3 May 2010

Dear Professor Jones

Thank you for your response to my earlier follow-up request relating to the evidence that we took from you in Norwich last month. I would be grateful however for a little clarification on two points.

1. Given your awareness of the M&M2004 paper and your reaction to it as reflecting in the email that I quoted in my letter, I would presume that you (and your fellow CLA), would recall the circumstances under which this work was assessed, and how consensus was arrived by the writing team about the statement about M&M2004 (and de Laat and Maurellis) in Chapter 3 of AR4? It would be helpful if you could describe this.

   Could you let me know as part of your response:

   Were there plenary meetings of the whole writing team to agree on the first, second and final drafts of Chapter 3, or only on the final draft?

   How long were these meetings?

   Was M&M2004 assessed by the team at one of these meetings, and if so when?

   When was the decision made to include the AR4 Report's reference to M&M2004, and was this text seen by the whole writing team?

2. I understand clearly the distinction between "review" and "assessment" of science, and the role of an experienced and expert group in exercising judgement in relation to the latter. *Could you let me know:*

   Of the reasons you give in your response to me for excluding M&M2004 from further considerations, which were ones that at the time led you to exclude it?

   When was it excluded?

It would of course be useful if there were written evidence of any of the above.

I would be grateful for a speedy response, as we are now working against a very tight schedule.

Regards

Geoffrey Boulton

Response (dated 7.5.10) from Prof Phil Jones to additional questions from Prof Geoffrey Boulton.

Preamble

The questions seem to be directed towards the workings of the IPCC. Each IPCC report is an assessment and not a review. The writing team were exercising their judgement about what to include and what not to in this Chapter. MM2004 was just one of over 800 references in the final version of Ch 3.

1. *Given your awareness of the M&M2004 paper and your reaction to it as reflecting in the email that I quoted in my letter, I would presume that you (and your fellow CLA), would recall the circumstances under which this work was assessed, and how consensus was arrived by the writing team about the statement about M&M2004 (and de Laat and Maurellis) in Chapter 3 of AR4? It would be helpful if you could describe this.*

   Could you let me know as part of your response:

   Were there plenary meetings of the whole writing team to agree on the first, second and final drafts of Chapter 3, or only on the final draft?

   How long were these meetings?

   Was M&M2004 assessed by the team at one of these meetings, and if so when?

   When was the decision made to include the AR4 Report's reference to M&M2004, and was this text seen by the whole writing team?

   There were 4 plenary meetings of AR4. These occurred Sept 26 – 30, 2004 (Trieste), May 8 – 12, 2005 (Beijing), December 11-15, 2005 (Christchurch) and June 25-28, 2006 (Bergen). The whole team for Ch 3 attended these meetings. The meetings for Ch 3 took place during the periods. The Ch3 writing team was together for about two thirds of the time. These were discussion and writing times – and lasted for at least two full days of the 3 or 4 day periods of the whole IPCC meeting. For the rest of the time there were IPCC plenary meetings mostly discussing cross-chapter issues.

   The whole chapter was discussed at these 4 plenary meetings. Some drafting of revised text, in conjunction with the drafting of responses to the comments on the drafts took place during these sessions at the last three meetings (Beijing, Christchurch and Bergen). After these three meetings a revised chapter draft was written in time for the deadline for submission given to us by IPCC. Each of the 4 drafts (there was also a zero-order draft after the Trieste meeting) was read through by the whole chapter writing team.

The text of section 3.2.2.2, as was the case for all sections, was discussed at each of these meetings. It is impossible to say for how long the discussion was or exactly when it took place. Each section was discussed as the lead author team went through the chapter in sequence. I do not recall MM04 being specifically addressed. As I have said before, section 3.2.2.2 was not my specific responsibility and I did not write the text.

The decision to include MM04 (and de Laat and Maurellis) was made at the final meeting in Bergen, and as stated the text was seen by the whole writing team. It hadn't been possible to include de Laat and Maurellis until then as it hadn't been published until after the third Lead Author's meeting.

Discussion of MM04 can be seen in comments numbered 3-283 to 3-289 of the Second Order Draft of Chapter 3. In two of these comments (3-284 and 3-285) it was stated that we would refer to MM04 in Section 3.2.2.2 with some text, which would point out that the papers by MM04 and de Laat and Maurellis were biased. The fact that the chapter author team had now read de Laat and Maurellis is referred to in response to comment 3-289.

These comments can be viewed by going to this web site

http://hcl.harvard.edu/collections/ipcc/

and scrolling down to comments on the second order draft of Ch 3.

http://pds.lib.harvard.edu/pds/view/7786376

The relevant comments are on pages 36 to 40.

