather than focusing on consensus, its task is to distinguish sound science from pseudo-science<sup>172</sup> (and 'junk science', ie 'the science of things that aren't so'<sup>173</sup>), and determine how various sound scientific opinions relate to the legal concepts and inform their interpretation and application in the case.

In climate science, scientific consensus, depending on the specific issue, may be relevant, but it may also be unreliable or irrelevant. Moreover, consensus is never decisive. Courts should be aware of the relativity of scientific consensus in deciding issues of fact in law. The

political IPCC process of consensus formation in climate science is not favourable to the free competition of the best scientific concepts. It does not encourage thorough debate. It pushes consensus in the direction set by the early identification of anthropogenic emissions as the cause of climate change. In short, the IPCC has become 'cast more in the model of supporting than informing policy development'.<sup>174</sup> Dissenting scientists have either abandoned IPCC processes,<sup>175</sup> or they have been marginalised by the drive towards consensus. Of course, their defection says nothing about whether they are right or wrong but, as these dissenting scientists are legitimate scholars, not charlatans, it is a cause for concern. Hence, a court judgment that invokes consensus as a justification would be perceived as taking sides and, thus, would only aggravate the already politicised situation. For the ICJ, the issue would appear to be even more serious, as this Court has limited experience with sorting through complex scientific issues and employs a rather undeveloped process for analysing scientific information submitted to it.

## 7 Empirical research on climate consensus

The problem of the climate science consensus is driven home by the quantitative research of the extent of consensus: even the extent of consensus in climate science has become a hotly debated issue. It has been called both 'unequivocal'<sup>176</sup> and a 'myth'.<sup>177</sup> As discussed above, consensus is not the most important aspect of a scientific debate and should always be examined and questioned. It is a relevant aspect nonetheless, because some judges may be inclined to use it as a proxy for scientific truth in particular in those situations where there is good evidence on both sides. Since even the quantitative research on climate consensus is unreliable, however, courts would be ill-advised to accept the consensus as the truth without serious scrutiny.

### 7.1 Quantitative research on climate consensus

An academic discussion in 2004 focused on the question as to whether the IPCC reports reflect a scientific

169 RA Pielke 'When scientists politicize science: making sense of controversy over the skeptical environmentalist' (2004) 7 *Environmental Science & Policy* 405–417.

170 D Kahan 'Why we are poles apart on climate change' (2012) 488 *Nature* 255.

171 See Hanekamp 'Utopia and gospel' (n 48). Cf Hanekamp and Pieterman's 'precautionary coalition'. See Hanekamp and Pieterman 'Risk communication in precautionary culture: the precautionary coalition' (n 168) 15–20.

172 One form of pseudo-science is 'cargo cult science', which resembles science in form, but lacks scientific integrity. See Richard P Feynman 'Cargo cult science' (1974) *Engineering and Science* 10–13.

173 Peter W Huber *Galileo's Revenge: Junk Science in the Courtroom* (Basic Books 1993).

174 JW Zillman 'Bulletin' (2003) 16 *Australian Meteorological and Oceanographic Society* 85.

175 See eg Chris Landsea's decision to resign [http://cstpr.colorado.edu/prometheus/archives/science\\_policy\\_general/000318chris\\_landsea\\_leaves.html](http://cstpr.colorado.edu/prometheus/archives/science_policy_general/000318chris_landsea_leaves.html).

176 <https://www.skepticalscience.com/global-warming-scientific-consensus.htm>.

177 Joseph Bast, Roy Spencer 'The myth of the climate change "97%"' *Wall Street Journal* (26 May 2014) <http://www.wsj.com/articles/SB10001424052702303480304579578462813553136>.

consensus.<sup>178</sup> This discussion established that one has to be careful with the use of the term ‘consensus’ in relation to the IPCC reports, because consensus is easily confused with a specific policy recommendation, whilst the IPCC ‘maintains that its assessments do not advocate any single course of action’. Rather than basing decisions on one consensus view, it has been recommended that policy actions ‘be robust to (i) the diversity of scientific perspectives, and thus also to (ii) the diversity of perspectives of the nature of the consensus’.<sup>179</sup> Although this is wise advice, as we have seen before, the IPCC process is not susceptible to accommodating dissent and minority opinions.

Further, a controversial 2013 study found that 97 per cent of the scientific literature endorses anthropogenic climate change.<sup>180</sup> This claim is often invoked in debates about climate policy and, if it is true, it might be an argument to support some climate action. A leading expert on the economics of climate change, however, has refuted the claim on the grounds that it would have mistaken a ‘trend in composition’ for a ‘trend in endorsement’; furthermore, the reported results were inconsistent and biased, and the sample was not representative and contained many irrelevant papers, with overall data quality being low.<sup>181</sup> A recent study claims that: ‘90 per cent of respondents with more than 10 climate-related peer-reviewed publications (about half of all respondents), explicitly agreed with anthropogenic greenhouse gases (GHGs) being the dominant driver of recent global warming’.<sup>182</sup> The study, however, appears to suffer from serious methodological shortcomings.<sup>183</sup> The debate continues.<sup>184</sup>

178 N Oreskes ‘The scientific consensus on climate change’ (2004) 306 *Science* 1686; R Pielke ‘Consensus about climate change?’ (2005) 308(5724) *Science* 952–54, DOI: 10.1126/science.308.5724.952.

