

Ward,RE

From: Arent, Doug <Doug.Arent@nrel.gov>
Sent: 08 March 2014 17:06
To: Ward,RE
Cc: r.tol@sussex.ac.uk; cfield@ciw.edu; ddokken@ipcc-wg2.gov; barros@cima.fcen.uba.ar; tsu@ipcc-wg2.gov
Subject: RE: Errors in Final Draft of IPCC WGII Chapter 10

Bob,

As I had previously indicated, we received and took your comments seriously, even though they were out of the normal review cycle. The data has been double and triple checked, and corrected if in error, and the chapter revised. Thank you again for your careful review and comments.

Doug

From: R.E.Ward@lse.ac.uk
[R.E.Ward@lse.ac.uk]
Sent: Friday, March 07, 2014 11:24 AM
To: Arent,
Doug
Cc: r.tol@sussex.ac.uk; cfield@ciw.edu; ddokken@ipcc-wg2.gov; barros@cima.fcen.uba.ar; tsu@ipcc-wg2.gov
Subject: RE: Errors in Final Draft
of IPCC WGII Chapter 10

Dear Doug,

I am just following up on our previous exchange. I have been somewhat disappointed, although not surprised, to find that Professor Tol has decided to use his blog to attack me for having pointed out the errors in the Government draft:
<http://richardtoll.blogspot.ca/>

As you may know, Professor Tol has a track record of over-reacting to others pointing out errors in his research, as Frank Ackerman describes here:
<http://frankackerman.com/tol-controversy/>

Unfortunately, I think that Professor Tol's antics in this case are also likely to reflect badly on the IPCC and his co-authors.

Best wishes,

Bob

Bob Ward

Policy and
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-----Original

Message-----

From: Arent, Doug [mailto:Doug.Arent@nrel.gov]

Sent: 16

February 2014 19:27

To: Ward,RE

Cc: Richard Tol; Christopher Field; David Dokken; barros@cima.fcen.uba.ar; tsu@ipcc-wg2.gov

Subject: RE: Errors in

Final Draft of IPCC WGII Chapter 10

Mr Ward;

Thank you for the detailed comments. Even though the comments arrived outside the normal review process, we have looked at them carefully and adjusted the chapter as appropriate.

Regards,

Doug Arent

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>On Jan 31, 2014, at 6:56

AM,

>"R.E.Ward@lse.ac.uk<mailto:R.E.Ward@lse.ac.uk>"

><R.E.Ward@lse.ac.uk<ma

ilto:R.E.Ward@lse.ac.uk>> wrote:

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>Dear Professor Tol and Professor

Arent,

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>I am writing to draw your attention to a number of errors in

Chapter 10

>of the Final Draft of the contribution of IPCC working group II

to the

>Fifth Assessment Report. My apologies for the lateness of submitting

my

>review comments - they relate to text that was introduced into

the

>report after the review of the Second Order draft, and I have only

just

>discovered a leaked version of the Final Draft which has been posted

on

>a blog.

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>The errors occur in Table 10.B.1 and Figure 10-1, as well as in the accompanying text, including the Executive Summary on page 4 and Section 10.9.2 on page 34. All of this content was added after the circulation of the Second Order draft and so has not been subjected to proper review, which no doubt explains the occurrence of multiple errors.

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>Some of the errors arise from the reliance of these sections on a paper by Professor Tol that was published by the *Journal of Economic Dynamics & Control*¹ on *Targets for global climate policy: An overview*¹, volume 37, pages 911-928.

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>All but one of the studies that provided the data for Table 10.B.1 and Figure 10-1 have been drawn from Tol (2013), which contained a number of small errors. Specifically, Table 10.B.1 purports to compile the results published by other authors, but contains two clear mistakes in the column labelled *Impact (% GDP)*¹, which are also wrongly plotted in Figure 10-1. >These are:

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>1. The Nordhaus (1994a) paper, which is listed in the references as *Expert opinion on climate change*¹ and published in *American Scientist*¹, found that a rise of 3°C in global average temperature by 2090 would result in a loss of between 0 and 21 per cent of gross world product, with a mean value of 1.9 per cent and a mode of 3.6 per cent, as shown in Figure 2 in the paper. However, Table 1 of Tol (2013) indicates that the paper found a loss of between 0 and 30 per cent, with a mean of 4.8 per cent. In fact, these figures correspond exactly

>to the results in Figure
>3 of the Nordhaus
(1994a) paper, which provides estimates of the
>likelihood of a
high-consequence event from global warming. It seems
>that Tol (2013)
accidentally mixed up the two, and used the wrong
>numbers, and this error
is reproduced in Table 10.B.1.

