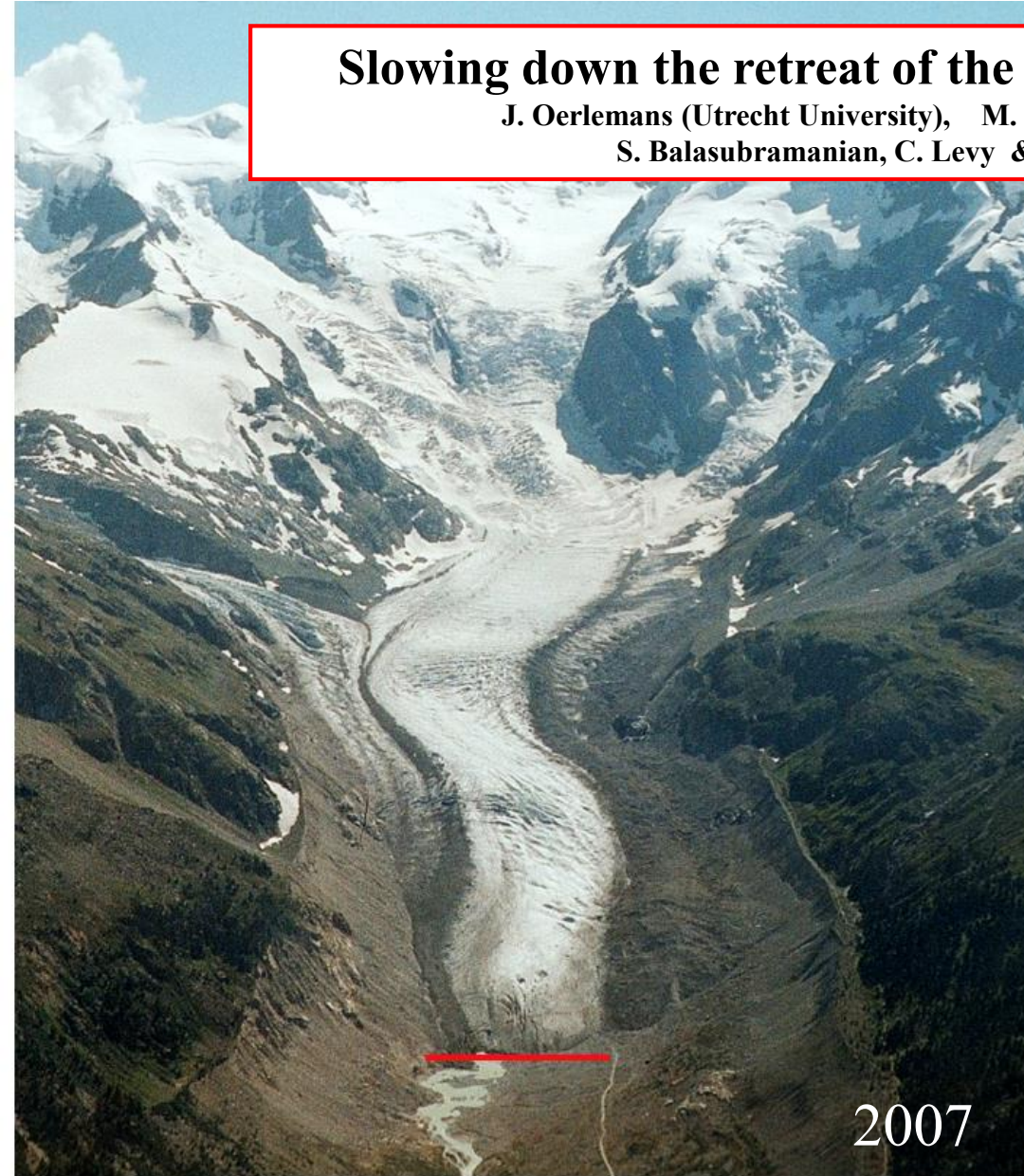
