

10.6.2 The Himalayan Glaciers (SECOND ORDER DRAFT)

Himalayan glaciers cover about three million hectares or 17% of the mountain area as compared to 2.2% in the Swiss Alps. They form the largest body of ice outside the Polar caps and are the source of water for the innumerable rivers that flow across the Indo-Gangetic plains. Himalayan glacial snowfields store about 12,000 km³ of freshwater. About 15,000 Himalayan glaciers form a unique reservoir which supports perennial rivers such as the Indus, Ganga and Brahmaputra which, in turn, are the lifeline of millions of people in South Asian Countries (Pakistan, Nepal, Bhutan, India and Bangladesh). The Gangetic basin alone is home to 500 million people, about 10% of the total human population in the region.

Glaciers in the Himalaya are receding faster than in any other part of the world (see Table 10.10 below) 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 getting warmer at the current rate. The glaciers will be decaying at rapid, catastrophic rates. Its total area will shrink from the present 500,000 to 100,000 km² by the year 2035.

Table 10.10: Record of retreat of some glaciers in the Himalaya

Glacier	Period	Retreat of Snout (meter)	Average Retreat of Glacier (meter/year)
Triloknath Glacier (Himachal Pradesh)	1969-1995	400	15.4
Pindari Glacier (Uttaranchal)	1845-1966	2840	135.2
Milam Glacier (Uttaranchal)	1909-1984	990	13.2
Ponting Glacier (Uttaranchal)	1906-1957	262	5.1
Chota Shigri Glacier (Himachal Pradesh)	1986-1995	60	6.7
Bara Shigri Glacier (Himachal Pradesh)	1977-1995	650	36.1
Gangotri Glacier (Uttaranchal)	1977-1990	364	28.0
Gangotri Glacier (Uttaranchal)	1985-2001	368	23.0
Zemu Glacier (Sikkim)	1977-1984	194	27.7

The receding and thinning of Himalayan glaciers can be blamed primarily on the global warming due to increase in anthropogenic emission of greenhouse gases. The relatively high population density near these glaciers and consequent deforestation and land use changes has also affected adversely these glaciers. The five-kilometre-long Dokriani Bamak glacier in Himachal Pradesh that feeds the Ganges retreated by 20 m in 1998 in spite of a severe winter in 1997, compared to an annual average of 16.5 m over the past five years. This is a phenomenal melt rate. The 30.2 km long Gangotri glacier, too, has been receding alarmingly in recent years. From observations dating back to 1842, the rate of recession of the snout — the point at which the glacier ice ends — has been found to increase more than two-and-a-half fold per year (Fig. 10.6). Between 1842 and 1935, the glacier was receding at an average of 7.3 m every year, whereas between 1935 and 1990, the rate of recession has gone up to 18 m a year. The average rate of recession between 1985 and 2001 is about 23 m per year (Hasnain, 2002).

Most of the rivers in northern India originate from glaciers. About 70 to 80% of the water in these rivers comes from snow and glacial melts, and the rest from monsoonal rains. The current trends of glacial melts heavily suggest that Ganga, Indus, Brahmaputra and the innumerable rivers that criss-cross the entire northern Indian plain will become seasonal rivers in the near future as a consequence of climate change and this will have implications for the economies of the countries in the region.

David Saltz suggests “17% of the Himalayan mountain area. This, compared . . .” The writing team responds with ‘Appropriate editing made,’ but the final text is unchanged.

Xiuqi Fang asks what ‘the region’ refers to. The writing team responds by saying “South Asia,” but this is not clarified in the final text.

David Saltz suggests cutting the sentence in green. The writing team says ‘Appropriate editing made,’ and does in fact cut it from the final draft.

Saltz then asks what the ungrammatical ‘Its’ refers to. The team responds “Glaciers” and doesn’t revise.

Saltz points out the internal contradiction in the paragraph (“100,000? You just said it will disappear.”) The authors write “Missed [sic] to clarify this one” and don’t revise.

Poh Poh Wong suggests “examples of rates of retreat of glaciers outside Asia (e.g. Alpine, Arctic) to show that Himalayan glaciers are indeed receding [sic] faster.” The writing team responds with “Revised the section,” but no changes were made for the final draft.

Hayley Fowler writes: “I am not sure that this is true for the very large Karakoram glaciers in the western Himalaya. Hewitt (2005) suggests from measurements that these are expanding - and this would certainly be explained by climatic change in precipitation and temperature trends seen in the Karakoram region (Fowler and Archer, J Climate in press; Archer and Fowler, 2004) You need to quote Barnett et al.’s 2005 Nature paper here - this seems very similar to what they said.” The team responds: “Was unable to get hold of the suggested references will consider in the final version.” None of the references are used in the final version, and the challenged statement stands.

David Saltz suggests cutting ‘the’ here; once more, the team says “Appropriate editing made” but makes no change. (They do change “blamed primarily on” to “attributed primarily to.”)

David Saltz says that the ‘two-and-a-half fold’ text is inconsistent with the next sentence and with the Gangotri figure (not reproduced here.) The writing team responds “It’s actually hard to tell because the values given are averages over periods.” Nonetheless, this sentence is cut from the final version.

Clair Hanson notes that this is the only reference in Section 10.6.2. The team responds with “More references added,” and the final version does contain two more citations—Shen et al 2002, and, unfortunately, WWF 2005. Hanson separately comments that 10.6.2 and 10.7 together only contain three sources (this one included).

Poh Poh Wong suggests combining these two sentences, although it’s not clear why. The team writes “Appropriate editing made” but does not revise.

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The government of Japan writes, “This seems to be a very important statement, possibly should be in the SPM, but is buried in the middle of this chapter. What is the confidence level/certainty? (i.e. “the likelihood of the glaciers disappearing is very high” is at which level of likelihood? (ref. to Box TS-1, “Description of Likelihood”). Also in this paragraph, the use of “will” is ambiguous and should be replaced with appropriate likelihood/confidence level terminology.” The team responds, “Appropriate revisions and editing made.” The phrase “likelihood . . . is very high” was not changed (indicating that a quantitative likelihood level is not being assigned here) but “will” was changed to “will likely,” which does indicate a confidence level.

The government of Japan writes, “The text states that ‘The receding and thinning of the [sic] Himalayan glaciers can be blamed primarily on the global warming due to increase in anthropogenic emission of greenhouse gases’. This statement lacks any reference. Also, the reader wonders, are ‘global warming’ and ‘climate change’ interchangeable? Are we still using ‘global warming’? Clarification of this would be appreciated.” The team responds, “Appropriate revisions and editing made.” However, no source is added and the ‘global warming’ nomenclature is preserved with no explanation.

The government of Japan writes, “The use of ‘will’ (again) is ambiguous. The confidence level using IPCC terminology should be stated.” The team responds, “Appropriate revisions and editing made.” Indeed, they did change ‘will’ to ‘could likely’ in both cases.

The government of the Netherlands suggests adding “This will also affect relationships between India, Bangla Dsh [sic] and Nepal and may lead to conflicts in relation to the scarce water.” The team responds, “Will consider in the final version.” The comment was not added.