179 See Pielke ‘Consensus about climate change?’ (ibid) 952–54.

180 J Cook and others ‘Quantifying the consensus on anthropogenic global warming in the scientific literature’, (2013) 8(2) *Environmental Research Letters* 024024 <http://iopscience.iop.org/article/10.1088/1748-9326/8/2/024024;jsessionid=24BB298175E37DFEA88641E3E90A59F6.c1>. For an older study producing the same result see William R L Anderegg and others ‘Expert credibility in climate change’ (2010) 107(27) *PNAS* 12107–109. Cf Peter T Doran, Maggie Kendall Zimmerman ‘Examining the scientific consensus on climate change’ (2009) 90(3) *EOS* 22–23.

181 R S J Tol ‘Quantifying the consensus on anthropogenic global warming in the literature: a re-analysis’ (2014) 73 *Energy Policy* 701–705. See also his op-ed in *The Guardian* <http://www.theguardian.com/environment/blog/2014/jun/06/97-consensus-global-warming>.

182 Bart Verheggen and others ‘Scientists’ views about attribution of global warming’ (2014) 48(16) *Environ. Sci. Technol.* 8963–71 DOI: 10.1021/es501998e.

183 José L Duarte ‘Comment on “Scientists’ views about attribution of global warming”’ (2014) 48(23) *Environ. Sci. Technol.* 14057–58 DOI: 10.1021/es504574v.

184 John Cook and others ‘Reply to “Quantifying the consensus on anthropogenic global warming in the scientific literature: a re-analysis”’ (2014) 73 *Energy Policy* 706–708. R S J Tol ‘Quantifying the consensus on anthropogenic global warming in the literature: rejoinder’ (2014) 73 *Energy*

## 7.2 The merits of consensus messaging

Apart from the issue as to whether there is consensus, there is also disagreement on the question of whether consensus messaging even works in the area of climate change.<sup>185</sup> Apparently, a lack of appreciation of the perceived urgency of climate action is not caused by a lack of scientific understanding. A study found that ‘most scientifically literate subjects were slightly less likely, not more, to see climate change as a serious threat’ and ‘greater scientific literacy and numeracy were associated with greater cultural polarization’. Value predisposition, not scientific understanding, was found to determine a person’s position on this issue.<sup>186</sup> It suggests also that scientifically less literate and numerate people, such as judges, are more likely to respond positively to climate action appeals. According to a further study by the same group, people holding hierarchical and individualistic outlooks, on the one hand, and those holding egalitarian and communitarian outlooks, on the other, significantly disagreed about the state of expert opinion on climate change.<sup>187</sup>

## 7.3 Explanatory power of cultural cognition

Incidentally, but importantly, this cultural cognition research may also help to explain why the climate activists are now turning to the courts. In general, courts are composed of scientifically illiterate and innumerate lay persons serving as judges. Since the scientifically uninitiated are more likely to see climate change as a serious threat, the activists have a better chance to persuade judges to rule in favour of climate action than to persuade legislators, which is a mixed group also comprising scientifically trained individuals. The court ruling in the *Urgenda* case, of course, has confirmed the validity of the activists’ strategy; as I discussed in another publication, from a scientific-analytical perspective, the court’s reasoning reflects a serious lack of critical analytical skills.<sup>188</sup>

*Policy* 709. See also the written evidence submitted by Robin Guenier (n 112), who concludes that the extent to which the WGI Summary for Policymakers ‘reflects climate scientists’ views is both unknown and likely to continue to be unknown ... Such evidence as does exist indicates that the answer would probably be that AR5 reflects the range of views among climate scientists to only a very limited extent’.

185 <http://www.bristol.ac.uk/expsych/events/2015/232.html>.

186 D M Kahan and others ‘The tragedy of the risk-perception commons: culture conflict, rationality conflict, and climate change’ (SSRN 2011) [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1871503](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1871503).

187 D M Kahan and others ‘Cultural cognition of scientific consensus’ (2014) 14(2) *Journal of Risk Research* 147–74 DOI:10.1080/13669877.2010.511246.

188 See Bergkamp and Hanekamp ‘Climate change litigation against states’ (n 3) 102–114; Bergkamp ‘A Dutch court’s “revolutionary” climate policy judgment’ (n 3).