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>2. The Nordhaus (2008) paper, which
is listed in the references as
>CEA Question of Balance: Weighing the Options
on Global Warming
>Policies¹ and published by Yale University Press, used
the DICE model
>to estimate that global warming of 3.1°C by 2100 would
³increase
>damages by almost 3 percent of global output in 2100² (pages
13-14).
>However, Table 1 of Tol
>(2013) wrongly indicates that Nordhaus
(2008) found that global warming
>of 3.0°C would have an impact on global
GDP of -2.5 per cent. This
>error is reproduced in Table 10.B.1.

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>In
addition, another likely mistake occurs in the column labelled
>CEImpact (%
GDP)¹. It is:

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>1. The Hope (2006) paper, which is listed in the
references as CEThe
>marginal impact of CO₂ from PAGE2002: an integrated
assessment model
>incorporating the IPCC's five reasons for concern¹ and
published in
>CEThe Integrated Assessment Journal¹, estimates the marginal
damage cost
>of carbon dioxide emissions. These are calculated from the
PAGE2002
>model which incorporates regional impact factors listed in Table 5
on
>page 24 as percentage GDP loss due to global warming of ³2.5°C
above
>the tolerable level in each impact sector in the EU, with
regional
>multipliers for other regions². Apart from the EU, regional
weight
>factors are provided for seven other regions, with mean values
ranging

>from -0.35 for Eastern Europe and the Former Soviet Union (the only regional impact factor implying a positive change in GDP) to 2.5 for India. It is important to note that nowhere in the paper does Hope (2006) provide an estimate of the global impact of global warming relative to present day or pre-industrial levels. However, Table 1 of Tol (2013) indicates that Hope (2006) found that the range of global impact on GDP of global warming of 2.5°C was -0.9 per cent, with an uncertainty² of -0.2 to 2.7. This result obtained from the calculations of Tol (2013) is unlikely to be accurate, given the information provided in the Hope (2006) paper. This likely error is reproduced in table 10.B.1.

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>I note that most of these mistakes also appeared in earlier papers by Professor Tol which were published in the *Journal of Economic Perspectives*¹ in 2009 and *Environmental and Resource Economics*¹ in 2012.

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>I have been able to verify that six other values (for Nordhaus (1994b), Fankhauser (1995), Tol (1995), Nordhaus and Boyer (2000), Tol (2002a), and Bosello et al. (2012)) listed in Table 1 and plotted in Figure 1 of Tol (2013), and reproduced in table 10.B.1, are correct. However, the six remaining data points (for Nordhaus and Yang (1996), Plambeck and Hope (1996), Mendelsohn et al. (2000), Maddison (2003), Rehdanz and Maddison (2005), and Maddison and Rehdanz (2011)) were derived by Tol (2013) using his own calculations based on the other authors¹ work, so I have been unable to verify their accuracy.

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>In addition, one of the values listed in Table 10.B.1 for Roson and van der