The first, second and final drafts for section 3.2.2.2 are given at the end. The final draft includes the new paragraph – and this follows from the response to comments 3-284 and 3-285. The comments were signed off by the two Review Editors for the Chapter.

2. *I understand clearly the distinction between "review" and "assessment" of science, and the role of an experienced and expert group in exercising judgement in relation to the latter. Could you let me know:*

Of the reasons you give in your response to me for excluding M&M2004 from further considerations, which were ones that at the time led you to exclude it?

When was it excluded?

There was never a case of specifically excluding MM04. Reference to it was not included in the first three drafts, as were references to many other papers. Many authors wanted us to include reference to their papers (see the comments on the drafts), and each was assessed. The principal reason for not referring to MM04 was that it was scientifically flawed. I went into reasons for this in detail in my previous response. I reiterate that this was not just my decision and I did not write the text. The decision was taken by the whole writing team. Reference to MM04 was not included in the zero, first and second order drafts, principally because the whole writing team considered that the conclusions of the paper were wrong.

First order Draft – Aug 12, 2005

3.2.2.2 Urban temperatures and the urban heat island

The micro-climates in cities are clearly different than in neighbouring rural areas. The relative warmth of a city compared with surrounding rural areas is known as the Urban Heat Island (UHI), associated with urban-related effects on heat retention, changes in runoff, changes in albedo, changes in pollution and aerosols, and so on. Such changes are real but very localized. Section 3.3.2.4 discusses impacts of urbanization on precipitation. This section considers the UHI and the broader issues of the impacts of land-use change, both from a temperature perspective.

Many local studies have demonstrated that the microclimate within cities is, on average, warmer than if the city were not there. However, the key issue from a climate change standpoint is whether urban-affected temperature records have significantly biased temporal trends. The few studies that have looked at hemispheric and global scales conclude that any urban-related effect is an order of magnitude smaller than decadal and longer timescale trends evident in the series (e.g., Jones et al., 1990), a result that could partly be attributed to omitting a small number of sites (<1%) with clear urban-related warming trends. In a worldwide set of about 260 stations, Parker (2004) noted that warming trends in night minimum temperatures over 1950–2000 were not enhanced on calm nights, which would be the time most likely to be affected by urban warming. Thus, the global land warming trend discussed is very unlikely to be influenced by increasing urbanization (Parker, 2004). Over the conterminous USA, rural station trends are almost indistinguishable from series including urban sites (Figure 3.2.3 from Peterson and Owen, 2005), and the same is true of China from 1951–2001 (Li et al., 2004).

Comparing surface temperature estimates from the NCEP/NCAR reanalysis with unadjusted (i.e., as measured) station time series, Kalnay and Cai (2003) concluded that more than half of the observed decrease in DTR in the eastern USA since 1950 was due to changes in land use, which are partly related to urbanization. However, there was no specific analysis of urban or rural effects and the conclusion was based on the fact that the reanalysis did not include these factors. Also the reanalysis did not include many other natural and anthropogenic effects, such as increasing greenhouse gases and observed changes in clouds or soil moisture (Trenberth, 2004), and Vose et al. (2004) show that the adjusted station data for the region (for various issues affecting homogeneity, see Appendix 3.A.2) do not support Kalnay and Cai's conclusions. Nor are the results reproduced in the surface temperature fields from the ERA-40 reanalyses (Simmons et al., 2004). Instead most of the changes appear related to abrupt changes in the type of data assimilated into the reanalysis, rather than to gradual changes over the period arising from land-use and urbanization changes. Reanalyses can only be used for estimating longer timescale trends reliably since 1979 (Simmons et al., 2004) and their unreliability for estimating trends incorporating earlier periods is discussed in Appendix 3.A.5.

On the same regional scale, urban stations in the conterminous USA had slightly larger DTR declines than rural stations after 1950, but the difference was not statistically significant (Gallo et al., 1999). Radiosonde-based temperature measurements in the central USA had a decrease in DTR only below 850 hPa (Balling and Cerveny, 2003). The decrease at 850hPa was larger than that at the surface, suggesting that trends in the low troposphere were likely influenced by near-surface processes such as variations in cloud cover or precipitation but were not dominated by urban and land-use change effects. Regional changes in land use can still be important for DTR at the local-to-regional scale. For instance, land degradation in northern Mexico resulted in an increase in DTR relative to locations across the border in the USA (Balling et al., 1998) and croplands in the mid-western United States had lower maximum temperatures and a smaller DTR in comparison with forested areas in the northeastern part of the country (Bonan, 2001). Desiccation of the Aral Sea since 1960 raised DTR locally around this region (Small et al., 2001). By processing surface temperature maximum and minimum data as a function of day of the week, Forster and Solomon (2003) found a distinctive "weekend effect" in DTR at stations examined in the United States, Japan, Mexico, and China. The weekly cycle in DTR has a distinctive large-scale pattern and strongly suggests an anthropogenic effect on climate, most likely through changes in pollution and aerosols.