## 8 Precaution, cognitive bias and emotional appeals

If scientists cannot resolve these complex and tricky issues, how can courts resolve them? Society faces very substantial scientific uncertainty, which is the root cause of the scientific disagreements. Courts cannot make the uncertainty go away and, if substantial, court decisions granting claims will also be arbitrary and subjective, not based on law.

### 8.1 The precautionary principle

The precautionary principle's advance owes much to the rise of the 'risk society'.<sup>189</sup> In this risk society, politics are increasingly dominated by risks, specifically, the acceptability and distribution of risks of industrialisation. Politics reshape both risks in society and the study, analysis and regulation of risks; not actual risk, but the public's perception of risk drives the politics. These shifts tend to render risk identification and analysis a political exercise, and thus to politicise science itself.<sup>190</sup> In this system, the precautionary principle serves as a tool to cater to the public demand for safety through the elimination of industrial risks. The risks of climate change, of course, are a main target of the risk society's regulatory programme.

Under certain conditions, a court may consider the precautionary principle<sup>191</sup> a justification for some policy decision made by the government, assuming the applicable law allows it to do so.<sup>192</sup> As soon as a court invokes the precautionary principle to find a positive obligation for government to address a highly uncertain and long term risk,<sup>193</sup> however, we will immediately be on a very slippery slope, and the door will be wide open for all sorts of human

rights and social justice litigation, with the courts making government policies.<sup>194</sup> A court of law, including the ICJ, should therefore not decide climate science disputes, not even with reference to the elusive precautionary principle.

Courts also have to be aware of how the precautionary principle is used by activists in practice. Because it is basically undefined (indeed, the triple negative definition of the Rio Declaration is not much of a definition<sup>195</sup>), it can be used in strategic and opportunistic ways. If there is scientific consensus, whether managed or spontaneous, consensus can be invoked as support for a proposed policy or court decision. If, on the other hand, no consensus exists, there is, in most cases activists care about, scientific uncertainty. Uncertainty, in turn, allows the precautionary principle to be invoked, which can then provide the support for a policy or decision.

In other words, there is always support for a proposal, no matter what the science is. For instance, in the case of genetically modified organisms, activists have relied on the precautionary principle, because there was scientific consensus on the safety.<sup>196</sup> Their plea was presented as a 'scientific approach to risk',<sup>197</sup> which could imply basing policy on a 'minority opinion'.<sup>198</sup> In the case of climate change, on the other hand, scientific consensus is the support for the desired policy, and minority opinions should be ignored. These strategies might be confusing to courts that handle one case at a time and have limited experience with risk regulation. Needless to say, the arbitrary nature of such ostensibly reasonable rationales is not consistent

The group acknowledges, however, that 'the obligations embedded in our Principles go well beyond the international "consensus"'. Commentary <http://www.osloprinciples.org/oslo-principles-commentary/>. Like Sands, they want to employ a minority legal opinion to squash (what may well be) a minority scientific opinion. Thus, they claim for themselves what they deny to others.

194 See Bergkamp and Hanekamp 'Climate change litigation against states' (n 3) 102–114. This is exactly what is happening in the Netherlands following the *Urgenda* judgment; health lawyers are looking for ways to involve the courts in a range of pressing healthcare-related issues, and human rights lawyers are examining the judgment's usefulness to 'strategic litigation' in the broad area of human rights. See eg NJCM <http://www.njcm.nl/site/events/show/180>.

195 Principle 15 of the Rio Declaration of 1992 states that: 'In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation' <http://www.unep.org/Documents/Multilingual/Default.asp?documentid=78&articleid=1163>.

196 Interestingly, this is now also being challenged. See A Hilbeck and others 'No scientific consensus on GMO safety' (2015) 27(4) *Environmental Sciences Europe* DOI: 10.1186/s12302-014-0034-1.

197 See eg <http://www.greenpeace.org/seasia/ph/press/reports/the-precautionary-principle-an/>.

198 Coalition of NGOs 'Principles for transparency, excellence and independence in scientific advice to the European Commission' Brussels (18 November 2014).

189 Ulrich Beck *Risk Society: Towards a New Modernity* (Sage 1992).

190 Lucas Bergkamp 'The concept of risk society as a model for risk regulation – its hidden and not so hidden ambitions, side effects, and risks' (forthcoming).

191 The *Urgenda* court referred to this principle in construing the state's duty of care <http://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RBDHA:2015:7196&keyword=urgenda>.

192 For a discussion of the various possible meanings of the precautionary principle see L Bergkamp 'Understanding the precautionary principle, Parts I and II' (2002) *Environmental Liability* 18–30, 67–82.

