

Reviewing the Climate Reviewers: a Science Studies Approach

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Introduction

2009 was a milestone in the climate change issue: after Copenhagen and the CRU e-mail scandals reflexive, i.e. science studies approach of climate science have become very important and topical. We should understand the controversy, which is not merely about the cause of climate change; it is about science, e.g. how the scientific means i.e. scientific literature, citations, rhetoric are used; how the scientific truth is constructed; how the arguments are formulated and confronted by the opposing sides.

We 're-view' i.e. analyse and contrast two opposing scientific reports; the 'Climate Change 2007 The Physical Science Basis' published by the Intergovernmental Panel on Climate Change and the 'Climate Change Reconsidered' published by the Nongovernmental International Panel on Climate Change.

Methods

The approach of scientometrics and science studies (see e.g. Latour's 'Science in action') were chosen. Based on the reference lists of the reports, statistics were processed, the overlapping references were selected and the context of some citations were analysed. We used only the first six chapters of the NIPCC report, which are related to the IPCC WGI. Report.

Results

Compared to the NIPCC's references list, the scientific basic of the 'IPCC-report' is four times bigger but relative more concentrated. Considering the most important journals, there are no remarkable differences. However, citations from 'paleo-science' journals are more frequent in the NIPCC (Table 1).

Table 1. The scientific background of the reports, the first ten cited journals without recurrence

| Rank | IPCC | % | Cumm. % | Rank | NIPCC Chp. 1-6. | % | Cumm. % | |
|------|--|------|---------|-------|---|------|---------|-------|
| | References altogether | 5242 | - | | References altogether | 1466 | - | |
| | Journal references (from 258 journals) | 4742 | 100,00 | | Journal references (from 218 journals) | 1331 | 100,00 | |
| 1 | Journal of Geophysical Research | 694 | 14,64 | 14,64 | 1 Geophysical Research Letters | 128 | 9,62 | 9,62 |
| 2 | Geophysical Research Letters | 673 | 14,19 | 28,83 | 2 Science | 104 | 7,81 | 17,43 |
| 3 | Journal of Climate | 657 | 13,85 | 42,68 | 3 Journal of Geophysical Research | 91 | 6,84 | 24,27 |
| 4 | Climate Dynamics | 276 | 5,82 | 48,50 | 4 Nature | 85 | 6,39 | 30,65 |
| 5 | Science | 275 | 5,80 | 54,30 | 5 Journal of Climate | 83 | 6,24 | 36,89 |
| 6 | Nature | 255 | 5,38 | 59,68 | 6 The Holocene | 62 | 4,66 | 41,55 |
| 7 | Global Biogeochemical Cycles | 108 | 2,28 | 61,96 | 7 Quaternary Research | 42 | 3,16 | 44,70 |
| 8 | Journal of the Atmospheric Sciences | 100 | 2,11 | 64,07 | 8 Climatic Change | 35 | 2,63 | 47,33 |
| 9 | Climatic Change | 85 | 1,79 | 65,86 | 9 Quaternary Science Reviews | 33 | 2,48 | 49,81 |
| 10 | International Journal of Climatology | 83 | 1,75 | 67,61 | 10 International Journal of Climatology | 31 | 2,33 | 52,14 |

There are only 260 overlapping journal articles and there are only nine overlapping 'grey' literatures in the reports. This result is simultaneously surprising and self-evident. By analysing the context of these citations especially the topic of extreme weather was chosen to look deeper in the reviewing process of the reports. The IPCC aims usually to compare the findings with grouped citations, and often applies the „uncertainty-however-evidence” formula. Meanwhile the NIPCC operates with direct criticism to mainstream (IPCC) opinions i.e. studies, and gives word-for-word quotations of the challenging results with a narrative introduction to the most important authors.

Two examples for the different use of a given article. IPCC on the left (p. 306 and 788), NIPCC on the right (p. 329 and 310)
italics from the authors

In the western North Pacific, long-term trends are masked by strong inter-decadal variability for 1960 to 2004 (Chan and Liu, 2004; Chan, 2006), *but results also depend on the statistics used and there are uncertainties in the data prior to the mid-1980s (Klotzbach, 2006)* Further increases in activity have occurred in the last few years after Chan and Liu (2004) was completed (Figure 3.40). Tropical cyclones making landfall in China area small fraction of the total storms, and *no obvious long-term trend can be discerned* (He et al., 2003; Liu and Chan, 2003; Chan and Liu, 2004). *However, Emanuel (2005a) and Webster et al. (2005, 2006) indicated that the typhoons have become more intense in this region, with almost a doubling of PDI values since the 1950s and an increase of about 30% in the number of category 4 and 5 storms from 1990 to 2004 compared with 1975 to 1989. The post-1985 record analysed by Klotzbach (2006) is too short to provide reliable trends.*

Knutson and Tuleya (2004) use a high-resolution (down to 9 km) mesoscale hurricane model to simulate hurricanes with intensities reaching about 60 to 70 m s⁻¹, depending on the treatment of moist convection in the model. They use mean tropical conditions from nine global climate models with increased CO₂ to simulate tropical cyclones with *14% more intense central pressure falls, 6% higher maximum surface wind speeds and about 20% greater near-storm rainfall after an idealised 80-year buildup of CO₂ at 1% yr⁻¹ compounded.*

Conclusion

Our analysis showed that review is (also) a subjective approach, the selectivity of the articles and of their findings is clearly visible. Each side has the truth to believe in and has the means to support it. The result is politicization of science, the stake is the

Taken all round the following citation patterns could be detected in the two reports:

- Both citation are neutral, used to demonstrate methods or data of analysis
- Both citation demonstrates uncertainty
- One citation is neutral and the other supports the 'mainstream' or 'challenging' view
- One citation indicates uncertainty, the other supports the view of one side
- The citations are opposing, their way of interpretation supports the different view of climate change

[Klotzbach] did indeed indicate, in his words, "a large increasing trend in tropical cyclone intensity and longevity for the North Atlantic basin," but it also indicated "a considerable decreasing trend for the Northeast Pacific." Combining these observations with the fact that "all other basins showed small trends," he determined there had been "no significant change in global net tropical cyclone activity" over the past two decades. With respect to Category 4 and 5 hurricanes, however, he found there had been a "small increase" in their numbers from the first half of the study period (1986-1995) to the last half (1996-2005); but he noted that "*most of this increase is likely due to improved observational technology.*" Klotzbach said his findings were "*contradictory to the conclusions drawn by Emanuel (2005) and Webster et al. (2005),*" in that *the global TC data did "not support the argument that global TC frequency, intensity and longevity have undergone increases in recent years."*

[Pielke et al.] indicate that although early theoretical work by Emanuel (1987) "suggested an increase of about 10% in wind speed for a 2°C increase in tropical sea surface temperature," more recent work by Knutson and Tuleya (2004) *points to only a 5 percent increase in hurricane windspeeds by 2080,* and that Michaels et al. (2005) conclude that even this projection is likely twice as great as it should be.

authority of scholars. What left to do when science is not able to justify political decisions? Perhaps we should seek for common environmental goals to aspire after them, and be open to and accept our ignorance.