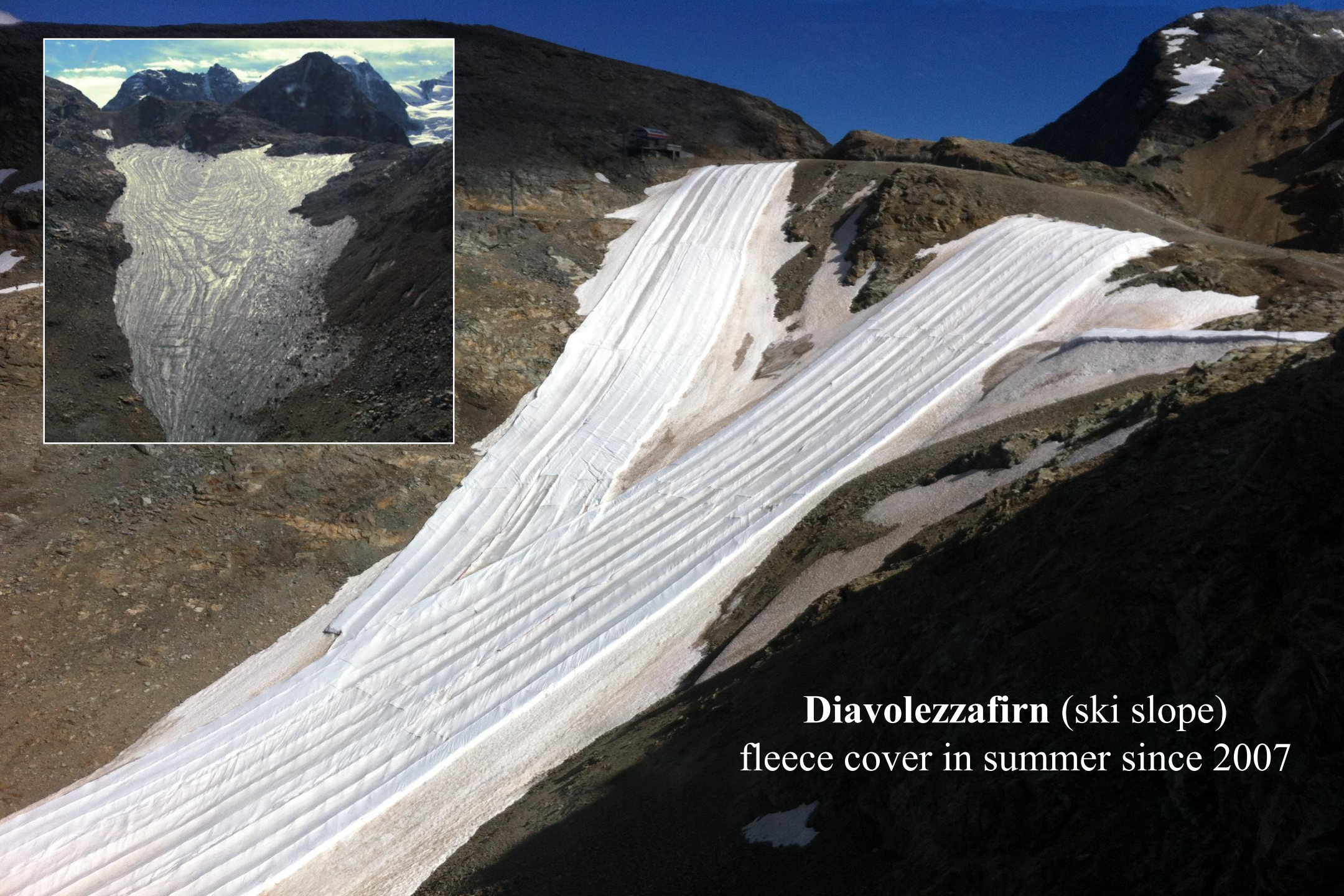


