Poiesis Prax (2010) 7:211–219
DOI 10.1007/s10202-010-0085-3

COMMENT

Against politicization of science

Comment on S. Keller: Scientization: putting global climate change on the scientific agenda since 1970 and the role of the IPCC

Hans von Storch · Dennis Bray

Published online: 24 September 2010

1 Lamenting the IPCC

Even though having some credibility in trans-disciplinary research (see e.g., Stehr and von Storch 1995, Bray and von Storch 1999, von Storch 2009, Bray and von Storch 2009 or Stehr and von Storch 2010), we may not have fully grasped the conceptions and arguments of S. Keller. What stuck to us was the complaint that the IPCC, mainly under the influence of Bert Bolin, would have failed to issue an authoritative, ideally numerical specification about "a level that would prevent dangerous anthropogenic interference with the climate system".

S. Keller laments

> If the IPCC refuses to accept these facts by failing to specify a temperature a constitutive ethical engagement could be demanded or even challenged. … Thus the IPCC's decision to refuse a temperature specification could be reframed from a question of science to a question of scientific ethics and failure to act accordingly.

and eventually summarizes

> Scientization of climate change cannot absolve from the responsibility required by scientific ethics and hence neither from the implicit social, societal and political consequences.

The authors are climate scientists—Hans von Storch is a practitioner of physical climate science, in terms of scientific endeavor (such as publishing results of climate dynamics, impacts and change in peer-reviewed journals like Geophysical Research Letters or Journal of Climate), of communication (regular presence in public media) and function in the Intergovernmental Panel of Climate Change—IPCC (lead author in 3rd and 5th IPCC Assessment Reports); Dennis Bray a sociologist, who is studying the perceptions and beliefs of climate scientists. We read the piece of S. Keller with interest.

H. von Storch (✉) · D. Bray
Institute for Coastal Research, GKSS Research Center, Geesthacht, Germany
e-mail: hvonstorch@web.de

> In the light of the questions of scientific ethics and due to the limitations inherent in the IPCC's conception of science, a scientifically justifiable setting of temperature specification should be debated. The hitherto existing self-conception of the IPCC which differentiates between policy recommendation on the one hand and dissemination of research results on the other hand and consequently the previous modus operandi of the IPCC has to fundamentally be questioned.

Keller places any due blame on the shoulders of Bert Bolin for his inception of the role of the IPCC. But Keller, not explicitly, and perhaps even unaware, is contesting the need for scientific objectivity as a prerequisite for science, as discussed in terms of academic science versus 'post-academic' science (Ziman 1996). Briefly, whereas academic science, among other things, attempts to adhere somewhat to Merton's CUDOS model of science (Merton 1942; see below), non-academic science 'is not directed to producing knowledge as such: it is directed to solving specific problems' (Ziman 1996: 752). Under conditions of 'post-academic' science, academic science will hybridize 'with knowledge and belief systems that do not share the same intellectual values and standards of "good science"'(Ziman 1996: 753). We assume, for brevity, even though it is somewhat simplistic, 'good science' to follow the tenets of Merton's model of science.

We discuss Keller's comment and Bert Bolin's intentions in the context of Merton's CUDOS model. While we acknowledge the weaknesses of Merton's model as demonstrated by the interpretative approach to the sociology of scientific knowledge (SKS), which emphasizes the role of the cognitive and the social to merge in the manufacture of knowledge, we nonetheless see Merton's scheme as providing a measure of that which is abstract and impersonal, traits which seem to satisfy general principles of academic science. We do not agree, however, with Schuster (1990: 258) that '… Mertonianism is a dead letter as a sociology of science…'.