Second order draft – February 22, 2006

3.2.2.2 Urban heat islands and land-use effects

The modified land surface in cities affects the storage and radiative and turbulent transfers of heat and its partition into sensible and latent components, see Section 7.2 and Box 7.2. The relative warmth of a city compared with surrounding rural areas, known as the Urban Heat Island (UHI) effect, arises from these changes and may also be affected by changes in water runoff, pollution and aerosols. UHIs are often very localized and depend on local climate factors such as windiness and cloudiness (which in turn depend on season), and on proximity to the sea. Section 3.3.2.4 discusses impacts of urbanization on precipitation.

Many local studies have demonstrated that the microclimate within cities is on average warmer, with smaller DTR than if the city were not there. However, the key issue from a climate change standpoint is whether urban-affected temperature records have significantly biased large-scale temporal trends. Studies that have looked at hemispheric and global scales conclude that any urban-related trend is an order of magnitude smaller than decadal and longer timescale trends evident in the series (e.g., Jones et al., 1990), a result that could partly be attributed to the omission from the gridded dataset of a small number of sites (<1%) with clear urban-related warming trends. In a worldwide set of about 270 stations, Parker (2006) noted that warming trends in night minimum temperatures over 1950–2000 were not enhanced on calm nights, which would be the time most likely to be affected by urban warming. Thus, the global land warming trend discussed is very unlikely to be influenced significantly by increasing urbanization (Parker, 2006). Over the conterminous USA, rural station trends were almost indistinguishable from series including urban sites (Peterson, 2003; and Figure 3.2.3 from Peterson and Owen, 2005), and the same is true of China from 1951–2001 (Li et al., 2004). One possible reason for the patchiness of UHIs is the location of observing stations in parks where urban influences are reduced (Peterson, 2003). In summary, although some individual sites may be affected, even some small rural locations, the UHI effect is not pervasive as all global-scale studies indicate it is a negligible component of large-scale averages.

Comparing surface temperature estimates from the NRA with raw station time series, Kalnay and Cai (2003) concluded that more than half of the observed decrease in DTR in the eastern USA since 1950 was due to changes in land use, which are partly related to urbanization. This conclusion was based on the fact that the reanalysis did not include these factors which would affect the observations. But the reanalysis also did not include many other natural and anthropogenic effects, such as increasing greenhouse gases and observed changes in clouds or soil moisture (Trenberth, 2004). Vose et al. (2004) show that the adjusted station data for the region (for various issues affecting homogeneity, see Appendix 3.B.2) do not support Kalnay and Cai's conclusions. Nor are the results reproduced in the surface temperature fields from the ERA-40 reanalyses (Simmons et al., 2004). Instead most of the changes appear related to abrupt changes in the type of data assimilated into the reanalysis, rather than to gradual changes over the period arising from land-use and urbanization changes. Reanalyses may be reliable for estimating trends since 1979 (Simmons et al., 2004) but are in general unsuited for estimating longer-term global trends as discussed in Appendix 3.B.5.

Nevertheless, regional changes in land use can be important for DTR at the local-to-regional scale. For instance, land degradation in northern Mexico resulted in an increase in DTR relative to locations across the border in the United States (Balling et al., 1998), and cropland effects on maximum temperatures in the United States (Bonan, 2001). Desiccation of the Aral Sea since 1960 raised DTR locally around this region (Small et al., 2001). By processing maximum and minimum temperature data as a function of day of the week, Forster and Solomon (2003) found a distinctive "weekend effect" in DTR at stations examined in the United States, Japan, Mexico, and China. The weekly cycle in DTR has a distinctive large-scale pattern with geographically-varying sign and strongly suggests an anthropogenic effect on climate, likely through changes in pollution and aerosols (Jin et al., 2005). Section 7.2 (Chapter 7) provides fuller discussion of the effects of land use changes.

Final Draft – September 2006, printed in early 2007

3.2.2.2 Urban heat islands and land-use effects

The modified land surface in cities affects the storage and radiative and turbulent transfers of heat and its partition into sensible and latent components, see Chapter 7, Section 7.2 and Box 7.2. The relative warmth of a city compared with surrounding rural areas, known as the Urban Heat Island (UHI) effect, arises from these changes and may also be affected by changes in water runoff, pollution and aerosols. UHIs are often very localized and depend on local climate factors such as windiness and cloudiness (which in turn depend on season), and on proximity to the sea. Section 3.3.2.4 discusses impacts of urbanisation on precipitation.

