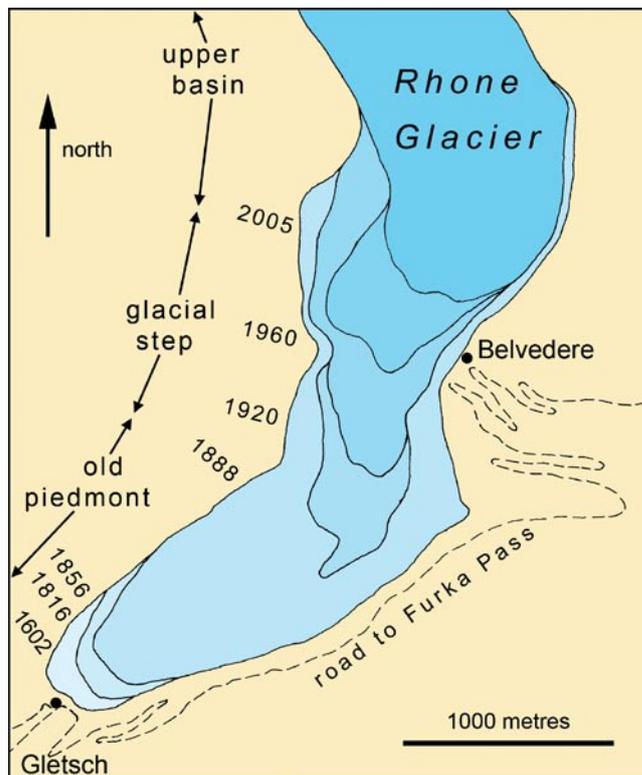


Alpine ice in retreat

by Tony Waltham

It is well known that glaciers are in retreat the world over, thereby beautifully illustrating global warming (however much this may or may not be man-enhanced). Switzerland's Rhone Glacier is both very accessible and also very conspicuous in its retreat. It is easy and instructive to compare present views of the glacier with older images that are widely available in books and on postcards. The upper basin of the Rhone Glacier is only seen by climbers and serious hikers, but it feeds into a lower basin just above the Belvedere on the Furka Pass road. There it drops over a considerable glacial step, where its Pleistocene ancestor joined another glacier in from the east. During the cold period of about 1400-1800 AD (the Little Ice Age, or Neoglacial), a piedmont glacier of degrading ice spread over the lower valley floor and reached almost to the present site of the Gletsch Hotel. The ice was still nearly that far down the valley in the early 1800s, but climatic warming then accelerated, and almost the entire piedmont had gone within about 75 years. This loss largely predates photography, so the only images of the piedmont are paintings that may owe a little to artistic licence. In the following 100 years or so, the unstable toe of the glacier that used to hang down the glacial step has also been lost. This retreat has been so rapid that the aspect of the glacier from the Belvedere reveals changes that are dramatic just between successive visits by the writer.

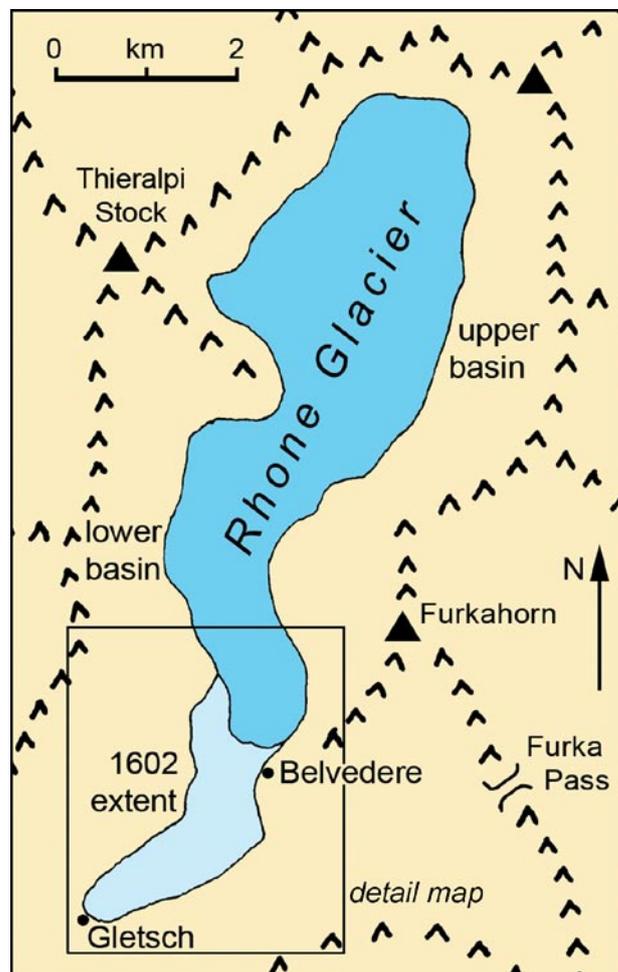


Progressive retreat of the snout of the Rhone Glacier.

Furthermore, the wider view from the Belvedere also reveals a major ice loss within the lower basin. Though the retreat of the Rhone Glacier is singularly well documented, its stepped profile prevents its pattern



The Rhone Glacier seen from above Gletsch, on a postcard from 1932 and as it is today.



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being directly or simply related to global warming. However it is still in retreat, so perhaps now is the time for young geomorphologists to go and take their own photographs from the Belvedere, to match with more images when they are much older.

Not far from the Rhone Glacier, another glacial feature reveals dramatic change, and rewards a spectacular but easy day's walk around the Eggishorn (reached by the cable car up from Fiesch). Surely many of the more mature readers of *Geology Today*, were, like the writer, brought up on a diet that included Arthur Holmes' classic book on physical geology. Alongside stories of England's many Pleistocene ice marginal lakes that were ringing in his ears, the writer has childhood memories of Arthur Holmes' reference to the Marjelensee, a beautiful but much smaller ice-dammed marginal lake on the edge of the Aletsch Glacier. Sadly it was nearly 50 years before the writer got to walk round the Eggishorn to see the lake for himself - only to find it gone. The Aletsch Glacier is still there (with its snout another 8 km down-valley), though its level has declined somewhat, and the Marjelen stream just flows away into its marginal crevasses. The lake has been lost due to opening up of fissures and caves within or beneath the glacier, to provide an outlet route. Though some loss of ice pressure may allow the glacier to float more easily on input lake water, the lake's drainage may equally be due to chance changes within the glacier's internal hydrology. It was after all a remarkable balancing act to keep the lake impounded in the past, with input from its own valley drainage just matching the outflow through the glacier. A descendent of the Marjelen does appear on modern maps, but it is only a small pool behind moraine in a rocky hollow - no match for that lovely ice-dammed lake that was such an evocative analogy for schoolboy geomorphologists.



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Left: Recent loss of ice volume from the lower basin of the Rhone Glacier; the upper basin is out of sight to the right.

Above: Retreat of the front of the Rhone Glacier over the last 27 years, as seen from the Belvedere.

Below: The demise of the Marjelensee, seen on an old postcard and not seen today.