193 This is what the Oslo Principles, which have been prepared by a group of lawyers turned climate activists, would seem to require: 'All principles, laws, policies and practices, whether local, national or international, that may affect the environment and, in particular, the global climate must be based on scientific evidence. As this evidence is constantly evolving and improving, lawmakers, policymakers and tribunals have a duty to inform themselves of and base their actions – in good faith and respecting justice and equity – on prevailing scientific knowledge and opinion. *If necessary, in order to respect the Precautionary Principle (Principle 1 below), such decision makers must take into account, and take action to avoid, any credible and realistic worst-case scenario accepted by a substantial number of eminent climate change experts*'. See Oslo Principles (n 73).

with a balanced interpretation of the law: in all cases, the court should independently examine the evidence, whether it is labelled a scientific consensus or a minority opinion.

## 8.2 Media coverage and cognitive bias

Further, judges are not immune to the effects of media coverage of climate change. The relationship between public perceptions and media coverage of climate change is complex, and ‘climate alarmism’ does not necessarily result in more significant concern.<sup>199</sup> At least in the English speaking media, a media narrative emphasising uncertainty is deemed to be unsuited to their adversarial style, resulting in excessive coverage of extreme positions.<sup>200</sup> A further complication is that some of the research on media coverage of climate change appears to be biased or operating on the basis of invalid assumptions, such as that media coverage should reflect consensus; one study even launched the concept of ‘balance as bias’ to suggest that climate sceptics receive too much media attention,<sup>201</sup> as if the media coverage should report only a scientific consensus position!

Recent developments are a cause for concern. It has been established that there is a strong relationship between the political perspective of a media organisation and its position on climate change.<sup>202</sup> In countries where the media tends to gravitate towards the left side of the spectrum, media coverage would over-emphasise climate catastrophe. Implying that the media should protect the public from inaccurate or controversial information, the BBC upheld a complaint regarding an interview with a climate sceptic in which he allegedly made inaccurate statements about climate science.<sup>203</sup> Further, a group of 25 newspaper publishers, including *The Guardian*, *El País*, *Le Monde* and *China Daily*, have entered into an alliance ‘to share climate change content to raise awareness’ in the run up to COP 21.<sup>204</sup> In an encyclical letter, the Pope made climate action a moral imperative, uncritically accepting the scientific

consensus and conventional wisdom on climate change.<sup>205</sup> The US Pentagon declared climate change an ‘urgent and growing threat to [US] national security’, which ‘will aggravate problems such as poverty, social tensions, environmental degradation, ineffectual leadership and weak political institutions that threaten stability in a number of countries’.<sup>206</sup> Worst of all, President Obama has repeatedly made alarmist statements about climate change that no science can support,<sup>207</sup> and refers to people who criticise his climate ideology as ‘the flat earth society’.<sup>208</sup> This kind of propaganda, of course, receives much media attention, politicises the scientific issues and is likely to shape public opinion on climate change.<sup>209</sup>

Judges are not immune to cognitive bias. Inasmuch as they are not likely to be scientifically proficient, they are exposed to the potential influence of biased information. In the area of climate science, as discussed above, there is no shortage of biased or incorrect information. Judges should be aware of the cognitive bias media coverage (and other sources of information) may have caused in their minds. Once aware of this potential bias, they can more easily avoid its pernicious effects on their judgments.

## 8.3 The psychology of emotional appeals

Courts should also be aware that they will be put under psychological pressure by the climate activists, who will attempt to provide judges with the motivation to create new law. They do so by offering them an opportunity to make a meaningful contribution to the ‘survival of mankind and the planet’. Judges will be told that they are ‘the last

199 L Whitmarsh ‘Scepticism and uncertainty about climate change: dimensions, determinants and change over time’ (2011) 21 *Global Environmental Change* 690–700.

200 B Ward ‘A higher standard than “balance” in journalism on climate change science’ (2008) 86 *Climatic Change* 13–17; Maxwell T Boykoff, Jules M Boykoff ‘Climate change and journalistic norms: a case-study of US mass-media coverage’ (2007) 38(6) *Geoforum* 1190–204.

201 Maxwell T Boykoff, Jules M Boykoff ‘Balance as bias: global warming and the US prestige press’ (2004) 14(2) *Global Environmental Change* 125–136.

202 J Painter *Poles Apart: The international reporting of climate change scepticism* (Reuters Institute for the Study of Journalism 2011). See also <http://www.nationalreview.com/corner/384057/burn-witch-roger-pielke-jr-out-fivethirtyeight-charles-c-w-cooke>.

203 <http://blogs.lse.ac.uk/politicsandpolicy/climate-correctness-lawson-climate-change-sceptic/>.

204 <http://www.theguardian.com/media/2015/may/21/news-organisations-climate-change-content-guardian>.

205 ‘Laudato Si’ <http://www.cruznov.com/church/2015/06/18/read-the-encyclical-for-yourself-laudato-si/>.