2 Post-normality and ethics

The complaints layed out by Keller fit well into the analysis of climate science as located in a post-normal context (Funtowicz and Ravetz 1985; Bray and von Storch 1999; Ravetz 2006). Post-normality (of science) describes a situation in which the uncertainty of scientific knowledge is inherently large, the societal demand for answers is urgent and—at the same time—the implication of any conclusions drawn from such science is costly and societally of great significance. Interest-driven forces act upon science, and try to make it a supportive tool for preconceived agendas and political agendas. The present complaint of S. Keller is just about this, the failure of the IPCC to support a specific political agenda, namely what may be called the Post-Kyoto Top-Down.

This term "post-normal" has undergone some metamorphoses—some people, in particular in the blogosphere, claim that it would be a concept, which would legitimize scientists to act as stealth advocates; that it would be choice of scientists

to engage in normal or post-normal science; that it would be science by popular vote; also that post-normal science would be abnormal science. It should be stressed that the term is meant—at least here—as a description of a science, which is taken place in a specific socio-political context, not as a recipe of how to do science.

As common for a post-normal context climate science is strongly politicized, and some climate scientists even support the dramatizing of statements—according to the surveys among climate scientists done by Bray and von Storch in 1996, 2003 and 2008 (Bray 2010), about half in 1996 and one-third in 2003 agreed (opted for a response of 1–3) to the statement "Some scientists present the extremes of the climate debate in a popular format with the claim that it is their task to alert the public" (Fig. 1a). In 2008, the question was formulated so that scientists were no longer asked if they agree with the statement but with the practice (Fig. 1): about 1/7th opted for a 1–3, i.e., favorably. Also, the other two survey results shown in Fig. 1b and c, about the influence of external factors and the degree of value-neutrality in the 2008 survey, point to the heavy intrusion of political forces into climate science. In this situation, a reconsideration of the ethics of climate science is needed, which takes into account the plethora of demands for utility of scientific assertions. We find it is imperative to reconsider Merton's (1942, 1973) four scientific norms that are often referred to as "CUDOS":

Communalism: the common ownership of scientific discoveries, according to which scientists give up intellectual property rights in exchange for recognition and esteem. Basically, this norm stipulates that the products of scientific investigation be regarded as public knowledge.
Universalism: according to which claims to truth are evaluated in terms of universal or impersonal criteria, and not on the basis of race, class, gender, religion, or nationality.
Disinterestedness: scientists, when presenting their work publicly, should do so without any prejudice or personal values and do so in an impersonal manner.
Organized skepticism: all ideas must be tested and are subject to rigorous, structured community (peer review) scrutiny. Basically, this is the test for logical consistency and reliability. It is not, however, in Merton's intentions, an invitation for total relativism.

Scientific research should, and can, be based on Merton's ethos of science as a guideline of social conduct; even if these norms cannot strictly be met in practice. According to Pielke Jr (2007), one role for scientists is acting as 'honest *brokers*'—primarily through authoritative institutions—in the exchange with society and politics, instead of acting as (stealth) advocates. This implies that good science should recognize the always-existing possibility of new future findings that may lead to revisions of the current body of knowledge. Climate science provides the current knowledge about the dynamics of climate, the effect of certain societal activities on climate (emissions, land use change), and the effect of the present and possible future climate on societal activities (impacts). Science helps to work out response options enabling societies to choose solutions from a number of options consistent with its values and goals. Climate science finally helps to localize and to contextualize climate change and its effects in society in order to enable adequate

