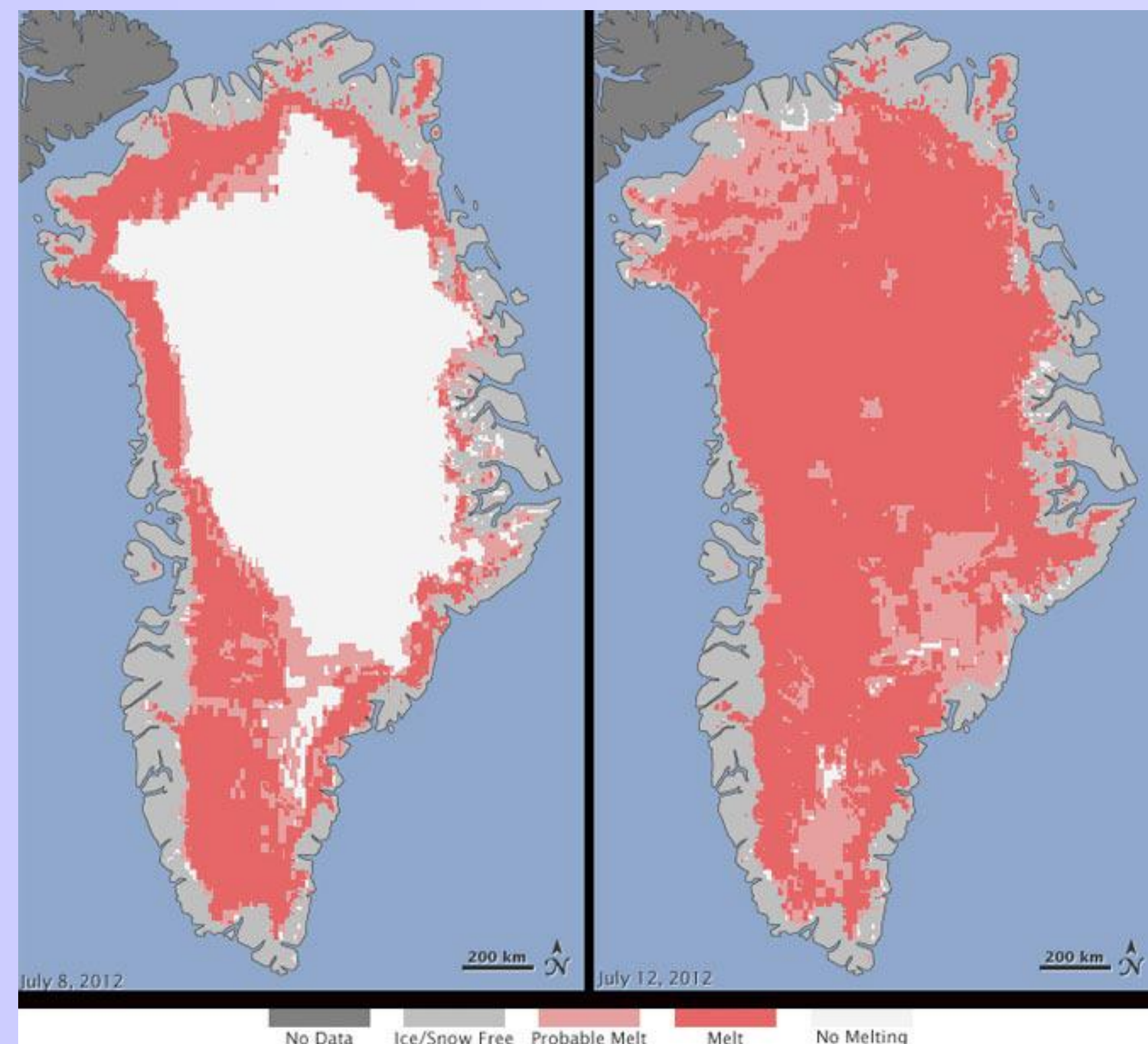


Mountain Climate Change and Melting Glaciers: Causes and Consequences

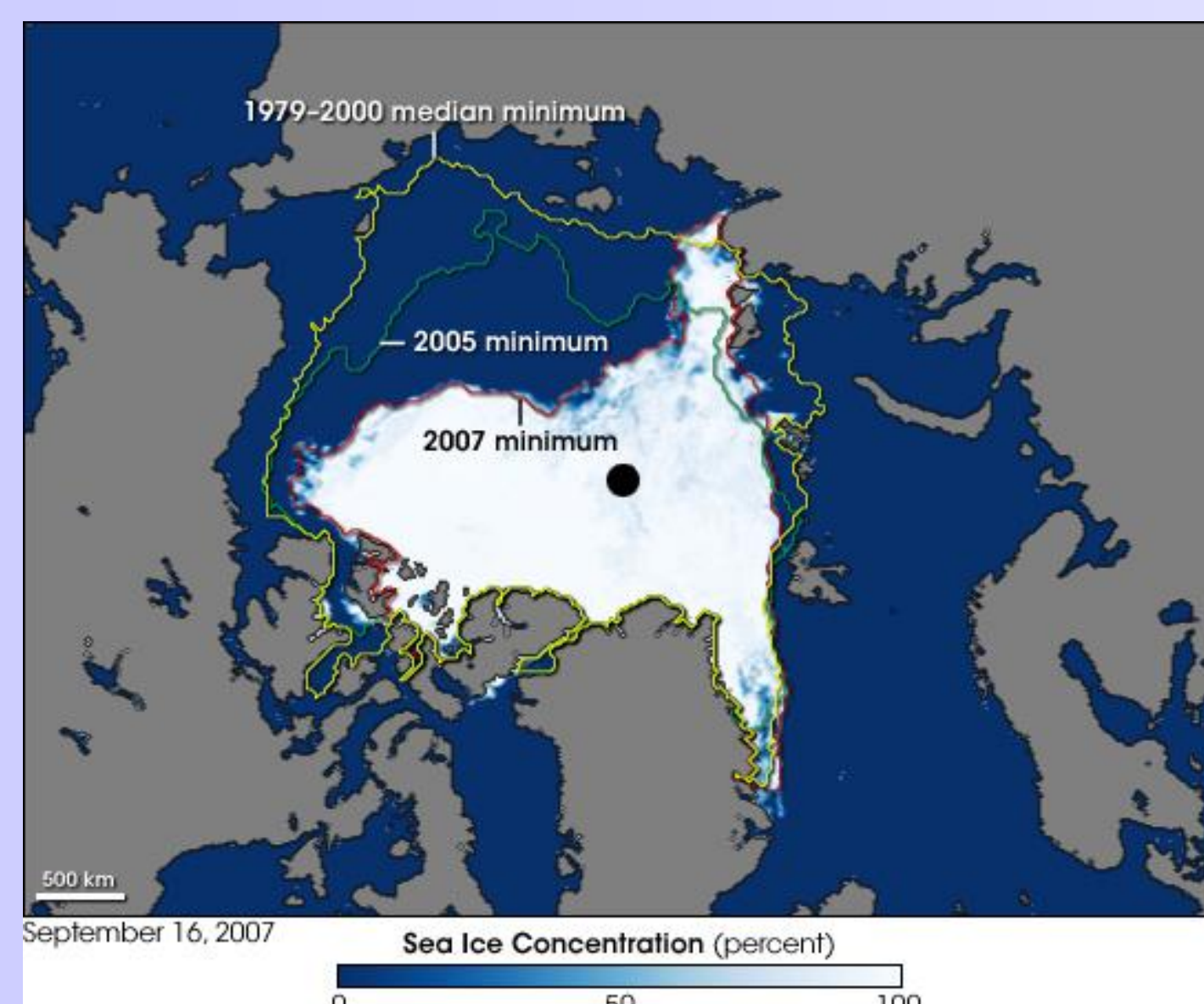
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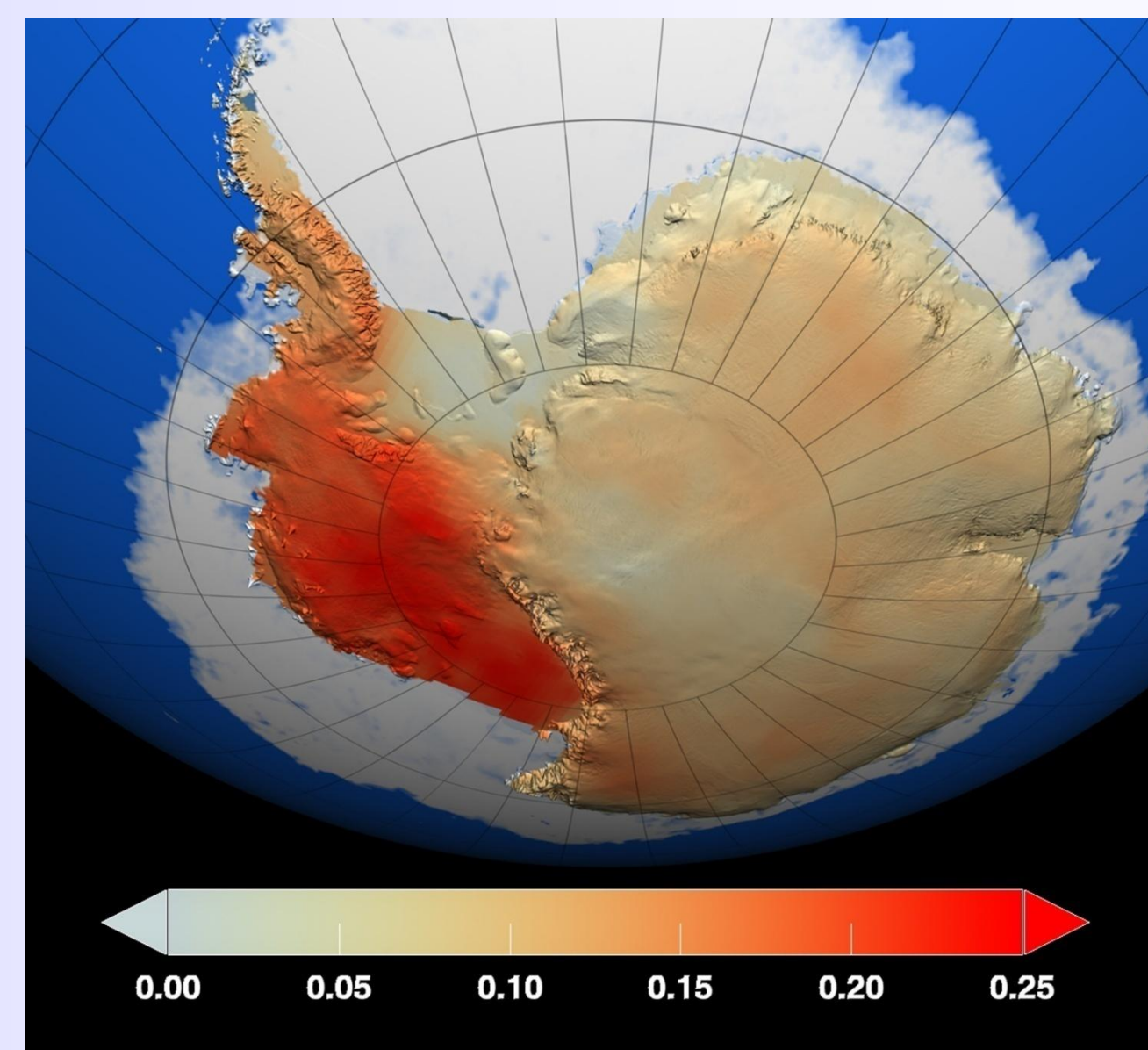
There is increasing calving of ice around the edges of the Greenland Ice Sheet as it becomes more porous due to the development of moulins. The water pouring into the moulin can melt through the ice until it makes contact with the rock base below causing the glacier to advance more rapidly and perhaps even slide off its base into the sea. While it is unlikely that the Greenland Ice Sheet will disappear altogether, continued melting could reduce it to one-third its normal size.