206 US DoD ‘National security implications of climate-related risks and a changing climate’ <http://www.defense.gov/News-Article-View/Article/612710>. This might mean that climate change will become an instrument in US foreign policy, thus implying further politicisation of the science. Because the US plays such a substantial role in climate science and the IPCC reporting, the effects may be felt everywhere.

207 For instance, President Obama has linked climate change to hurricanes and to asthma in children. <https://notalotofpeopleknowthat.wordpress.com/2015/06/16/judith-curry-the-state-of-the-climate-debate-in-the-u-s-the-global-warming-policy-forum-gwpf/>.

208 <http://www.bbc.com/news/world-us-canada-23057369>.

209 For an even more pernicious kind of propaganda see Snyder ‘The next genocide’ (n 134). Snyder argues that climate deniers ‘tend to present the empirical findings of scientists as a conspiracy and question the validity of science – an intellectual stance that is uncomfortably close to Hitler’s’. Like the Germans at the time, we now face ‘the same crucial choice between science and ideology’. Interestingly, if one assumes that climate activists are ‘the ideology’ and climate deniers accurately represent ‘the science’, his argument still works, except that the climate activists are now the Nazis and the cause of war will not be ‘ecological panic’ but civil unrest over the perversion of the system of government.

hope for mankind'. This is exactly what Urgenda did in the Dutch case, and it played this card very skilfully. 'It is time for the judiciary to step in and avert climate catastrophe', it suggested. A judicial ruling for the planet would require 'courage', and it invited the judges to show courage. If the court were to show courage and compassion, it would not only do good, but would also gain importance and prominence. To achieve maximum effect, Urgenda appealed directly to emotion, common sense and bias. It told the judges: 'When in 20 years you discuss this case with your children or grandchildren, and they ask what you decided, I hope you can answer in honesty: I made a just decision, the only right decision'.<sup>210</sup> Like all precautionary rhetoric,<sup>211</sup> the *Urgenda* plea assumes what should be proven, namely, that a climate catastrophe is impending and emission reduction is the only effective remedy. The Court of The Hague fell into the trap: the ICJ should avoid making the same mistake.

#### 8.4 Omitted alternative remedies

Not unexpectedly, Sands deploys tactics quite similar to Urgenda's. As discussed above in section 2.3, he makes a strong emotional appeal to the ICJ. In addition, his argument is intended to trick the judges into believing that emission reduction is the only way out. Where he cites the IPCC findings, he includes the following statement from the 2014 'Synthesis Report': 'Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions'.<sup>212</sup> This is not a scientific statement, however; it is a mix of science and politics. Logically, the greenhouse gas concentrations in the atmosphere can be reduced by removal of greenhouse gases from the atmosphere,<sup>213</sup> which the IPCC disregards here. In addition, increased atmospheric concentrations will not cause global warming if the heat from the sun is kept out (eg through injection of SO<sub>2</sub> into the stratosphere);<sup>214</sup> again, the quoted statement disregards this statement.

These alternatives are not popular in some circles, but the reasons for their lack of popularity are political, not scientific. According to climate activists and their supporters, geoengineering as a solution to global warming would create a 'moral hazard', ie 'geoengineering proposals could reduce the fragile political and public support for

mitigation and divert resources from adaptation'.<sup>215</sup> More generally, dissenting scientific and policy opinions are systematically discredited in the public debate, because they distract from the need for emission reductions.<sup>216</sup> Withholding information from the public or the courts, however, may harm their support rather than fostering a much-needed and long overdue open and honest discussion.

#### 8.5 The moral urge to do good

Despite these objections, the psychology climate activists put to work is smart and appealing to the unaware. Who would not want to act if it was the last hope for survival? The proposition is simple: judges who dare to be so courageous will feel good about themselves, experience the realisation of being saviours of planet earth and acquire fame and respect for bending the law for the common good. What more could an otherwise relatively unimportant judge wish for? It is the opportunity of a lifetime, offered free of charge by *Urgenda*. The question is, however, whether it is also free of charge to society; where courts of law become allies of the social justice movement, there will be a strong societal response at some point. As the *Urgenda* judgment demonstrates, emotion is an unreliable chaperone, and avoiding precautionary bias requires a critical attitude.

### 9 The limits and counter-productive effects of a judicial climate opinion

Assume the ICJ (or any other court) would entertain the idea of issuing an advisory opinion on climate science and the obligations of states to take action to combat climate change. If the issues around the state of climate science discussed above can be overcome, the ICJ, and any other court for that matter, should be aware of the limits of any possible opinion and of the counter-productive effects a ruling would have on policy-making in constitutional democracies.

#### 9.1 Scientific questions a court could answer

Sands has suggested that the ICJ tackle the following questions: 'Is climate change underway? Have sea-levels

210 See van den Berg 'Urgenda zitting' (14 April 2015) para 120 <http://www.urgenda.nl/themas/klimaat-en-energie/klimaatzaak/>.

