



Accelerated collapse of Arctic Ice Shelves

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Arctic ice shelves, formed from ancient marine, meteoric and glacial ice, have undergone dramatic recent losses from which they will likely not recover. They have contracted by >90% over the last century, with a loss of approximately a third of their total area since 2005 alone. The most recent period of disintegration started in 2002 with the fracturing in two of the Ward Hunt Ice Shelf. This was followed by the complete loss of the Ayles Ice Shelf in summer 2005 and the loss of a third of the Petersen Ice Shelf between 2005-7. In summer 2008 the entire Markham Ice Shelf calved away, 60% of the Serson Ice Shelf was lost, and there was extensive further fracturing and loss of the Ward Hunt Ice Shelf. There are now only four Ellesmere Island ice shelves remaining. These losses have imperilled unique ice-dependent microbial ecosystems both on and adjacent to these ice masses.

These collapses have occurred during periods of record warm temperatures and extremely low sea ice conditions along northern Ellesmere Island. This has resulted in the loss of a semi-permanent sea ice fringe along the northern edge of the ice shelves that used to provide protection from the influence of waves and wind. Under present and predicted climate conditions, it is likely that all remaining Ellesmere Island ice shelves will disappear within the next few decades.