

Where is ice found?

The Antarctic

The "Antarctic ice sheet" actually consists of two distinct ice-sheets. A Western one, which is smaller and is anchored to a group of islands, and an Eastern one, which is very vast and which, alone, accounts for 78% of the world's glaciers; the latter covers the Antarctic continent and rises with a number of domes, to heights over 4,000 m. The two ice-sheets are separated by the Transantarctic mountain chain, which has peaks over 4,000 m high. The Western ice-sheet has a maximum thickness of 3.5 km, and its base is prevalently below sea level, while the Eastern ice-sheet reaches thicknesses up to 4.5 km and it is prevalently above sea level. Antarctic ice forms slowly due to the scarce precipitations, however it melts equally slowly due to the very low temperatures : it is here that we can find the most ancient ice on Earth. It is still not possible to make any forecasts about the state of health of the Antarctic ice-sheet : its balance still seems positive, even though the Western part has incurred large losses due to calving as its base is below sea level. The Ross Ice Shelf, which is the most extensive in the planet, is named after James Ross, who was navigating on account the British government to reach the South Pole, and discovered it in 1841 : the enormous walls bordering this ice shelf brought an end to the Captain's explorations, Ross did not reach the South Pole, but wrote a detailed report on the margins of the ice shelf, leaving extremely precious historical information for the study of the evolution of Antarctic ice.

The Greenland Ice Sheet

Greenland, the green land, named this way by Eric the Red in the 10th century, to encourage the Vikings to colonize the land. At the time, in fact, it was truly green, however the subsequent advance of ice forced the colons to abandon the island : only the Inuits survived the Little Ice Age. The Greenland Ice Sheet occupies seven eights of the island, with a surface area of 1.73 million km² and a volume of 2.6 million km³, leaving only a small mountainous coastal strip that limits and "contains" the ice-sheet. The ice thickness is 1,790 m on average, but in some parts it is over 3,000 m, culminating in two domes that are 3,300 m high. Many tongues flow out of the ice-sheet, but due to the mountainous characteristics of the coast, only few are able to reach the sea, therefore Greenland practically has no ice shelves. One of the most important outlet glaciers is the Jakobshavn Glacier, a real factory of an enormous number of icebergs. It is the fastest glacier in the world, and near its front it moves at an impressive speed of 1 m per hour, producing continuous collapses and an enormous quantity of icebergs, over 20 million tons per year. Icebergs falling into the sea from the fronts can provoke tsunamis up to 10 m high. The iceberg that sank the Titanic originated in Greenland. Since December 2002 the thickness of the Greenland Ice Sheet is monitored by the NASA satellite ICE Sat , which also monitors the Antarctic ice with laser equipment that can measure up to 1 cm variations in thickness.

Glaciers in the Alps

Glaciers in the Alps account, on the whole, for less than 0.02% of the world glaciers, but are very important because it is here that the first glaciology studies were started, and we have a lot of information about these glaciers over a long period of time. The 1989 International Glacier Registry recorded 5,154 glaciers in the Alps with a surface of a little less than 3,000 km² , of which the largest are in the Northern slopes, where large valley glaciers form frequently. The largest glaciers are in Switzerland in the Bernese Alps, where there is also the largest Alpine glacier, the Aletschglätscher (24 km long, with a surface area of 170 km², and a thickness of a little less than 900 m), in the Vallese Alps, where the largest glacier is the Gornerglätscher, in the Monte Rosa mountain group, and in the Rhetic Alps, where the most extended is the Morteratsch Glätscher, in the Bernina Group (Glätscher means glacier in German). Important glaciers are also to be found in the Mont Blanc group, among which the famous Mer de Glace (sea of ice) one of the first glaciers ever to be studied , in Austria, in Ötztal and in Alti Tauri.

Glacier inventories

In Italy, the Italian Glaciology Committee, in collaboration with the Consiglio Nazionale delle Ricerche, (the Italian National Research Council) published the Italian Glacier Inventory in the years between 1959 and 1962, and up-dated it

in 1989. It is a fundamental document that clearly shows the situation of Italian glaciers and is complete with historical data and images of great importance. In many other countries where research about glaciology has ancient traditions dating as far back as the 19th century, similar detailed compilations regarding national glaciers exist (for example in Switzerland, Norway, Austria, the ex-USSR and Canada). From 1970 all these data flow into an international inventory, promoted by UNESCO and by the International Association of Scientific Hydrology, that has founded the World Glacier Monitoring Service, based in Zurich. The World Glacier Inventory is the most up-dated document regarding the world glacier situation.

Italian glaciers

The Italian Glaciers Registry identified 838 glaciers with a total surface of 540 km² of which almost 100 km² in the Ortles-Cevedale Massif, followed by the Adamello-Presanella group and the Mont Blanc Group. On the Apennines there is only one glacier which is becoming extinct, the Calderone Glacier, a small strip on the Gran Sasso d'Italia.

The glaciers with the largest extension in the Italian Alps are the Forni Glacier in the Ortles-Cevedale Massif, with a surface area of 13 km² in 1989, which competes for the first position in Italy with the Adamello Glacier with a surface area of 18 km², which is however divided into various distinct flows. The Forni Glacier consists of three accumulation basins whose flows converge in a vast tongue that descends into the valley while the Adamello Glacier is on a plateau, a kind of small ice-sheet called Pian di Neve, from which numerous minor tongues and ice streams descend.