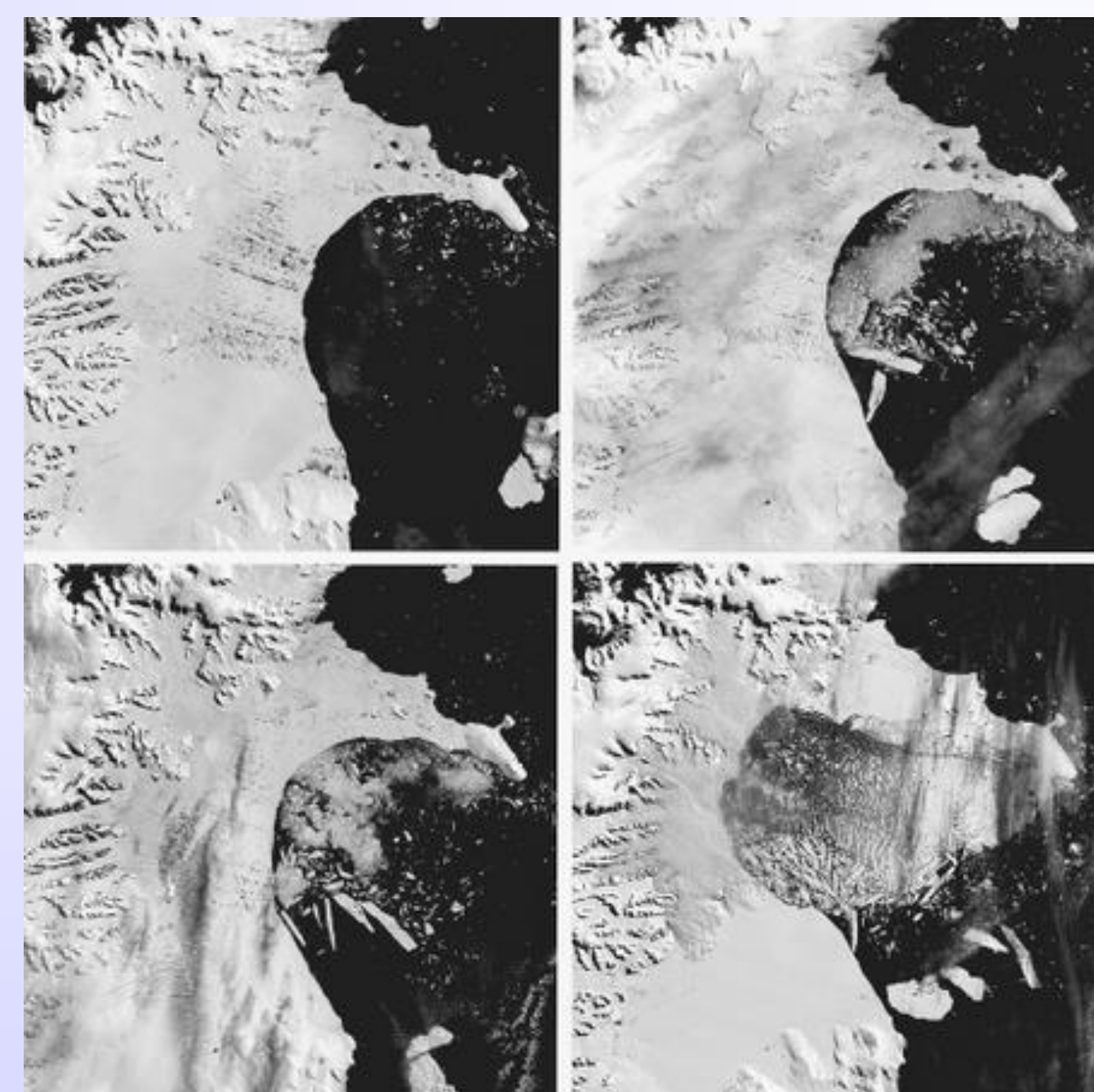
Forecasts had originally suggested that the Arctic Ocean could be ice free in summer by 2030. However, the so-called Northwest Passage from the Atlantic to the Pacific was free of ice and open in the summer of 2007 and at the current rate of melting, the Arctic Ocean could be ice free by the end of the 21st century.



The Himalayan Mountains and the Tibetan Plateau are home to many of the world's great glaciers covering more than 70,000 square miles. The glaciers are the source of water for the main rivers of India including the sacred Ganges and the Indus. During the summer, the slowly melting glaciers provide water for drinking and irrigation, and during the winter snowfall replenishes the ice for the next summer. However, warmer temperatures are causing the glaciers to melt faster during the summer, causing major flooding in the lowlands while the lack of snowfall at higher elevations during the warmer winters is causing drought. The same is true of the glaciers along the equator in Africa. Mount Kenya has had glaciers throughout recorded history, but now only 20 percent of the glaciers there remain. The farmers in the surrounding valleys have always depended on the glaciers for their water, but the rivers are drying up and people are starving. The Snows of Mount Kilimanjaro are world famous and have been a mainstay of the people of equatorial Africa for centuries. Today the glaciers on the mountain are nearly gone and will soon vanish completely leaving the locals to fight over the limited remaining water supplies. Likewise, in the mountains of Uganda, the glaciers are disappearing at an alarming rate with 80 percent of the glacial ice melting since 1850 and all of the glaciers expected to be gone within the next 40 years. The glaciers in the European Alps have decreased by 50 percent since the 1900s and are predicted to disappear by the middle of the 21st century. During the devastating summer heat wave of 2003 which killed at least 30,000 Europeans, the glaciers in the Alps lost 7 feet of ice. Switzerland suffered major flooding in 2005 as a result of rapidly melting glaciers and the resultant runoff. And, Glacier National Park has lost 80 percent of its glacial ice since 1850 and is expected to be glacier free within 30 years. This research examines the causes and consequences of melting mountain glaciers across the globe.

