

## The Glacier Trust

*Communities living at high altitudes in the Himalayas frequently face disaster as a result of climate change. The Glacier Trust provides financial support and expertise for grassroots Non Governmental Organisations working in these high environments, enabling communities to adapt and share their solutions.*

### First Climategate, then Glaciergate. So did we get it all wrong?

A recent poll by *Populus*, reported in *The Economist*<sup>1</sup> suggested that now only a quarter of UK voters think that climate change is happening *and* that it is man made. And who can blame the other three quarters of voters after the coldest winter in the UK for about 30 years and the reporting of the Climategate and Glaciergate scandals?

Both are scandals of managerial and academic ineptitude. The Climategate scandal announced by the press was that the University of East Anglia (UEA) were found to be ‘suppressing’ or ‘burying’ data which may have had the potential to show that climate change wasn’t happening in the way scientists had predicted<sup>2</sup>. This only came to light after a mail server at UEA was hacked into and many hundreds of emails were brought to light. You can now find the so called incriminating emails quite easily on the web. I haven’t read them all by any means. But the emails that I have read indicate a deep worry that data and predictions could be extrapolated to give a totally false view of the wider picture by a hostile media. That is almost exactly what happened when a potentially misleading article appeared in *Science*<sup>3</sup> and set Glaciergate scandal rolling. But what deepened the Glaciergate scandal was the inclusion of unreferenced and highly speculative material in the Intergovernmental Panel on Climate Change (IPCC) 2007 report<sup>4</sup>. That should never have happened. Quite why it took so long for it to come to light is another mystery. Why, for example, hadn’t I read it?

So are the sceptics right? Perhaps there really is a whole Climate Change ‘Jobsworth’ industry whose employment depends upon maintaining belief in climate change as if they were the priests and priestesses of a new religion. Plenty of Australians think so because scientists do have a knack of making it look like that. For example, I recall the hysteria with which Warwick Hughes, an Australian scientist, was treated by ‘the establishment’, when he questioned whether increases in atmospheric CO<sub>2</sub> had any traceable connection with human activity and ‘the establishment’ reacted as if he were a holocaust denier. Actually, there is plenty of evidence for thinking that increases in atmospheric CO<sub>2</sub> are man made, which I will come to later. But, strange as it may seem, science proceeds through processes of *falsification* rather than by verification, thanks to the work of Karl Popper and others. It is by debunking hypotheses that science makes progress and scientific findings usually are couched in terms of probability ratings rather than as absolute truths. But instead of telling Hughes to go away and ‘falsify’ the accepted evidence of the human origin of atmospheric CO<sub>2</sub>, and come up with a better hypothesis, they merely treated him with contempt,

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<sup>1</sup> *The Economist*, 13 February 2010, p.3

<sup>2</sup> Scientists use the word ‘predict’ in a slightly different way to the rest of us. Instead of ‘foretell’ they use it to express the projected outcome from a hypothesis or model within a range of probability.

<sup>3</sup> Pallava, B. 2009 No sign yet of Himalayan meltdown, Indian report finds, *Science*, 326, 024 – 5.

<sup>4</sup> Cruz, R.V., H. Harasawa, M. Lal, S. Wu, Y. Anokhin, B. Punsalmaa, Y. Honda, M. Jafari, C. Li and N. Huu Ninh, 2007: Asia. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 469-506.

which can only leave the public guessing. Additionally, as we shall see, scientists are sometimes tempted to sensationalise their theoretical work to the media and this also does them no good.

The Climategate scandal may have contained elements of this ‘new religion’ syndrome, but much more likely it is a failure of management to deal with a crisis. We will have to wait to see how the Russell enquiry reports on this whole matter later this year. But for the moment it is worth keeping the following in mind (i) The UEA Climate Research Unit (CRU) is not itself a source of primary data but collates data from primary sources around the world and that these data are also available from those original sources. (ii) According to a *Sunday Times*<sup>5</sup> statement by Prof Phil Jones, head of the CRU, the CRU was being bombarded with applications for data under the Freedom of Information Act at an alarming rate (reportedly 60 requests in July 2009 alone), which were bringing the CRU, with only 13 staff, to a point of collapse. Some of these requests can take many days to deal with. Jones stated that he had reason to believe this inundation originated from *Climate Audit*, which is sponsored by arch climate change sceptic Steve McIntyre, during the build up to the Copenhagen summit. Not many university professors are trained in crisis management and if the sceptics have found an Achilles heel, it may prove to be a logistical one rather than a theoretical one.