211 See eg Hanekamp 'Utopia and gospel' (n 48).

212 Sands lecture (n 8) 5.

213 Freeman Dyson 'The question of global warming' (2008) 55(10) *The New York Review of Books*.

214 Roy Harrison, Ron Hester *Geoengineering of the Climate System* (Royal Society of Chemistry 2014).

215 See eg Royal Society *Geoengineering the Climate: Science, Governance and Uncertainty* (London September 2009). For a critique see Benjamin Hale 'The world that would have been: moral hazard arguments against geoengineering' in Christopher Preston (ed) *Reflecting Sunlight: The Ethics of Solar Radiation Management* (Rowman and Littlefield 2012) 113–31.

216 The tide seems to be turning, however, and the activists are becoming less successful in discrediting pertinent counter-arguments merely by reference to silly slogans such as 'merchants of doubt' and 'the fossil fuel lobby'. Cf Naomi Oreskes, Erik M Conway *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (Bloomsbury Press 2010). This book argues that 'merchants of doubt' claim that there is no 'scientific consensus' on an issue, although there is one. [https://en.wikipedia.org/wiki/Fossil\\_fuels\\_lobby](https://en.wikipedia.org/wiki/Fossil_fuels_lobby).

risen? Have anthropogenic greenhouse gas emissions been the main cause of atmospheric warming?<sup>217</sup> These are not the questions a lawyer who understands the scientific debate would have posed. Of course, climate change is underway, but it has always been underway.<sup>218</sup> Sea-levels have risen somewhat, but the rate seems to be slowing, and the key question is by how much and how quickly they will rise in the future, what the root cause of the rise is etc.<sup>219</sup> Admittedly, whether anthropogenic greenhouse gas emissions have been the *main cause* of atmospheric warming is not a straightforward issue,<sup>220</sup> but the more relevant question is whether anthropogenic emissions are the cause of any future climate-related damage and losses. Despite Sands's failure to identify useful questions, there may, of course, be other questions that a court could answer.

It is true that the objections outlined in this article do not necessarily apply to all climate science. Any court that plans to issue a truthful and lawful ruling on climate science or climate policy, however, should understand that its findings would be useless. Surely, a court could probably find that surface temperatures and greenhouse gas concentrations have been rising. It could probably also find that human activities are adding carbon dioxide to the atmosphere, and that greenhouse gases have a net warming effect on the planet. However, these are not the issues that divide the scientists. The real bones of contention, on which courts could not take a position, have to do with the accuracy of the climate models and with intractable issues like climate sensitivity.<sup>221</sup> There is legitimate scientific disagreement on questions such as whether the warming since 1950 has been dominated by human causes, how much the planet will warm in the 21st century, whether warming is 'dangerous', whether we should radically reduce CO<sub>2</sub> emissions in the absence of knowledge about the effects of natural phenomena, to what extent such reduction would improve the climate and what the relative costs and benefits

are of increased atmospheric CO<sub>2</sub> concentrations compared with various reduction situations and other policy options. A court should not hide behind some statement in an IPCC report selected to support a predetermined result. Instead, if it takes the case, it should engage these tough issues.

### 9.2 Questions a court could not and should not answer

If a court respects its role in the legal system, the limits of its authority and the rule of law, it could not make subjective value and political judgments not supported by positive law. A ruling that 'there is a "safe" level of no more than 2°C warming', or that developed states must limit their emissions in accordance with general, non-binding commitments made in international negotiations, would require a court to make a series of subjective value judgments and political choices on which the positive law provides little or no guidance. Climate science is plagued by enormous scientific uncertainty, volatility, ambiguity, complexity and contingency. It is a 'super wicked problem'.<sup>222</sup> Making decisions under these conditions necessarily involves a series of subjective value judgments. A court of law cannot go there without violating the legal order and undermining its own authority and credibility.

In short, if it wants to reach any useful conclusions, a court could not avoid making decisions it is not authorised and not competent to make. Where it does render a value or political judgment, it no longer merely 'finds' a pre-existing scientific fact or law. The substantial value judgments unguided by the existing law that judges would have to make form a strong argument against an unaccountable, unelected body, such as a court of law, assuming jurisdiction over these scientific disputes.

### 9.3 A court opinion's counter-productive effect on climate policy

A further argument against a court ruling on climate science or policy is derived from the adverse effects such a ruling would have on policy-making. These adverse effects arise from judicial policy-making's inflexibility, inadaptability and unresponsiveness to changing circumstances, including scientific progress. Additionally, if a court ruling were to settle scientific disputes, it would do a disservice to society and to the body politic, because it would deprive the policy-makers of the full range of scientific opinions that should be available to them. Rather than being presented a simplistic, judicially endorsed scientific consensus on climate change, policy-makers should know the range,

217 Sands lecture (n 8) 14.

218 <http://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-climate-change-k4.html>.

