

# Melt down

The Earth's cryosphere – its frozen regions – is melting fast. According to the 2007 report of the Intergovernmental Panel on Climate Change, 30 mountain glaciers around the world lost more than half a metre of thickness in 2005, resulting from a temperature rise of 0.6°C over the 20th century. This, most scientists agree, is largely due to our greenhouse gas emissions.

Side-effects from the melting itself may now be accelerating the process: when permafrost thaws, for example, it releases methane, a long-lasting greenhouse gas, from the soil; and melting Arctic sea ice also means loss of its reflective qualities, as water absorbs more of the sun's energy than ice and snow. Here are some of the world's shrinking cold spots.



**Alaskan glaciers, United States of America**  
Many of these thinned three times faster in the last decade than in the 40 preceding years, producing an annual sea-level rise of about 0.14 millimetres.

J. Greenberg/Still Pictures

**Glacier National Park, United States of America**  
Two thirds of the Park's glaciers have disappeared in the last century; it may have none left by 2030.



**Chacaltaya glacier, Bolivia**  
Home to the world's highest ski slope, Chacaltaya lost two thirds of its mass in the 1990s alone, and may disappear by 2010.

www.reisabum.de

**Peruvian glaciers**  
These have lost at least 22 per cent of their area since 1970, and melting is accelerating – threatening the water and power supply for the nation's arid coast, where two thirds of its population lives.

**Patagonian ice fields**  
The Southern Hemisphere's largest non-Antarctic ice masses are the Earth's fastest-retreating glaciers, contributing more than 9 per cent of global sea-level change from mountain glaciers.

**Amundsen Sea, West Antarctica**  
Glaciers are losing 60 per cent more ice into the sea than is accumulated through snowfall – this could raise sea levels by around 0.2 millimetres annually.

**Greenland ice sheet**  
The largest land ice mass in the Northern Hemisphere is losing at least 50 cubic kilometres of ice per year, enough to raise global sea levels by 0.13 millimetres annually.

**Breidamerkurjökull glacier, Iceland**  
The main glacier emerging from the Vatnajökull ice cap – Europe's largest – receded by 2 kilometres between 1973 and 2000. Most of Vatnajökull's glaciers were receding as of 2000.

**Quelccaya ice cap, Peru**  
The melting of the world's largest tropical ice cap has accelerated to 60 metres a year; it will probably disappear by 2020.

**Larsen B ice shelf, Antarctic Peninsula**  
A vast 3,000 square kilometres of this ice shelf disintegrated in 2002 (shown right in blue). Since then, local glaciers have been moving faster, releasing more ice into the sea.



NASA/GSFC/LaRC/JPL

**Arctic sea ice**  
Arctic sea ice has been shrinking at a rate of around 9 per cent per decade over the last few decades. All summer sea ice could disappear this century.



September 1979



September 2005

NASA/GSFC

**Norwegian glaciers**  
Many of Norway's 1,627 glaciers are expected to melt away within the next century, including a third of its largest and all of its smallest.

**Caucasus Mountains, Russian Federation**  
Glaciers here have shrunk by half in the last century.

**Tien Shan Mountains, Central Asia**  
Glaciers lost nearly a third of their area in the second half of the 20th century, up to 2 cubic kilometres of ice annually.

**Alps, Western Europe**  
Alpine glaciers are likely to shrink to 5 per cent of their 1970s volume by the end of this century.

**Mt Kenya glaciers, Kenya**  
The glaciers at this World Heritage site have shrunk rapidly, losing over 75 per cent of their area in the last century. Eight of the 18 ice entities totally disappeared over the same period.

**Mt Everest, Himalayas**  
Everest's glaciers have shrunk by 2 to 5 kilometres in the last five decades, flooding glacial lakes and nearby communities.

**Tibetan Plateau glaciers**  
The largest area of ice outside the polar regions, these 46,298 glaciers are disappearing at the rate of 50 per cent per decade, threatening water supplies across much of Asia.

**Carstensz and West Meren glaciers, Indonesia**  
Carstensz shrank by 80 per cent between 1942 and 2000, while West Meren melted completely in the late 1990s.

**New Zealand glaciers**  
Glaciers have been retreating since the mid-19th century, and have lost half of their area since then. Breaking glaciers are posing a hazard to climbers.



L. S-Eisenlohr/Still Pictures

**Arctic permafrost**  
Permafrost has warmed by up to 2°C since the 1980s. Widespread thawing is predicted, which will release large amounts of methane and carbon into the atmosphere.

- Arctic sea ice
- Permafrost extent
- Glaciers and permanent land ice
- Antarctic snow accumulation
- Arctic boundary

Sources: GEO Snow and Ice 2007; IPCC; AAAS; Earth Policy Institute; NASA; Chinese Academy of Sciences. Map: UNEP-WCMC/National Snow and Ice Data Center.