Slowing down the retreat of the Morteratsch glacier, Switzerland

J. Oerlemans (Utrecht University), M. Haag (Fachhochschule Nordwestschweiz),
S. Balasubramanian, C. Levy & F. Keller (Academia Engiadina)



Photos taken from a glider by Christine Levy



Diavolezzafirn (ski slope)
fleece cover in summer since 2007



Fleece cover is impossible because of:

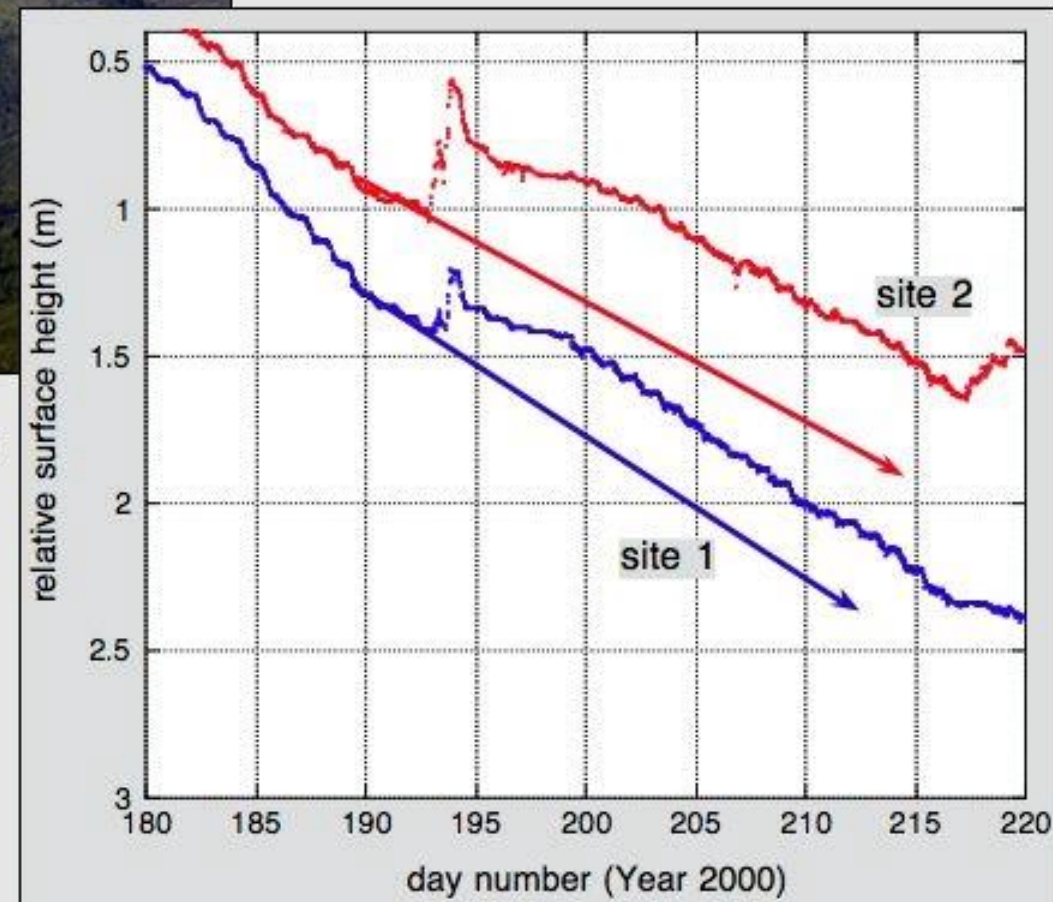
- scale
- ice movement

C. Levy, 1 August 2017



On 10 July 2000 (day 192), a cold front swept from the northwest into central and southern Europe. In the cold air behind the front there was widespread shower activity for several days, bringing heavy precipitation over the central Alps and snow above 1800 m.