On, then, to Glaciergate. There are two distinct threads to this saga. The first is the notion that by 2035 the Himalayan glaciers would be gone. The second is that far from being gone by 2035, Himalayan glaciers are not retreating but advancing. The breaking of the Glaciergate story is interesting. Late in October 2009, before the Copenhagen summit, the Indian journalist Pallava Bagla was preparing an article for the journal *Science*, referred to earlier, and wrote to a number of distinguished glaciologists with what appeared to be a draft article (a ‘white paper’) by an Indian Geologist, Dr V. K. Raina<sup>6</sup> asking them to comment. From my reading of the chronology of these events published on *Cryolist* (an internet correspondence channel for glaciologists) Bagla had cleverly used this document as a kind of stalking horse by which to debunk the IPCC’s Working Group II Fourth Assessment Report, which suggested that 80% of Himalayan glaciers could melt by 2035 (the 2035 melt date)<sup>7</sup>. He did this by inviting comment and clarification as to why some Himalayan glaciers appeared to have stopped retreating. One of the scientists consulted, Dr Jeffrey Kargel from the University of Arizona, was uncomfortable about commenting publicly on something that had not been published, particularly as he regarded parts of Raina’s paper as wildly inaccurate. Nevertheless he replied in impressive detail at very short notice, explaining while some Himalayan glaciers had become stagnant and were down wasting (losing mass), in the Karakoram range (North West of the Himalayas) there was evidence that a number of glaciers were advancing. Kargel suggested several reasons for this including delayed response, which can result from conditions at the glacier base and oscillating weather patterns.

Bagla’s article appeared in *Science* in November 2009, using some of Raina’s paper to call in to question the 2035 melt date with corroborating snippets from eminent glaciologists. Kargel was justifiably outraged that a journal as important as *Science* should cite Raina’s inaccurate and unpublished report as the basis of its article. Prof Graham Cogley from Trent University in Canada decided to dissect the structures surrounding the 2035 melt date. On 18 November he reported to the *Cryolist* suggesting that the 2035

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<sup>5</sup> See *Sunday Times* 7 Feb 2010, p10.

<sup>6</sup> This ‘white paper’ later transpired to be a draft of Chapter 8 of V.K. Raina’s report to the Indian Government’s ministry of Environment and Forests published in November 2009 (Kargel’s letter to *Cryolist*, 18 November 2009). Kargel regarded much of the report as sound, but flawed by the claims in this chapter. The report has been made available through the University of Colorado at <http://cires.colorado.edu/~braup/himalaya/>

<sup>7</sup> The IPCC report (*op. cit.* footnote 3) para. 10.6.2. contains the following: ‘Glaciers in the Himalaya are receding faster than in any other part of the world and, if the present rate continues, the likelihood of them disappearing by the year 2035 and perhaps sooner is very high if the Earth keeps warming at the current rate. Its total area will likely shrink from the present 500,000 to 100,000 km<sup>2</sup> by the year 2035 (WWF, 2005)’.

date was a typo of a date, 2350, given by V.M. Kotlyakov in 1996, citing its exact source and reporting its first misquotation, which has continued to run in articles including those in *New Scientist*. But he subsequently traced ‘the first public appearance of this claim’ to an article in an Indian publication *Down to Earth* in April 1999<sup>8</sup>. God help any student who tries plagiarism in an essay submitted to Prof Cogley!

Interestingly none of the scientists who edited this section of the IPCC report are glaciologists. Had they been, one would hope that this mess would never have occurred. Rather, the editors’ expertise is in climate change. Cogley went on to point out that IPCC’s attributing the 2035 melt date to a WWF report from 2005<sup>9</sup> was also mistaken. The WWF report does however cite an earlier *New Scientist* article<sup>10</sup> wherein Prof Hasnain is quoted as saying that most Himalayan glaciers ‘will vanish within 40 years as a result of global warming’. Hasnain later remarked to the *New Scientist*<sup>11</sup> that the comment was speculative. Certainly it should be seen as a massive failure of management on the part of the IPCC in not appointing competent editors with sufficient background to avoid falling into such an open crevasse. As a result, it is difficult to see how future IPCC publications will gain public confidence while Dr Rajendra Pachauri remains at its head.