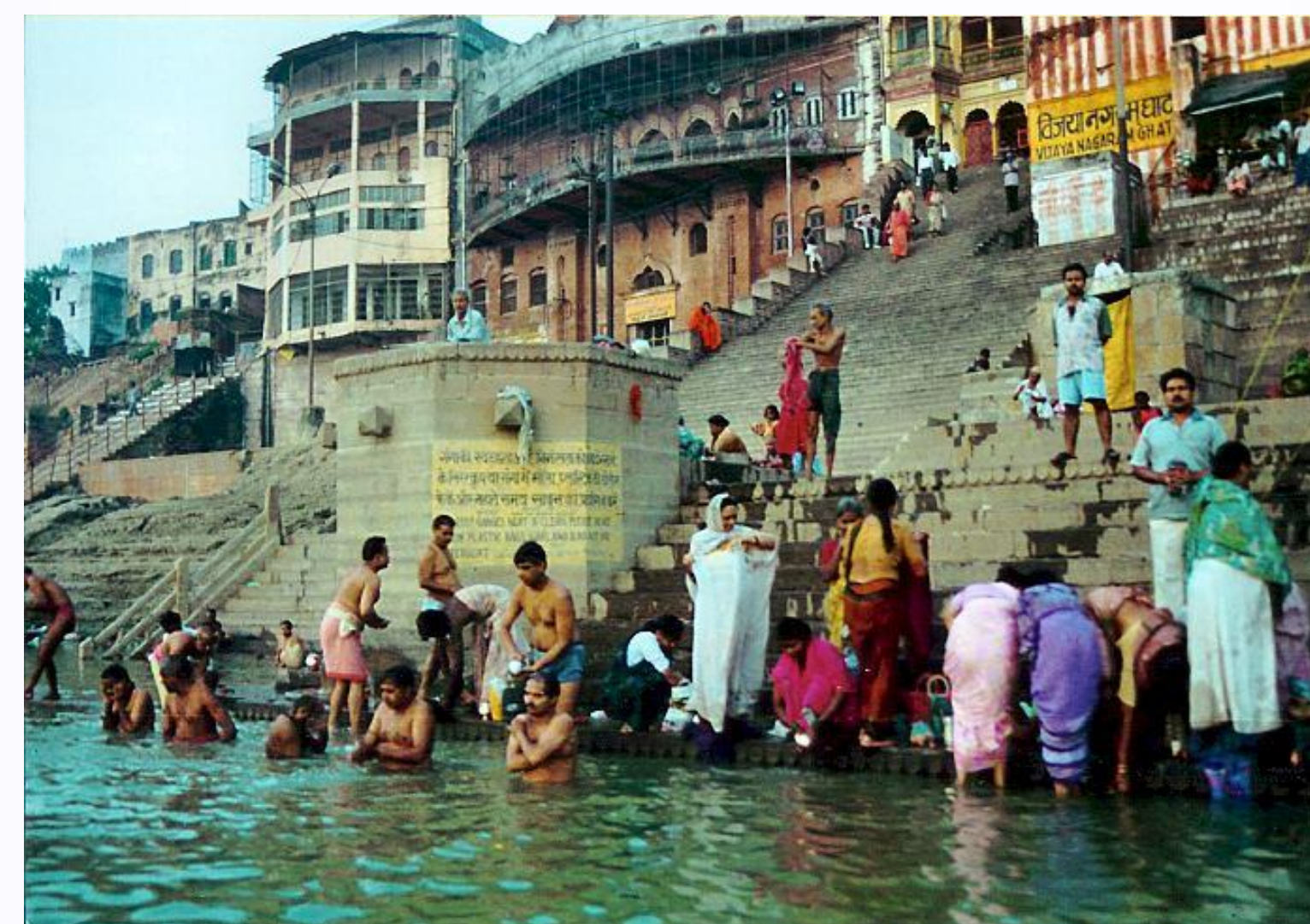


Antarctica contains the largest continental ice sheets on the planet, and they are showing signs of rapid melting and movement. Large chunks of ice occasionally break off the edges of these floating ice masses and drift away.

