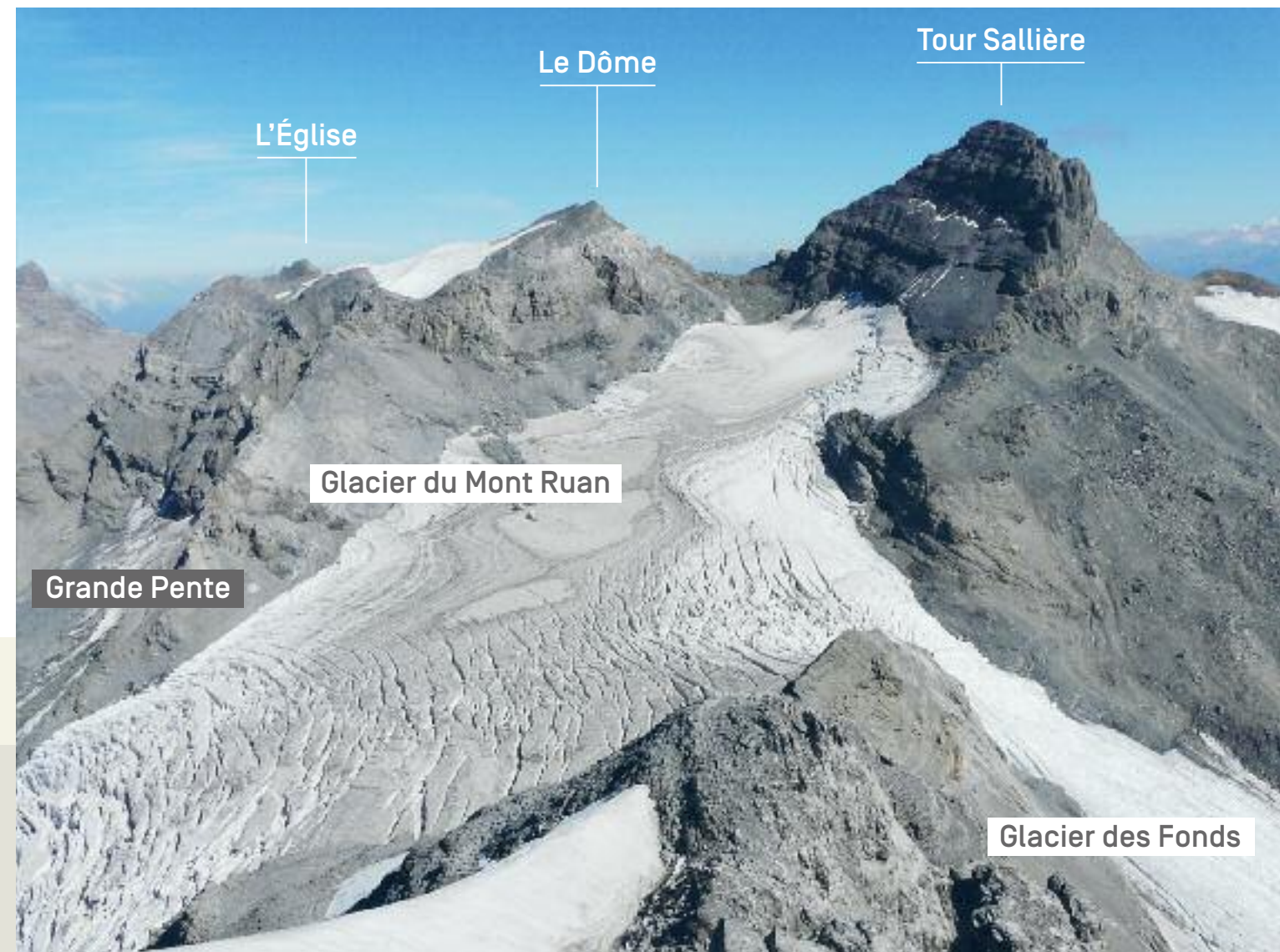


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GLACIAL RETREAT

Since 1864, the world's annual median temperatures have risen by an average of 0.85°C. In Switzerland, temperatures have risen by 1.7°C; our shrinking alpine glaciers are a living testimony to this global warming.



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IMPACT ON NATURAL HAZARDS

The melting of all this ice is responsible for rising water levels in mountain lakes and increased flow speeds in rivers. In addition to the glacial meltwater, the permafrost levels are also rising, destabilizing alpine terrain and heightening the risk of landslides.