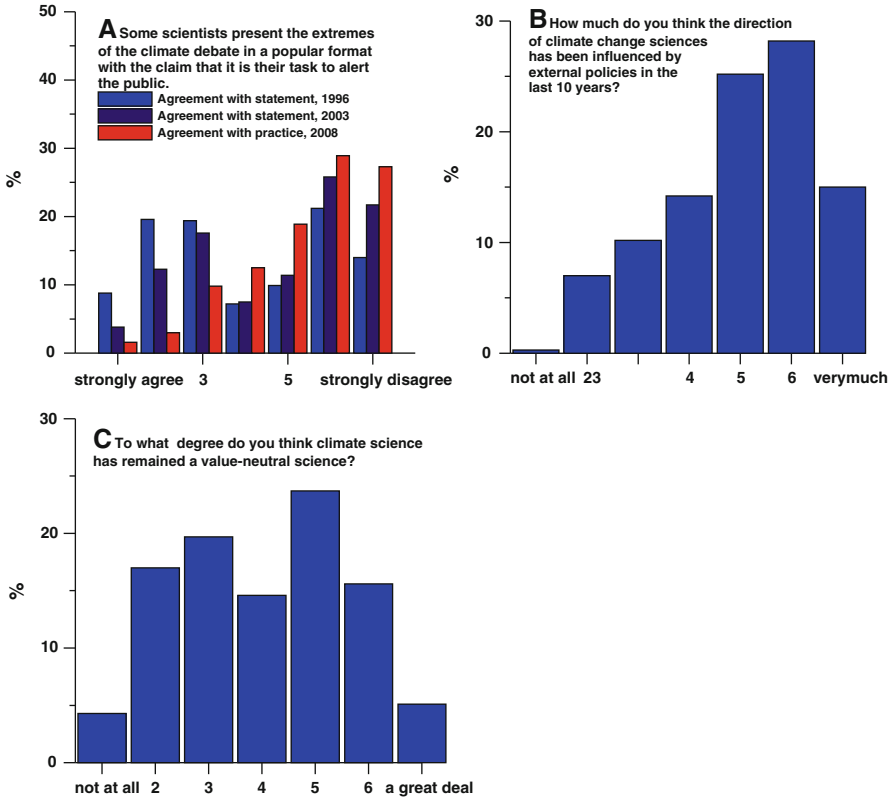

Fig. 1 Results from a series of three surveys by Bray and von Storch among climate scientists in 1998, 2003 and 2008 (for reference, see Bray 2010). **a** Shown is agreement that usage of extreme positions is common (1998 and 2003, *left*/*middle columns*), and (dis-)agreement to the practice of using extreme positions (in 2008, *right columns*). **b** Agreement to "How much do you think the direction of climate change sciences has been influenced by external policies in the last 10 years?". **c** Agreement to "To what degree do you think climate science as remained a value-neutral science?"

regional and local responses (Krauss 2009, 2010). Policymaking then will consider these options, when designing and selecting strategies to implement policies upon.

3 What if …

What if climate science had supported the political goal of dealing with the specter of man-made climate change by limiting temperature change to a maximum of 2°C, by placing its full authority behind this limit? This goal may have been thought of by scientists, but, as we have learned, not as part of their scientific knowledge production. It could have been a scientific result only if it would be possible to provide a number, above which "dangerous climate change" becomes somehow probable. To do so, one would need to define what "dangerous" means, and which type of "probability" (subjective, objective) would have to be considered enough to

warrant action, as well as justify the threshold. These decisions are of fundamental societal character, since it is a matter of preferences, beliefs, cultural and social construction that constitutes probability and danger. It seems that for many people in North America, the approach to deal with danger is rather different from the people in Wuppertal.

But even if these obstacles (the denomination of danger, a decided upon temperature threshold) were somehow overcome, then difficulties would emerge of how to relate danger to temperatures. To do this in terms of temperature, as S. Keller seems to insist upon, is arbitrary—why not in terms of concentrations (what UNFCC is asking in its paragraph 2), sea level rise, melting rate of Greenland, precipitation change in Wuppertal, changing pH-value of the sea?

There is likely a broad consensus that less climate change is preferable to more climate change, so that less reliance on fossil fuels and their use in energy production would be considered favorably. But if science clearly says: maximum 2°C, beyond which climate change will become climate catastrophe—even if the scientific method does not allow concluding such a statement—then additional short-term momentum for the sought-after policies of Top-Down, of Cap-and-Trade would have provided an additional push for a global international agreement. But even if so, we would not expect that a sustainable solution would have been agreed upon—and significant damages would have resulted for science as a societal institution.