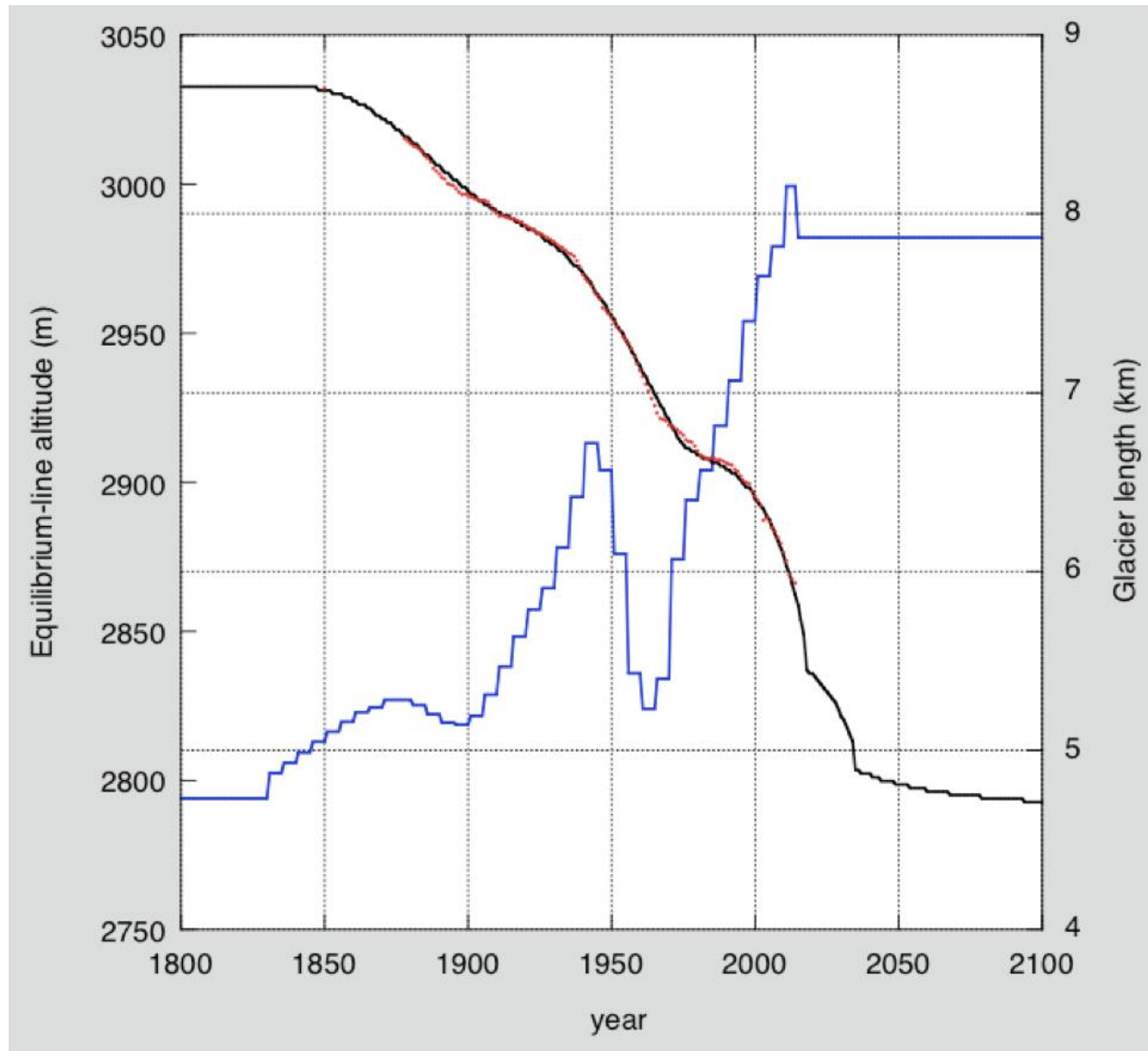
The sonic rangiers at site 1 (at ~2100 m) and site 2 (at ~2600 m) clearly show the interruption of the melt process by the snow event. Note the daily cycle in the melt rates.