In both cases, natural alpine hazards like floods, landslides and mudflows increase significantly, especially in the spring-time. It is becoming ever more important that we create infrastructures to retain this excess water and the debris that it carries.

IMPACT ON WATER RESERVES

Glaciers are a precious stock of water, providing reserves for periods when precipitation levels are low. Water resources have never yet been a problem for Switzerland but this could easily change over time. Just as we are experiencing increased natural disasters in springtime, we are also having unprecedented dry periods in summer. This affects everything from irrigation to drinking water. Building new dams could artificially replicate the natural water reserve system in glaciers and provide an infrastructure for hydroelectric energy production.

MONT RUAN GLACIER (1, 2 and 3)

The north-facing Ruan Glacier is melting more slowly than its neighbouring glacier in France, the south-facing Fonds Glacier [5]. This is due in part to the below-average temperatures in the Susa Valley, where the median annual temperature is around 0°, and to higher levels of rainfall (about 2,700 mm per year) on this side of the Dents du Midi* climatic barrier.

Back in 1850, Switzerland's glaciers covered a territory of 1,750 km², roughly 4% of Switzerland's surface area. By 2010, the glaciated areas had shrunk to 950 km², or 2% of Switzerland's surface area. The Alps' largest glacier, the Aletsch, lost 800 metres between 1980 and 2010. In terms of volume, the numbers are even more shocking, with a loss of over 50% of glacial volume recorded over this thirty-year period. From 1850 to 1990, the glaciers lost 25 cm of thickness per year. From 1990 to 2000 this loss climbed to 75 cm per year; and since the year 2000, we have been losing 1 metre per year. In 2003, a particularly hot year, the glaciers lost an average of 2.5 metres in thickness.

Even if humankind manages to stabilize global warming, the glaciers will continue to melt. This is due to a phenomenon called glacier response time, which is the length of time it takes for a glacier to stabilize in reaction to climate change. The bigger the glacier, the longer the response time; although small glaciers can adapt in a few years, larger glaciers may need decades.

*Dents du Midi: la century ago, this iconic mountain ridge was known as the Dents de Tsallen. This name, derived from the word 'chalin' in local dialect, means «bare, high pasture». Initially, the Haute Cime was known as the Dent du Midi or the «noon tooth» and the Dent de Bonnavau was called the Dent d'une Heure or «one o'clock tooth», from the time when the locals used the mountains as a natural sundial.