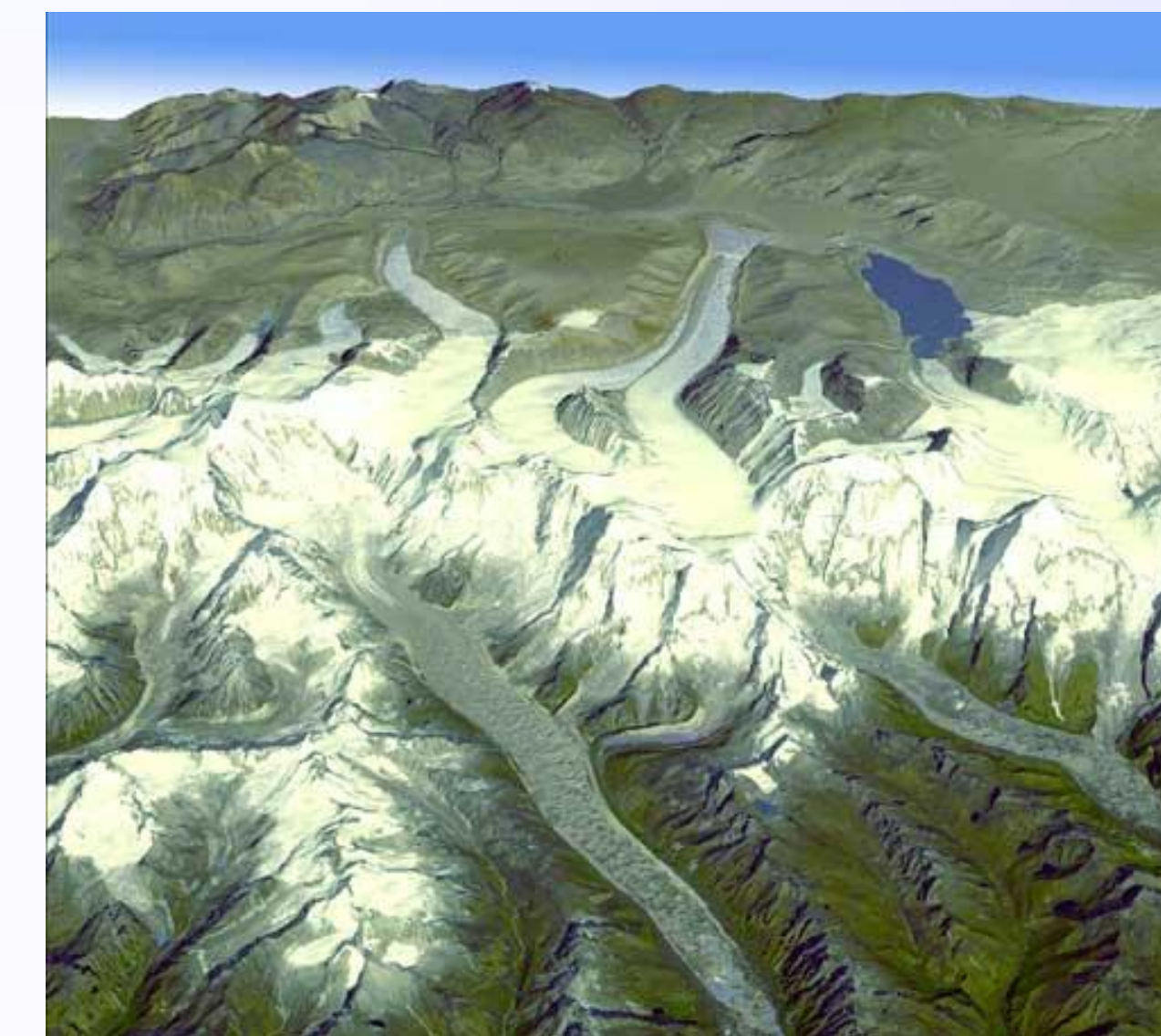


While the breakup of these ice shelves may not have a major effect on sea level because they are already floating in water, many of these ice shelves hold back glaciers in the ice sheet preventing them from advancing seaward. If the ice shelves melt, it will allow the glaciers to move forward, adding ice to the sea and raising sea level.

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Hundreds of millions in India and China depend on glacial melt water for their existence. However, the Hindu Kush and the Himalayan ice mass which supports river flow and water supply has decreased over the last two decades and this trend is projected to continue.



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It is estimated that 20 to 25 percent of the global landmass is permafrost and much of that is softening as the climate continues to warm. Across Siberia, the temperature of the permafrost has risen by more than 1°C since 1960 causing trees in the forests to lean in all directions like staggering drunks and buildings to crack and crumble as the underlying frozen soil begins to thaw.

