This is the print version of the Skeptical Science article 'IPCC were wrong about Himalayan glaciers', which can be found at http://sks.to/himalaya.

Himalayan glaciers: how the IPCC erred and what the science says

What The Science Says:
The IPCC error on the 2035 prediction was unfortunate and it's important that such mistakes are avoided in future publications through more rigorous review. But the central message of the IPCC AR4, is confirmed by the peer reviewed literature. The Himalayan glaciers are of vital importance, providing drinking water to half a billion people. Satellites and on-site measurements are observing that Himalayan glaciers are disappearing at an accelerating rate.

Climate Myth: IPCC were wrong about Himalayan glaciers

"In 1999 *New Scientist* reported a comment by the leading Indian glaciologist Syed Hasnain, who said in an email interview with this author that all the glaciers in the central and eastern Himalayas could disappear by 2035.

Hasnain, of Jawaharlal Nehru University in Delhi, who was then chairman of the International Commission on Snow and Ice's working group on Himalayan glaciology, has never repeated the prediction in a peer-reviewed journal. He now says the comment was "speculative".

Despite the 10-year-old *New Scientist* report being the only source, the claim found its way into the IPCC fourth assessment report published in 2007. Moreover the claim was extrapolated to include all glaciers in the Himalayas." (Fred Pearce)

This is not the first inaccuracy to be found in the IPCC Fourth Assessment Report - there have been several papers demonstrating where IPCC predictions have underestimated the climate response to CO2 emissions. However, this time the climate response has been overestimated. Specifically, the IPCC AR4 predicted the Himalayan glaciers would disappear by 2035 which is decidedly not the case. What's the significance of this error? To determine this, let's look at how it happened and the broader context.

The error occurs in Section 10.6.2: The Himalayan glaciers of the IPCC Fourth Assessment Report:

> "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^2 by the year 2035 (WWF, 2005)."

The source for this information was "An Overview of Glaciers, Glacier Retreat, and Subsequent Impacts in Nepal, India and China", a 2005 report by the World Wildlife Fund. The WWF report was not peer reviewed. On Page 25, we find:

> "In 1999, a report by the Working Group on Himalayan Glaciology (WGHG) of the International Commission for Snow and Ice (ICSI) stated: “glaciers in the Himalayas are receding faster than in any other part of the world and, if the present rate continues, the livelihood of them disappearing by the year 2035 is very high”. Direct observation of a select few snout positions out of the thousands of Himalayan glaciers indicate that they have been in a general state of decline over, at least, the past 150 years. The prediction that “glaciers in the region will vanish within 40 years as a result of global warming” and that the flow of Himalayan rivers will “eventually diminish, resulting in widespread water shortages” (New Scientist 1999; 1999, 2003) is equally disturbing."

The WWF sourced their information from a 1999 news item in New Scientist. Again this was not peer reviewed (New Scientist is a popular science magazine). The article was based on an interview with Indian scientist Syed Hasnain, chair of the Working Group on Himalayan Glaciology, who speculated that Himalayan glaciers might disappear by 2035. This speculation was not supported by any formal research.

Unfortunately, the error was not spotted in the review process. This may be because it was buried deep in the Working Group II section (which focuses on Impacts, Adaptation and Vulnerability with a regional emphasis). It was not one of the key features included in the Technical Summary, the Summary for Policymakers or the Synthesis Report. The 2035 prediction was not included in the Working Group I section (focusing on the Physical Science with more of a global emphasis) which was solidly based on peer reviewed research.

The moral of the story seems clear - stick to the peer reviewed scientific literature. This is not to say peer review is infallible. But as a source for climate science, there is no higher standard than rigorous research based on empirical data, conducted by scientific experts and reviewed by other experts in the field.

This leads to an important question: what does the peer reviewed science say about Himalayan glaciers? The ice mass over the Himalayas is the third-largest on earth, after the Arctic/Greenland and Antarctic regions (Barnett et al. 2005). There are approximately 15,000 glaciers in the Himalayas. Each summer, these glaciers release meltwater into the Indus, Ganges, and Brahmaputra Rivers. Approximately 500 million people depend upon water from these three rivers (Kehrwald et al. 2008). In China, 23% of the population lives in the western regions, where glacial melt is the principal water source during dry season (Barnett et al. 2005).

On-site measurement of glacier terminus position and ice core records have found many glaciers on the south slope of the central Himalaya have been retreating at an accelerating rate (Ren et al. 2006). Similarly, ice cores amd accumulation stakes on the Naimona'nyi Glacier have observed it's losing mass, a surprising result due to its high altitude (it is now the highest glacier in the world losing mass) (Kehrwald et al. 2008).

While on-site measurements cover only a small range of the Himalayas, broader coverage is achieved through remote sensing satellites and Geographic Information System methods. They've found that over 80% of glaciers in western China have retreated in the past 50 years, losing 4.5% of their combined areal coverage (Ding et al. 2006). This retreat is accelerating across much of the Tibetan plateau (Yao et al. 2007).

The IPCC error on the 2035 prediction was unfortunate and it's important that such mistakes are avoided in future publications through more rigorous review. But the central message of the Synthesis Report, the concluding document of the IPCC AR4, is confirmed by the peer reviewed literature. The Himalayan glaciers are of vital importance to half a billion people. Most of this crucial resource is disappearing at an accelerating rate.

The Skeptical Science website by Skeptical Science is licensed under a Creative Commons Attribution 3.0 Unported License.

Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a college textbook on climate change and the book Climate Change Denial: Heads in the Sand. Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.

The Skeptical Science website by Skeptical Science is licensed under a Creative CommonsAttribution 3.0 Unported License.