Many local studies have demonstrated that the microclimate within cities is on average warmer, with smaller DTR than if the city were not there. However, the key issue from a climate change standpoint is whether urban-affected temperature records have significantly biased large-scale temporal trends. Studies that have looked at hemispheric and global scales conclude that any urban-related trend is an order of magnitude smaller than decadal and longer timescale trends evident in the series (e.g., Jones et al., 1990, Peterson et al., 1999), a result that could partly be attributed to the omission from the gridded dataset of a small number of sites (<1%) with clear urban-related warming trends. In a worldwide set of about 270 stations, Parker (2004, 2006) noted that warming trends in night minimum temperatures over 1950–2000 were not enhanced on calm nights, which would be the time most likely to be affected by urban warming. Thus, the global land warming trend discussed is very unlikely to be influenced significantly by increasing urbanisation (Parker, 2006). Over the conterminous United States, after adjustment for time-of-observation bias and other changes, rural station trends were almost indistinguishable from series including urban sites (Peterson, 2003; and Figure 3.3 from Peterson and Owen, 2005), and similar considerations apply to China from 1951–2001 (Li et al., 2004). One possible reason for the patchiness of UHIs is the location of observing stations in parks where urban influences are reduced (Peterson, 2003). In summary, although some individual sites may be affected, including some small rural locations, the UHI effect is not pervasive, as all global-scale studies indicate it is a very small component of large-scale averages. Accordingly, we have added the same level of urban-warming uncertainty as in the TAR: standard deviation 0.006 °C decade^{-1} (i.e. 95th percentile 0.01° C decade^{-1}) since 1900 for land, and 95th percentile 0.003° C decade^{-1} since 1900 for blended land-with-ocean. These uncertainties are added to the cool side of the estimated temperatures and trends, as done by Brohan et al. (2006), so that the error-bars in Figures 3.6, 3.7 and FAQ3.1 Figure 1 are slightly asymmetric. The statistical significances of the trends in Tables 3.2 and 3.3 take account of this asymmetry.

McKitrick and Michaels (2004) and De Laat and Maurellis (2006) attempted to demonstrate that geographical patterns of warming trends over land are strongly correlated with geographical patterns of industrial and socioeconomic development, implying that urbanisation and related land-surface changes have caused much of the observed warming. However, the locations of greatest socioeconomic development are also those which have been most warmed by atmospheric circulation changes (Sections 3.2.2.7 and 3.6.4) which exhibit large-scale coherence. Hence the correlation between warming and industrial and socioeconomic development ceases to be statistically significant. In addition, observed warming and transient greenhouse-induced warming is expected to be greater over land than over the oceans (Chapter 10), owing to the smaller thermal capacity of the land.

Comparing surface temperature estimates from the NRA with raw station time series, Kalnay and Cai (2003) concluded that more than half of the observed decrease in DTR in the eastern United States since 1950 was due to changes in land use, including urbanisation. This conclusion was based on the fact that the reanalysis did not explicitly include these factors which would affect the observations. But the reanalysis also did not include explicitly many other natural and anthropogenic effects, such as increasing greenhouse gases and observed changes in clouds or soil moisture (Trenberth, 2004). Vose et al. (2004) show that the adjusted station data for the region (for homogeneity issues, see Appendix 3.B.2) do not support Kalnay and Cai's conclusions. Nor are Kalnay and Cai's results reproduced in the ERA-40 reanalysis (Simmons et al., 2004). Instead most of the changes appear related to abrupt changes in the type of data assimilated into the reanalysis, rather than to gradual changes arising from land-use and urbanisation changes. Current reanalyses may be reliable for estimating trends since 1979 (Simmons et al., 2004) but are in general unsuited for estimating longer-term global trends, as discussed in Appendix 3.B.5.

Nevertheless, changes in land use can be important for DTR at the local-to-regional scale. For instance, land degradation in northern Mexico resulted in an increase in DTR relative to locations across the border in the United States (Balling et al., 1998), and agriculture affects temperatures in the United States (Bonan, 2001; Christy et al., 2006). Desiccation of the Aral Sea since 1960 raised DTR locally (Small et al., 2001). By processing maximum and minimum temperature data as a function of day of the week, Forster and Solomon (2003) found a distinctive "weekend effect" in DTR at stations examined in the United States, Japan, Mexico, and China. The weekly cycle in DTR has a distinctive large-scale pattern with geographically-varying sign and strongly suggests an anthropogenic effect on climate, likely through changes in pollution and aerosols (Jin et al., 2005). Chapter 7, Section 7.2 provides fuller discussion of the effects of land use changes.