Mensbrugge (2012), which was not included in the analysis by Tol
>(2013),
is inaccurate. The paper on Climate change and economic growth:
>impacts
and interactions¹, which was published in the International
>Journal of
Sustainable Development¹, volume 4, pages 270-285, states on
>page 283:
³According to our preliminary estimates, at the global level,
>the most
serious consequence from climate change will be changes to
>labor
productivity that would induce 84% of the global damage in 2050
>(-1.8% of
global GDP) and 76% in 2100 (-4.6% of global GDP)². I have
>corresponded
with the authors to confirm the temperature changes at
>2050 and 2100, which
are, respectively, 2.32°C and 4.79°C. Table 10.B.1
>lists these values as
2.3°C and 4.9°C, and the error is also reflected in Figure 10-1.
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>I
exchanged e-mail messages with Professor Tol in October 2013 about
>these
issues and he eventually confirmed that each represented errors
>in Table 1
and Figure 1 of Tol (2013). However, he has still not
>expressed any
intention of providing a corrigendum to for his journal
>articles to correct
these small errors. Nor has he responded to my
>request for him to make
available the details of his calculations so
>that I might verify the other
data he presented in the papers. I have
>now written to the journals about
these errors.
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>I suggest not only that you correct these small errors
in Table 10.B.1,
>but also that you check the calculations performed by Tol
(2013) to
>derive the unverified results for the studies included, so that
their
>accuracy can be confirmed for table 10.B.1. The curves fitted to
the
>data in Figure 10-1 will also need to be re-plotted using the corrected
data.
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>The commentary in Section 10.9.2 and the Executive Summary should also
>be amended to reflect the correction of the data.

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>However, I also note that Section 10.9.2 and the Executive Summary in
>the Final Draft are inconsistent with the data presented in Figure 10.B.1.

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>For instance, the first paragraph of Section 10.9.2 states:

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>³Since AR4, four new estimates of the global aggregate impact on human
>welfare of moderate climate change were published (Bosello et al.,
>2012; Maddison and Rehdanz, 2011; Roson and van der Mensbrugghe, 2012),
>including two estimates for warming greater than 3°C. Estimates agree
>on the size of the impact (small relative to economic growth) but
>disagree on the sign (Figure 10-1). Climate change may be beneficial
>for moderate climate change but turn negative for greater warming.
>Impacts worsen for larger warming, and estimates diverge. The new
>estimates have slightly widened the uncertainty about the economic
>impacts of climate.²

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>This paragraph is inaccurate and misleading in two very important
>respects:

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>1. The assertion that the size of the impact is ³small relative to
>economic growth² is misleading because this very much depends on what
>assumptions are made about future rates of economic growth, which are
>unlikely to be completely independent of damages from climate change,
>particularly at higher

temperature changes (see Stern, Nicholas. 2013.

>The Structure of Economic

Modeling of the Potential Impacts of Climate

>Change: Grafting Gross

Underestimation of Risk onto Already Narrow

>Science Models.¹ Journal of

Economic Literature¹, 51(3): 838-59).

>

>2. The assertion that

estimates³ agree on the size of the impact but

>disagree on the sign.

Climate change may be beneficial for moderate

>climate change but turn

negative for greater warming.² is patently not

>supported by the evidence

presented - in fact, of all the data

>presented in Table 10.B.1, only one

study (Tol, 2002) suggests that

>there would be a significant positive

impact on GDP from global

>warming. The analysis by Tol (2002) excluded a

long list of important

>impacts, including those relating to recreation,

tourism, extreme

>weather, fisheries, construction, transport, energy supply

and morbidity.

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>Furthermore, the corresponding paragraph in the

Executive Summary states:

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>³Globally aggregated economic impacts of

global warming are a small

>fraction of income up until 3°C [10.9.2, medium

evidence, high

>agreement]. A global mean average temperature rise of 2.5°C

may lead to

>global aggregated economic losses between 0.2 and 2.0% of

income

>(medium evidence, medium agreement) and losses increase with

greater

>warming.²

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>This is not consistent with the data presented in

Table 10.B.1. The

>term³ small fraction² could be misinterpreted by the

reader as meaning

>somewhat less than the range of estimates from the

published literature

>for warming of 3°C. In addition, the range of

estimates of impacts,

>expressed as equivalent income loss in per cent, for
warming of 2.5°C
>presented in Table 10.B.1 are +0.1 to -2.5 per cent of
GDP.
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>More importantly, the statement in the Executive Summary fails
to
>include an extremely important caveat which is listed in Section
10.9.2:
>³Different studies include different aspects of the impacts of
climate
>change, but no estimate is complete; most experts speculate
that
>excluded impacts are on balance negative². Hence it is important
to
>consider whether the Executive Summary should cite any figures,
given
>these very serious concerns about their accuracy.
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>Yours
sincerely,
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>
>Bob Ward
>
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