The second thread is that it emerged from Bagla’s article in *Science* that certain glaciers in the Western Himalayas are advancing. This isn’t exactly news to glaciologists, but it does provide a target for a climate change sceptic’s snowball. Glaciers are highly complex creatures. One that I have worked on in Arolla, Switzerland was actually larger in the early 1980s than it had been in the Little Ice Age (LIA). Another example was that in 1976 the Rhone Glacier had advanced 2km from its position in 1856 at the end of the LIA<sup>12</sup>. While it is possible to generalise about some of the types of glacier, the timing of their responses to changes in climate can be very different, even within the same massif. Responses may depend upon glacier type, altitude, mean annual temperature and above all conditions at their base. Alterations to wind direction can cause massive changes in snowfall as those living on America’s east side have been finding out of late. When such changes of wind direction continue for a few years and deposit heavy snowfalls in a glacier’s accumulation zone, this can significantly alter a glacier’s behaviour. As Jeffrey Kargel pointed out to Bagla for his *Science* article, response times can vary from months to decades or longer. So what is happening at a glacier snout today may be the result of what happened way up in its accumulation zone decades or even centuries ago. It is after all the *mass* of a glacier that is indicative of its ‘health’ rather than its length or even its volume. So, unfortunately, the fact that a glacier is advancing at present does not mean that global warming is over.

It seems clear now that both Climategate and Glacieregate are failures of management. The first may have resulted from inappropriate reaction to extraordinarily trying circumstances and the second a failure to put the right person in charge of a crucial piece of editing of a document of planetary importance. The fallout from such inaccurate reporting continues and will continue for years to come, rather as Prof Jones had feared. But at least there is now a move afoot to include minority reports in IPCC publications, which

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<sup>8</sup> Graham Cogley wrote to me on 6 March 2010 as follows: The first public appearance of the claim seems to have been in an article by Mridula Chettri, “with reportage by Samyabrata Ray Goswami”, in an Indian magazine (Glaciers beating retreat, *Down To Earth*, 7(23), 30 April 1999, [http://web.archive.org/web/20020827195937/www.cseindia.org/html/dte/dte990430/dte\\_analy.htm](http://web.archive.org/web/20020827195937/www.cseindia.org/html/dte/dte990430/dte_analy.htm)). The article “Melting into thin air” in the same issue, at the same web address, is also relevant, because one possible interpretation of the text that found its way into section 10.6.2 of the Fourth Assessment by IPCC Working Group II is that it is a jumbled rehash by somebody of material from these two articles.

<sup>9</sup> Rai, S. & Gurung, T. 2005 An overview of glaciers, glacier retreat and subsequent impacts in Nepal, India and China, WWF.

<sup>10</sup> *New Scientist*, 5 June 1999.

<sup>11</sup> *New Scientist*, 11 January 2010.

<sup>12</sup> Tufnell, L. 1984 *Glacier hazards*, Harlow, Longman.

will at least loosen the grip of the climate change religionists, who do so much damage by bringing the key issue of our time into disrepute.

Wrong as the 2035 ‘prediction’ was, one can work out on the back of an envelope that a 7% annual reduction of ice would result in 75% of a glacier disappearing within 20 years. Nobody that I know of is predicting that that for the Himalayas, where overall annual ice losses are predicted<sup>13</sup> to be well below 1% for some time to come, but that is still at an astonishing rate. In the European Alps, ice loss has been much quicker in recent decades. Swiss glaciologist Martin Zemp and colleagues<sup>14</sup> estimated that between 5 – 10% of all European Alpine ice was lost during the summer of 2003 (when that major rockfall occurred on the Matterhorn, stranding some 90 climbers). This compounded the 10 – 20% ice loss between 1980 and 1990 estimated by the Swiss glaciologists Haeberli and Hoelzle<sup>15</sup>. (A 5% annual reduction will halve a glacier’s volume in 15 years and reduce it by 75% well within 30 years.) The European Alps are, of course very different from the Himalayas, but the worrying aspect of Himalayan atmospheric warming is that it appears to be increasing with altitude. That is to say, the higher you go the more it is warming. Chinese scientists Liu and Chen<sup>16</sup> suggested that at some altitudes on the Tibetan plateau, the atmosphere had been warming at three times the rate at sea level according to measurements taken between 1955 and 1966. This hypothesis has been corroborated by more recent Chinese research<sup>17</sup>, although personally I struggle with some of the explanations given. Japanese scientists<sup>18</sup> are now suggesting that the warming of the permafrost in the Himalayas may be even faster than on the Tibetan plateau. With each 1° C of warming, the atmosphere can hold another 6% of moisture. Snow will give glacier ice protection, especially if it hangs around into the late spring. But the timing of snowfall is becoming less predictable and when moisture falls as rain instead of snow it is highly corrosive to glacier ice.