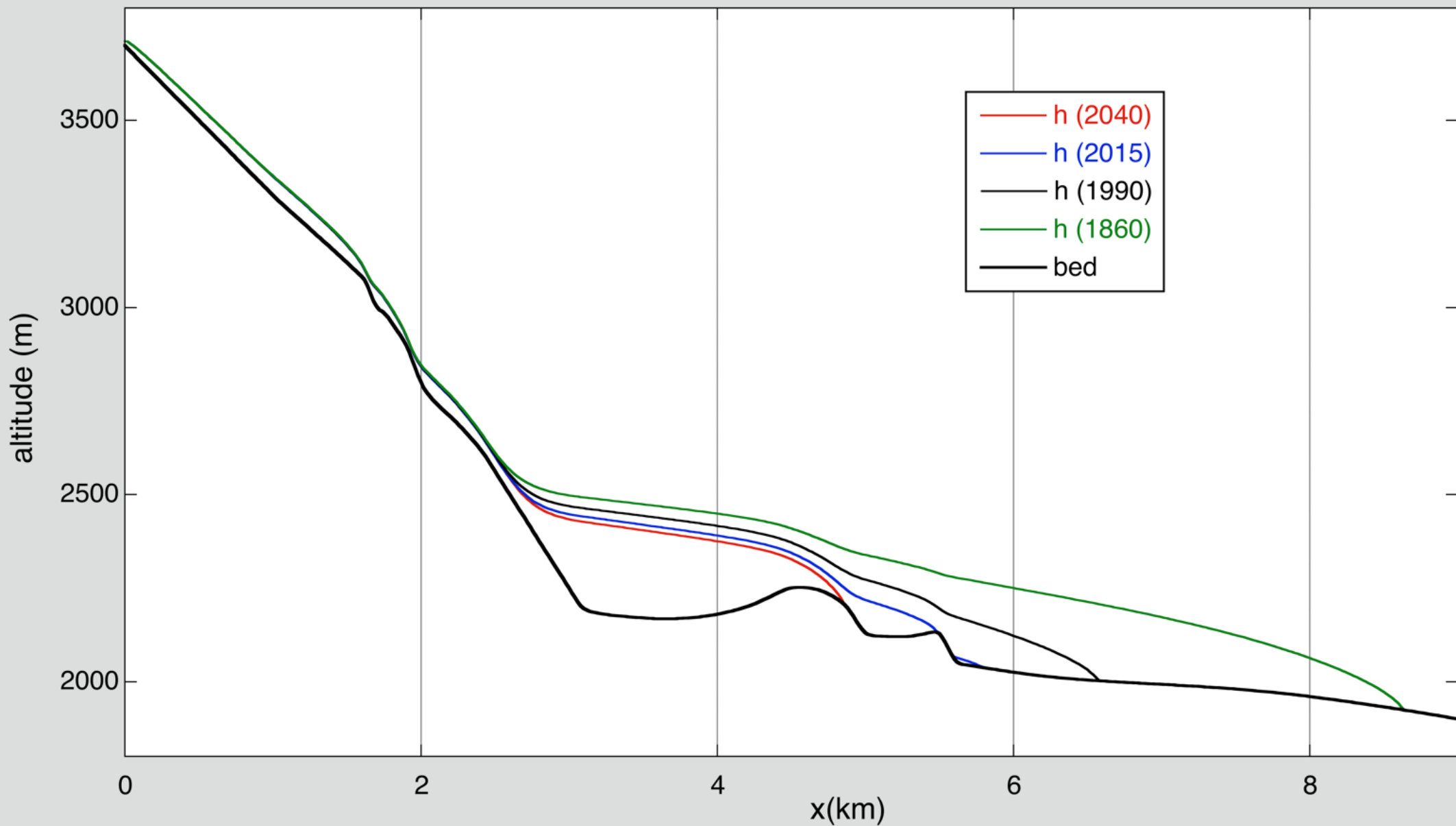
Calibration of **glacier model**
against length observations since
year 1850