219 See eg A Cazenave and others 'The rate of sea-level rise' (2014) 4 *Nature Climate Change* 358–61 doi:10.1038/nclimate2159.

220 The Fifth IPCC Report indeed states that humans are the main cause of the current global warming, but this statement has been disputed. See eg <http://judithcurry.com/2015/05/04/what-are-the-most-controversial-points-in-climate-science/> and <https://retiredresearcher.wordpress.com/>.

221 J A Curry 'Statement to the Committee on Science, Space and Technology of the United States House of Representatives' (n 136); Roger A Pielke Jr 'Written testimony for the House Committee on Science, Space, and Technology' Hearing on 'Examining the UN Intergovernmental Panel on Climate Change Process for the Process for the Fifth Assessment Report' (29 May 2014); Bjorn Stevens, Sandrine Bony 'What are climate models missing?' (2013) 340 *Science* 1053–54; Quirin Schiermeier 'The real holes in climate science' (2010) 463 *Nature* 284–87.

222 <http://link.springer.com/article/10.1007%2Fs11077-012-9151-0>.

distribution and diversity of scientific opinions.<sup>223</sup>

Similarly, if a court ruling were to prioritise climate action above other pressing social needs (such as poverty alleviation or eliminating hazardous chemicals), or to impose emission reduction over other policy options to address climate change, it would greatly reduce states' ability to respond to problems in accordance with their own unique circumstances and preferences. For instance, developing nations are entitled to the policy option of postponing emissions reduction, as well as any other climate action, based on other priorities. Developed nations should have the option of investing in adaptation, rather than mitigation, because, for instance, substantial parts of their territory are at risk of flooding or because they do not trust other nations to reduce their emissions.

Court rulings on climate science and policy also create a risk of upsetting the balance of powers. If a court were to interfere with the political process, the legislature may well respond with legislation explicitly to deprive the judiciary of the power to rule on climate science and policy (or any policy for that matter). Climate policy-making cannot be muzzled by judicial proclamations of the science the policy-makers must use. Any such court judgments would backfire.<sup>224</sup>

## 10 Conclusions

This article has considered Sands's proposal to have the ICJ rule on climate change and, more generally, the authority and ability of courts to decide issues of climate science and policy. The analysis presented in this article has shown that courts are poorly placed to accept Sands's invitation on grounds of both their limited authority and their limited epistemic abilities. Sands's proposal is light on legal arguments, but rich on emotional calls for climate action. Of course, Sands may well be sincerely concerned about the state of the environment,<sup>225</sup> but there is much more at stake in his ICJ plan than only the environment. Despite Sands's assertion to the contrary, the scientific evidence is not likely to meet a reasonable legal standard of proof, even the flexible one of the ICJ. Given the paucity

of the law on his side of the argument, one is left with the impression that he has come under the spell of the climate action ideology,<sup>226</sup> fuelled by a blind belief in science's (or, maybe more accurately, the IPCC's) ability to dictate policies for humanity and the planet.<sup>227</sup>

The science of climate change is no ordinary science.<sup>228</sup> It has been politicised by governments inserting themselves into the process of scientific consensus formation through the IPCC. Whilst the politicisation of climate science is a substantial problem for policy-making by governments, it is an insurmountable barrier for courts. An assumption that any statement in an IPCC report, in particular the 'Summary for Policy-makers', represents consensus science is unwarranted; a statement may be political, rather than scientific, it may reflect a value judgment, or it may be supported by no more than a minority of scientists. Hence, caution is required. Courts should also be aware that consensus science, which is invoked by policy advocates only if it supports their cause, is not a reliable guide, because it may reflect science power politics, 'group think,' political pressure, or be biased for other reasons.<sup>229</sup>

As a matter of law, the IPCC reports cannot be assumed to be either representative of a scientific consensus or free from political influence and value judgments; this would need to be established independently for each specific statement, which would then have to be reviewed against the applicable legal standards on evidence and causation. In a climate case, more so than other policy-related cases, courts need to inform themselves of the range of scientific opinions, the specific points of agreement and disagreement, the assumptions made by scientists, their theories and reasoning, the validity and accuracy of the models used and the unknowns, uncertainties and gradations. Once they understand the climate science arena and the politics around it, as well as the limits of the science,

226 The psychology employed by these activists is discussed in sections 8.3 and 8.5 above.

227 As Hayek has observed: 'those intoxicated by the advance of knowledge so often become the enemies of freedom'. See FA Hayek *The Constitution of Liberty* (Routledge 1960).

228 It has been called a 'peculiar kind of science' because it is based on 'committee consensus'. See Weart 'Climate change impacts' (n 137) 46.