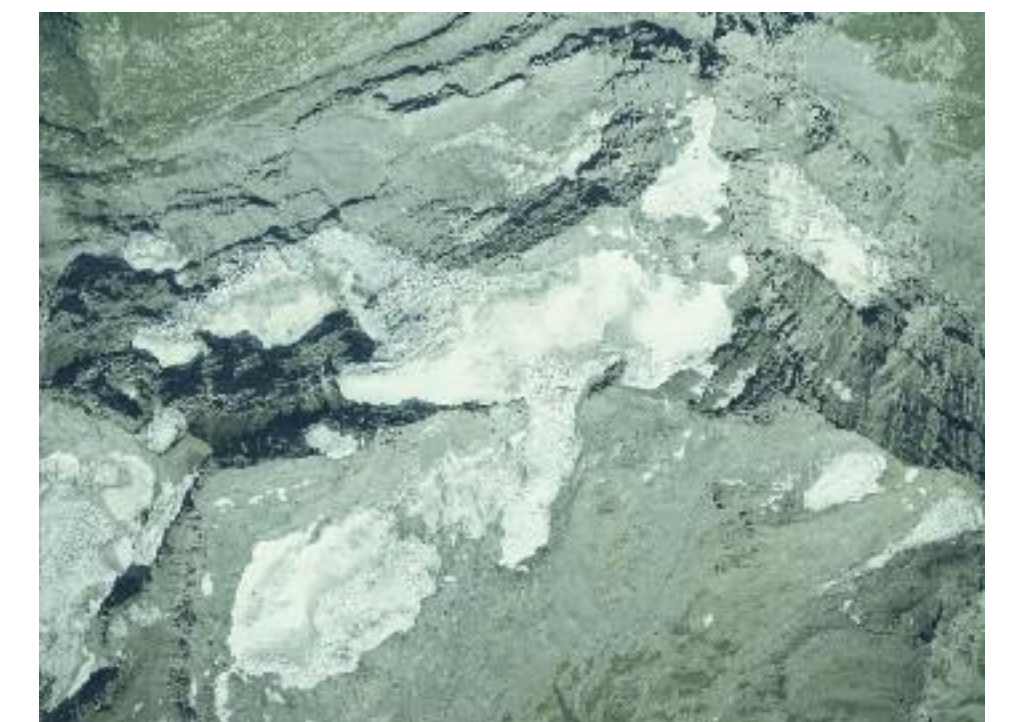
5



1946

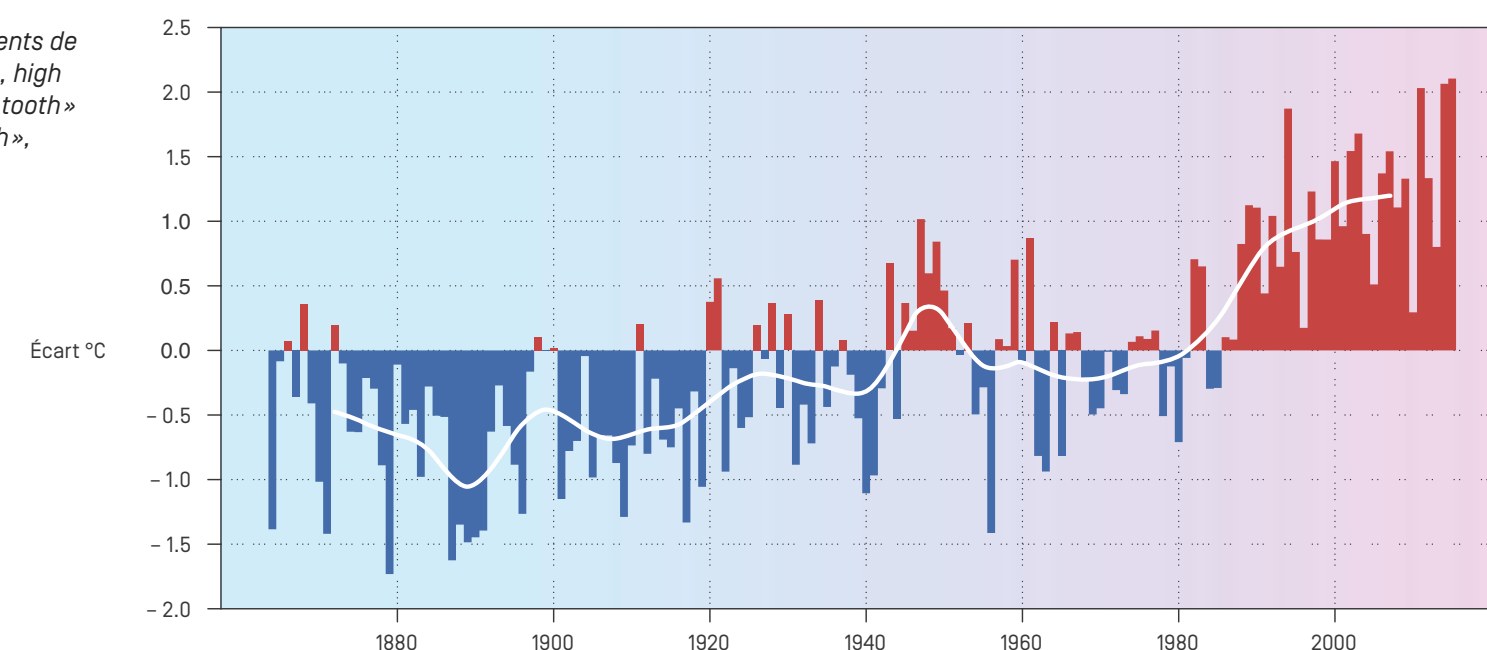


1982



2005

© Swisstopo



■ Years above the 1961 – 1990 average
■ Years below the 1961 – 1990 average

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- 1 The Ruan Glacier from the Tour Sallière.
- 2 + 3 The Ruan Glacier from Mont Ruan.
- 4 Evolution of the annual median temperatures in Switzerland from 1864 to 2015. The 0° corresponds to the average between 1961 and 1990.
- 5 Evolution of the Ruan and Fonds Glaciers from 1946 to 2005.

*If you want to go fast, go alone.
If you want to go far, go together.*

African proverb



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