Reference run with 'no climate
change':

$$E_{\text{future}} = E_{2001-2015}$$



Reference run with 'no climate change': $E_{\text{future}} = E_{2001-2015}$



Piz Bernina 4049 m

AWS

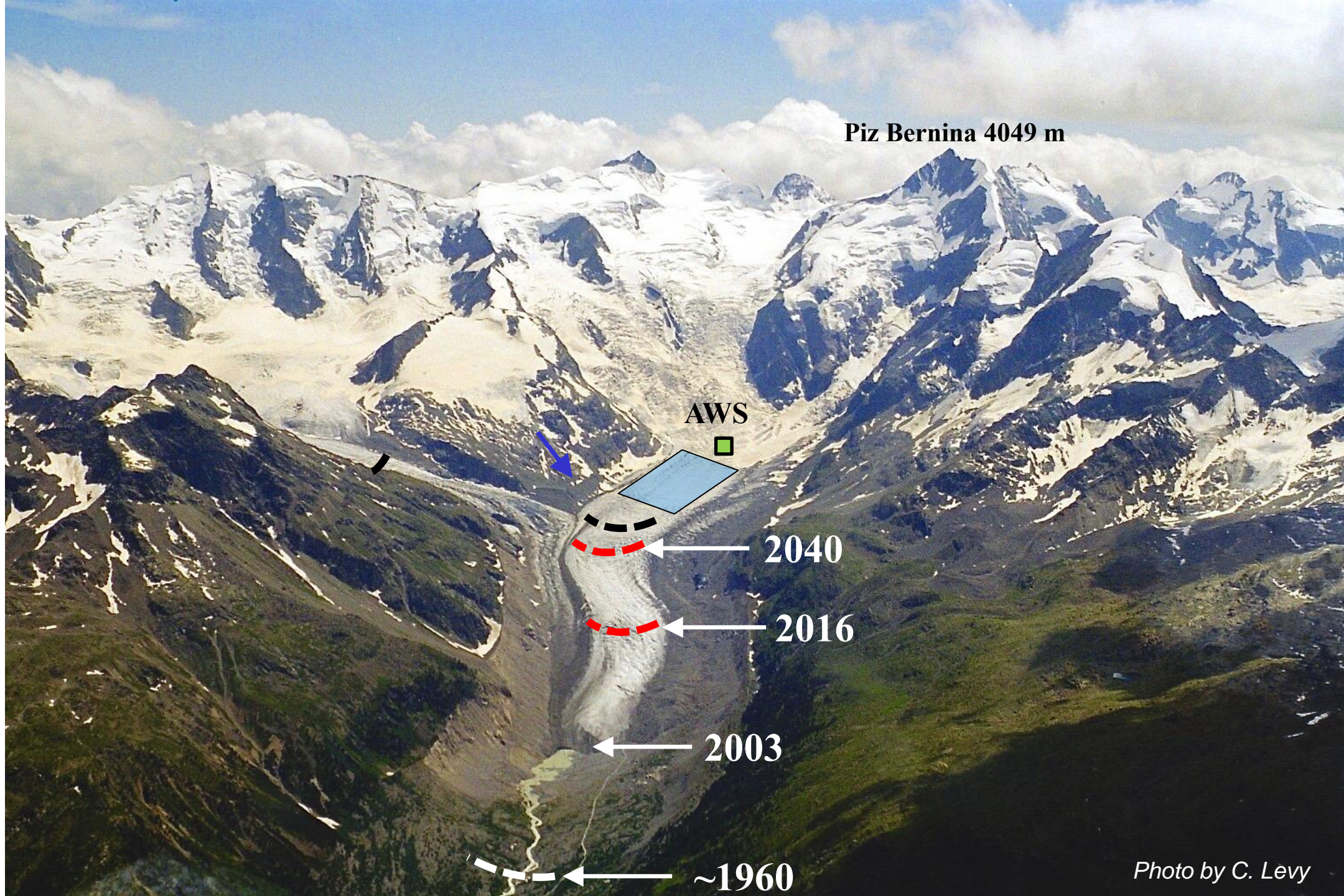
2040

2016

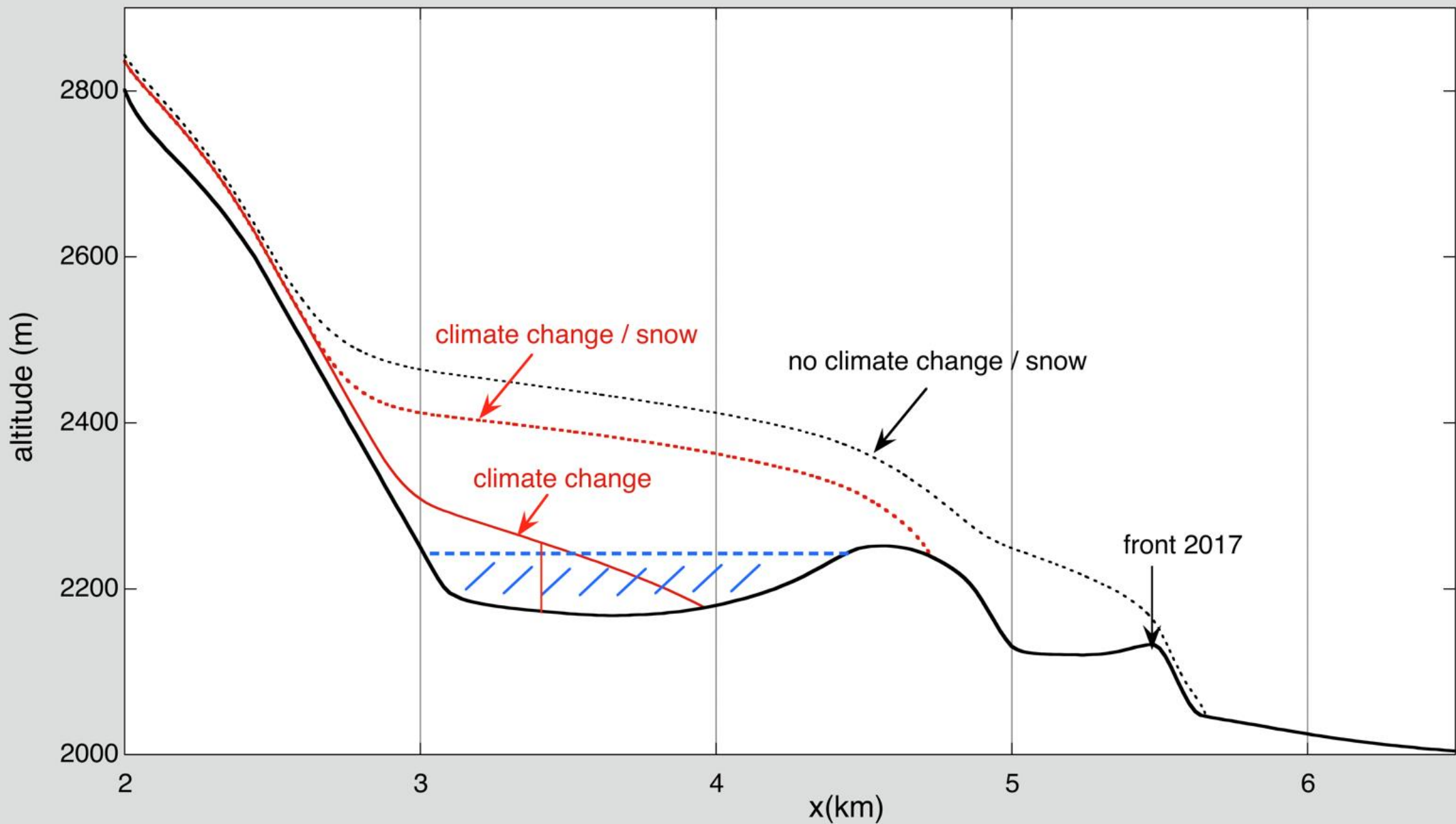
2003

~1960

Photo by C. Levy