And all this carbon dioxide stuff? It can be easily demonstrated that CO<sub>2</sub> acts as if it were ‘transparent’ to incoming short wave solar radiation, allowing it to pass to the earth’s surface. The surface absorbs much of the incoming radiation but subsequently emits it as longer wave ‘outgoing’ radiation. CO<sub>2</sub> acts as if it were opaque to certain frequencies of this outgoing longer wave radiation, trapping it in the atmosphere and delaying its return to space. This delay upsets the balance between incoming and outgoing radiation and causes the planet to warm. We know that in the 1850s the atmosphere held about 280 parts per million (ppm) CO<sub>2</sub> and now we have about 380 ppm. But how do we know that *we* put another 100 ppm into the atmosphere? Could there be another cause? There is both a simple answer and a more complicated one. The simple answer is that since 1850 we have put about 500,000,000,000 (five hundred billion) metric tonnes of carbon into the atmosphere from our industrial activities. That should have raised atmospheric CO<sub>2</sub> to 500ppm. Mercifully the biosphere (plants and plankton) and the ocean have absorbed a great deal of it. The more complicated answer lies in the relationship of two of carbon’s isotopes. Burning fossil fuels in the atmosphere would be expected to reduce the ratio of the heavier isotope <sup>13</sup>C to the lighter <sup>12</sup>C isotope and that is exactly the trend that is being reported. Certainly a smoking gun if not a smoking rainforest. But does a warmer climate matter?

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<sup>13</sup> Kargel, J. 27 March 2010 personal communication.

<sup>14</sup> Zemp, M., Frauenfelder, R., Haeberli, W. & Hoelzle, M. 2005 Worldwide glacier mass balance measurements: general trends and first results of the extraordinary year 2003 in Central Europe. *Data of Glaciological Studies*, 99.3–12.

<sup>15</sup> Haeberli, W. & Hoelzle, M. 1995 Application of inventory data for estimating characteristics of and regional climate-change effects on mountain glaciers: a pilot study in the European Alps, *Annals of Glaciology*, 21, 206–212.

<sup>16</sup> Liu, X. & Chen, B. 2000 Climatic warming in the Tibetan Plateau during recent decades, *International Journal of Climatology*, 20, 1729–1742.

<sup>17</sup> Liu, X, Cheng, Z, Yan, Y. & Yin, Z-Y. 2009 Elevation dependency of recent and future minimum surface air temperature trends in the Tibetan Plateau, and its surroundings, *Global and Planetary Change*, 69, 164–174.

<sup>18</sup> Fukui, K., Fujii, Y., Ageta, Y. & Asahi, K. 2007 Changes in the lower limit of mountain permafrost between 1973 and 2004 in the Khumbu Himal, the Nepal Himalayas, *Global and Planetary Change*, 55, 251–256.

We know that 750 years ago England had 32 Royal vineyards (those were just the Royal ones) and summer temperatures in Britain were probably 0.5 – 1° C warmer than the 20<sup>th</sup> century average. Greenland was successfully colonised. And at school I used to wonder why Chaucer talked about a pint of wine and a glass of ale, rather than the other way round as we have it today. Now I think I know the answer. So instead I'm wondering how the polar bears coped with the medieval warm period, when there may have been less ice in the Arctic Ocean. But I digress. There is a whole range of influences on our planet's temperature, too many to list here, but sunspots, the planet's changing tilt and distance from the sun in winter are among them. We happen to live in a very short period between glaciations and to glaciation we shall undoubtedly return in a few thousand years. In the mean time the planet has recently come out of quite a severe cold snap, (the Little Ice Age) during this interglacial period, and is warming naturally. What frightens me is the extent to which we are accelerating this warming process. There is a very real danger of it running out of control. Where I work, in the Himalayas, winter temperatures have risen alarmingly over the last decade, when compared to the previous three decades. This is presenting a raft of problems which I am able to see for myself. Some are truly frightening and uncannily like those predicted by previous IPCC reports.

It is hard to think of a time since Darwin's publication of *On the Origin of Species* 150 years ago, when science has been more at odds with public thinking. Talking of Darwin, two of my antecedents finished up on the wrong side of that argument but for very different reasons. William Thomson (Lord Kelvin) was wholly unconvinced about Natural Selection because of the way in which scientists, himself included, dated the age of the earth at the time. His criticism was apparently sufficiently robust to cause Darwin to remove estimates of evolutionary timescales from later editions. It was if you like, a proper attack of scientific falsification, although this falsification could be rejected later when new methods of gauging the date of the earth were discovered. Another antecedent, Bishop Wilberforce (Soapy Sam, as he was known) was chief cheerleader among the Natural Selection deniers. Today he has his perfect counterpart in the figure of Lord Lawson, whose inflation did so much to damage our economy when he was Chancellor and who now seems bent upon misleading the public with doubtful science. (Perhaps I should withdraw that remark in view of the foregoing article.) But the way things have been going, he will have an open road.

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29 March 2010

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