229 In addition, judges should be aware of attempts to politicise the law itself and to recruit the judiciary to support the climate action cause. See eg Jaap Spier *Shaping the Law for Global Crises: Thoughts about the Role the Law Could Play to Come to Grips with the Major Challenges of Our Time* (Eleven Publishing 2012). Even judges and retired judges participate in these efforts. See Oslo Principles (n 73) ('States must accept the jurisdiction of independent courts or tribunals in which the State's compliance with its obligations as set forth in these Principles can be challenged and adjudicated'). The principles are intended to 'help judges decide whether particular governments are in compliance with their legal obligations to address climate change'. <http://globaljustice.macmillan.yale.edu/news/oslo-principles-global-climate-change-obligations>.

223 M G Morgan 'Our knowledge of the world is often not simple: policymakers should not duck that fact, but should deal with it' (2015) *Risk Analysis* 19–20 <http://onlinelibrary.wiley.com/doi/10.1111/risa.12306/abstract>. Cf Brian Wynne 'Strange weather, again: climate science as political art' (2010) 27(2–3) *Theory, Culture & Society* 289–305.

224 L Bergkamp 'The *Urgenda* judgment: a "victory" for the climate that is likely to backfire' *EnergyPost* (9 September 2015) <http://www.energypost.eu/urgenda-judgment-victory-climate-likely-backfire/>.

225 As a great philosopher once said: '[t]he degree of one's emotion varies inversely with one's knowledge of the facts – the less you know the hotter you get'.

they will see the pitfalls of ruling on any scientific disputes in this area: erroneous conclusions on the facts, usurpation of legislative power, upsetting the balance of powers and frustrating effective and efficient policy-making. ‘Stay out’ would appear to be the best advice for courts.<sup>230</sup>

Accordingly, we should not take climate science to court. Court judgments, as the *Urgenda* case illustrates, will only aggravate the current state of affairs, and steer us into an unsustainable path. Courts, including the ICJ, should acknowledge that climate science, as a general matter, is non-justiciable, even though courts might have jurisdiction over specific disputes relating to climate change. The judiciary should therefore refrain from ruling on scientific disputes in climate science and tread carefully with respect to climate policy issues that hinge on the resolution of scientific issues. If courts uphold the rule of law, stay within the limits of their own authority and value the universe of science, they will refer scientific disputes back to the scientific community, which is where they belong. That is what the law and the balance of powers require, in the international arena too. Courts that ignore this warning will be accused of usurping legislative power and taking sides. The ICJ would be well advised to decline the invitation to issue an advisory opinion on climate science and policy.

Nevertheless, there is reason to believe that courts will increasingly be confronted with claims that require judicial assessment of climate science. As discussed in this article, climate science is far removed from the ideal of an objective, impartial quest for the truth.

Due to strong political forces, its self-corrective ability has been suppressed. As Sarewitz has noted, climate science serves one main purpose: to advance a top-down, coordinated, international emissions governance regime.<sup>231</sup> In line with this strategy, the dominant political forces are

pushing a ‘climate science-policy package’ requiring substantial emission reductions. This scientific package deal, which ties the science to a specific policy preference, renders climate science and scientific advice part and parcel of the political policy-making process and, thus, increases polarisation. As a result, in the area of climate change, scientific policy advice is an intractable mix of science, morality and politics that should be navigated with extreme caution. Courts are not well placed to conduct such an enquiry. The politicisation of the science and the socio-political construction of scientific consensus in the climate area render any attempt to rule impartially on the key scientific disputes futile and suspect. Judges should be aware that, like scientists, they are exposed to socio-political pressure and manipulation. They will be urged to decide in accordance with the enormous responsibility and opportunity associated with being the last hope for survival. Like global warming, judges need to pause, however, and look beneath the polished surface of IPCC science and related policy advice.<sup>232</sup>

Even though the notion that ‘the genuine values of the people can most reliably be discerned by a nondemocratic elite’ may not be unique to any political group, it is a dangerous concept nonetheless.<sup>233</sup> The hijacking of policy-making through the judiciary would backfire. Judicial disobedience is subversive and divisive, and creates more problems than it can hope to solve. If a trend of court-mandated climate action policies were to emerge, the victims might be both the climate and our system of government. In the empire of law, more important than the question of ‘what is decided’ is the question of ‘who decides’. It is called constitutional government. In this system, the courts do not make the laws: they merely apply them.

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230 Of course, courts are not able to avoid answering legal questions that turn on the resolution of scientific questions, but context matters. The relevant context includes the cause of action, the legal basis of government policy, other applicable laws, rights and obligations, the burden of proof, the standard of review and the intensity of review.

231 D Sarewitz ‘Does climate change knowledge really matter?’ WIREs Climate Change 2011.

232 See Alan Longhurst ‘Doubt and Certainty in Climate Science’ E-book September 2015.

233 J H Ely ‘The Supreme Court 1977 Term – Foreword: on discovering fundamental values’ (1978) 92 *Harvard Law Review* 5–51.