Profiles for the year 2100

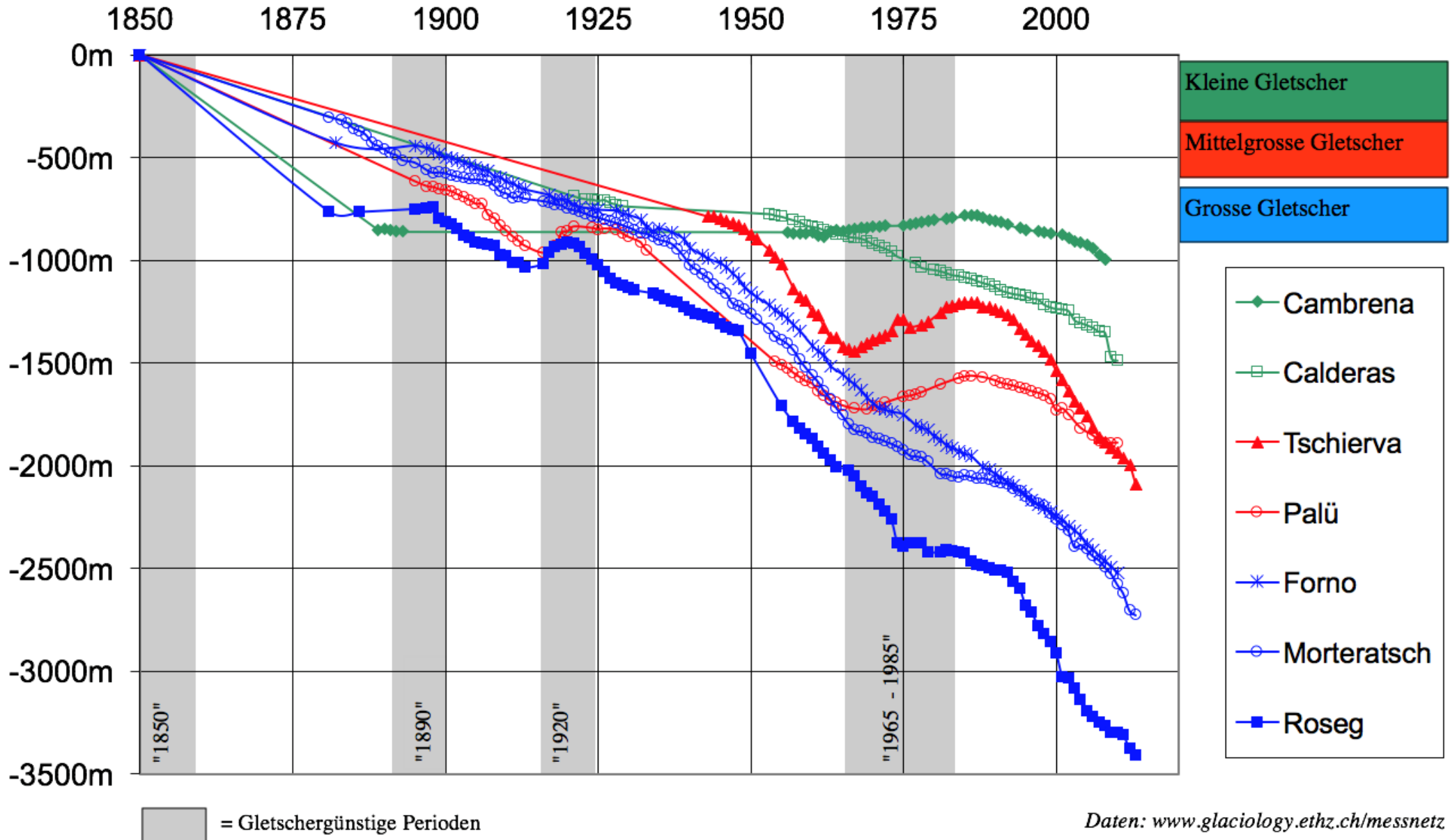


Slowing down the retreat of the Morteratsch glacier

- preventing ice melt by artificial snow is the best option
- effort is large – effect is modest
- availability and transport of water is probably the limiting factor



Zungenlängenänderungen und Klimasignale



☐ = Gletschergünstige Perioden

Daten: www.glaciology.ethz.ch/messnetz

Slowing down the retreat of the Mortieratsch glacier

In conclusion

- preventing ice melt by artificial snow is the best option
- effort is large – effect is modest
- availability of water is probably the limiting factor