We have seen the collapse of the 15th Conference of the Parties to the UN Framework Convention on Climate Change (COP-15), the stalling of the US legislation in these matters and the ever increasing atmospheric CO_2 concentrations (since, for instance, conference in Rio de Janeiro in 1992), and last but not least, the crisis of trust. Chances to meet the 2°C goal are slim and are getting slimmer. Empty talking about unavailable goals such as 1.5°C transforms this goal into mere political symbolic talk. We expect that in a few years time, the proclamation of catastrophe will appear as an oversell. Instead, we would expect likely massive adaptation challenges to prevail. At the same time, many bottom-up efforts will ease the situation.

In this case, policymaking including the EU, as well as activist climate scientists, would find them painted into the corner of "maximum 2 degree or climate catastrophe". Already now political scientists begin to examine the question of how to overcome the self-produced deadlock of "policy enforcing maximum 2 degree or nothing" (Geden 2010a, b).

The "truth", namely that there is no defined limit, will finally be recognized, and at the same time, the institution of science will be perceived of as a mere combatant of a specific and failed policy if Keller's request would be fulfilled. In other words, the blame for the futility of a scientifically legitimized 2 degree limit would fall on the shoulders of science. Scientific credibility would be at risk of being tarnished. The social capital of science—authority, trust, knowledge legitimation—would be squandered for the sake of political goals.

So what is this capital "authority"? When we use the term "authority", we do not refer the authority to enforce something. This is exactly what S. Keller has in mind, when she wants to have science as a utility for a specific policy. Instead, we refer to the ability to provide understanding about a complex world by reference to a

superior analysis method and a superior body of knowledge. Climate science has such authority to provide two services—one is to satisfy curiosity, the other to enable the understanding of a complex social and natural environment (and thus the opportunity to influence these environments, as well as allowing people to live in more self-determination). The authority of science comes from the methods, namely that the scientific actors adopt norms like those of Merton, or at least, that society perceives it so. When the suspicion arises that scientific actors make knowledge claims for political reasons, as was the case in the "Waldsterben"-discussion (ZEIT 2004; Taz 2008), then they leave the realm of science and enter the realm of politics. The only difference is that a politician has to regularly ask for legitimization, but scientists are, traditionally, free from such scrutiny by the public.

S. Keller's demand for the subservience of science to political utility must be understood as a request to move toward what some science-policy experts refer to as 'mode 2' knowledge production (Gibbons 1994), with the purpose not so much in producing knowledge but in solving problems, in which problem choice will shift from an individual choice to a collective activity (Ziman 1996) and the evaluation of knowledge and validity will be in a broader than peer context, all acting to erode the tenets of 'good science'.

4 Climate service

As Pielke Jr (2007), Luhmann (1977) and Grundmann and Stehr (2011) have argued, shifting the responsibility for a societal problem to the scientific community is based on a "linear model" of the science-policy interaction. Basically, this linear model states that the solution of a problem, after having been identified somehow, undergoes a series of linearly related steps from the scientific arena to the political arena. First, it is dealt with by a scientific analysis. After the provision of some societal constraints, scientifically identified strategies are weighted. Finally, a "solution" is determined, and the recipe for implementing it is given to stakeholders. Hasselmann's (1990) "Global Environment and Society"—model is an example of a linear model [see also, as an alternative model, the "Perceived Environment and Society"—model in Stehr and von Storch (2010)].

By leaving the analysis of the "needed societal action" to climate science (and again this is S. Keller's request) policymaking is reduced to following superior scientific orders, so to speak. Thus, the application of such a model both depoliticizes policymaking and politicizes science.

Depoliticizing policymaking leads to a lack of political debate with a disclosure of economic interests, ideological commitments and cultural values. It can also lead to deepening of opposing views (clad as scientific conflict), and eventually to a lack of broad social acceptance (see also Sarewitz 2004), which seems to be the current state of climate policy. In turn, the politicization of science leads to an exaggerated encroachment of political, economic and social utility into the scientific research and the interpretation of scientific findings—which goes along with a declining acceptance of climate science as an authority in unraveling complex phenomena and developments. Science and civil society commitments converge to some extent, as

exemplified by the unopposed references to politically motivated grey literature in the WG-II report of the IPCC.

In both instances, societal systems, science and policymaking are suffering. It is recommendable to reconstitute a reasonable division of labor between science and society, which will have advantages for both systems. A new societal contract between society and climate science is needed, based for instance on a renewal and adaptation of traditional concepts of such a contract (Mooney 2010). Such an agreement should acknowledge the post-normal condition (Funtowicz and Ravetz 1985; Ravetz 2006) of contemporary climate science and reconsider the potential utility of the general norms of science as presented by Merton (1942, 1973).

Such an agreement would imply that science is not *a priori* taking into account the political (or more generally: societal) utility of scientific answers but only the political utility of the questions. In this sense, science is playing an important but supportive role; the decisive role is still with policymakers and society at large. Thus, science offers a knowledge-based service to society; science offers knowledge about climate dynamics, change and impact; while recognizing the possibility for revision, it both contributes to the societal contextualization of such knowledge, and accepts feedback into the scientific arena of socio-politically significant issues. We call this bundle of tasks and competencies "Climate Service".

The societal conceptualization of climate change takes the form of possible response strategies—which could incorporate efforts to avoid climate change (mitigation; abatement), or to adapt to climate risks (adaptation) by reducing vulnerability to extreme weather events such as rain storms, flooding, wind storms, hail, or droughts (Hasselmann 1990). Abatement can be accomplished by limiting the agent of change, i.e., the emissions, or by geo-engineering. Both approaches need political consensus and will only be effective on the international scale. Adaptation is dominantly a regional or local challenge, since climate risks manifest themselves mostly on a scale corresponding to individual landscapes, extending rarely across more than a few 100 km.

Addressing the former, abatement—its potentials, options and perspectives—is mostly subject of Global Climate Service, whereas the knowledge brokerage revolving around local and regional adaptation and mitigation is what we call "Regional Climate Service". Elements of such servicing are sketched by Visbeck (2008) and von Storch and Meinke (2008).

5 Conclusion

S. Keller laments about the failure of the IPCC to provide UNFCCC and other institutions with concrete authoritative numbers as a support for the "good" policy of post-Kyoto, i.e., Top-Down of Cap-and-Trade. These types of complaints are typical for science in a post-normal situation, where uncertainty is inherently high, stakes are high and societal values are competing with each others in determining "solutions" and understanding [for a discussion of other cases of this sort, refer to Ravetz (2006)].

The authority of science comes from limiting itself to assertions, which are obtained using the scientific method while employing norms like those suggested by Merton in 1973. Giving-into the temptation of providing utility to a specific policy will lead to an erosion of this authority, and thus a diminishing of this resource, as was the case with Waldsterben.

The original arrangement, brought into the IPCC process by Bert Bolin, of being policy relevant but not policy-prescriptive allows science to play its role sustainably. Climate science should be, and likely is, thankful to this fine scientist and gentleman, in emphasizing the obvious:

> It should be stressed, however, that I left politicians and others to judge how serious a change of climate might be […]. These are primarily political issues and scientists can only provide answers to the technical and economic issues that arise. (Bolin 2007: 59)

Nevertheless, a new discussion is needed to revitalize or redesign the contract between society and climate science—this contract should contain explicitly a prescription that the suggestion of S. Keller is *not* acceptable for a professional conduct of climate science.

References

Bolin B (2007) A history of the science and politics of climate change. The role of the Intergovernmental Panel on Climate Change. University Press, Cambridge

Bray D (2010) The scientific consensus of climate change revisited. Environ Sci Policy 13:340–350

Bray D, von Storch H (1999) Climate science. An empirical example of postnormal science. Bull Am Met Soc 80:439–456

Bray D, von Storch H (2009) 'Prediction' or 'Projection'? The nomenclature of climate science. Sci Commun 30:534–543. doi:10.1177/1075547009333698

Funtowicz SO, Ravetz JR (1985) Three types of risk assessment: a methodological analysis. In: Whipple C, Covello VT (eds) Risk analysis in the private sector. Plenum, New York, pp 217–231

Geden O (2010a) Abkehr von 2 Grad Ziel? Skizze einer klimapolitischen Akzentverschiebung. Arbeitspapier der Stiftung Wissenschaft und Politik, Berlin, pp 22

Geden O (2010b) What comes after the two degree target? The EU's Climate Policy should advocate for flexible benchmarks. SWP Comments 2010/C (German Institute for International and Security Affairs, Berlin), http://www.swp-berlin.org/en/common/get_document.php?asset_id=7312 (as of 3rd August 2010)

Gibbons M, Camille L, Helga N, Simon S, Peter S, Martin T (1994) The new production of knowledge: the dynamics of science and research in contemporary societies. Sage, London, 192 pp

Grundmann R, Stehr N (2011) Die Macht der Erkenntnis. Berlin: Suhrkamp Verlag (in press)

Hasselmann K (1990) How well can we predict the climate crisis? In: Siebert H (ed) Environmental Scarcity–the International Dimension. JCB Mohr, Tübingen, pp 165–183

Krauss W (2009) Localizing climate change: a multi-sited approach. In: Falzon M (ed) Multi-sited ethnography. Theory, praxis and locality in contemporary research. Ashgate Publishers, Farnham, Burlington, pp 149–165

Krauss W (2010) Rooted in society. Nat Geosci 3:513–514

Luhmann N (1977) Theoretische und praktische Probleme der anwendungsbezogenen Sozialwissenschaften. In: Wissenschaftszentrum (ed) Interaktion von Wissenschaft und Politik. Theoretische und

praktische Probleme der anwendungsorientierten Sozialwissenschaften. Frankfurt am Main, Campus, pp 16–39
Merton RK (1942) Science and technology in a democratic order. J Leg Pol Sociol 1:115–126
Merton RK (1973) The normative structure of science. In: Storer NW (ed) The sociology of science. University of Chicago Press, Chicago, pp 267–273
Mooney C (2010) Do scientists understand the public?. American Academy of Arts and Sciences, Cambridge pp 15
Pielke RA Jr (2007) The honest broker: making sense of science in policy and politics. Cambridge University Press, New York
Ravetz J (2006) The no-nonsense guide to science. New Internationalist, Oxford, ISBN 10:904456-46-4, pp 132
Sarewitz D (2004) How science makes environmental controversies worse? Environ Sci Policy 7:385–403
Schuster JA (1990) The scientific revolution. In: Olby RC, Cantor GN, Christie JRR, Hodge MJS (eds) Companion to the history of modern science. Routledge, London, 217–242
Stehr N, von Storch H (1995) The social construct of climate and climate change. Clim Res 5:99–105
Stehr N, von Storch H (2010) Climate and society. Climate as a resource, Climate as a risk. World Scientific, Singapore
Taz (2008) Dann hält man besser das Maul, taz, http://www.taz.de/1/archiv/print-archiv/printressorts/digi-artikel/?ressort=sw&dig=2008/09/27/a0361&cHash=b6a305fedc (as of 1st August 2010)
Visbeck M (2008) From climate assessment to climate services. Nat Geosci 1:2–3
von Storch H (2009) Climate research and policy advice: scientific and cultural constructions of knowledge. Environ Sci Policy 12:741–747
von Storch H, Meinke I (2008) Regional climate offices and regional assessment reports needed. Nat Geosci 1(2):78. doi:10.1038/ngeo111
ZEIT (2004) Chronik einer Panik, http://www.zeit.de/2004/51/N-Waldsterben (as of 1st August 2010)
Ziman J (1996) Is science losing its objectivity? Nature 382:751–754