

I ghiacciai cambiano, cambiano i rischi: la situazione in Valle d'Aosta

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TIPOLOGIE DI RISCHI GLACIALI



Instabilità
gravitative in
ghiaccio:

Crolli di
seracchi



Instabilità
gravitative in
ghiaccio:

Destabilizzazioni
di ghiacciai
temperati



Instabilità
idrauliche:

GLOF

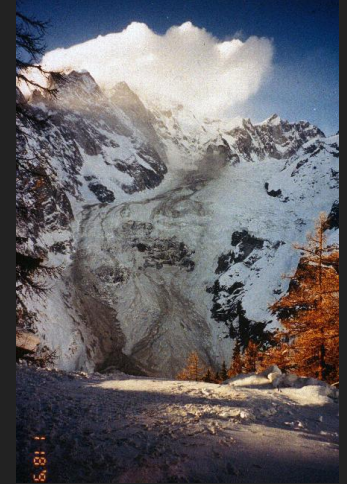
Laghi marginali e
supraglaciali



Instabilità
idrauliche:

GLOF

Laghi subglaciali e
intraglaciali



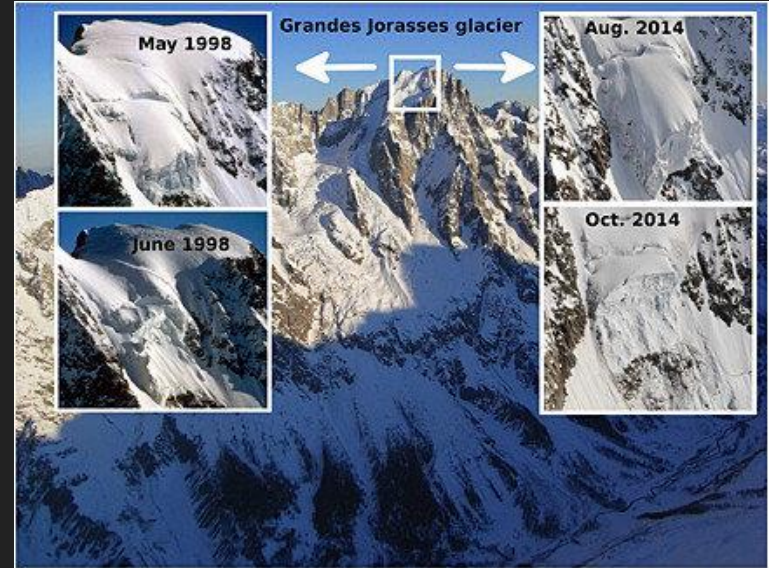
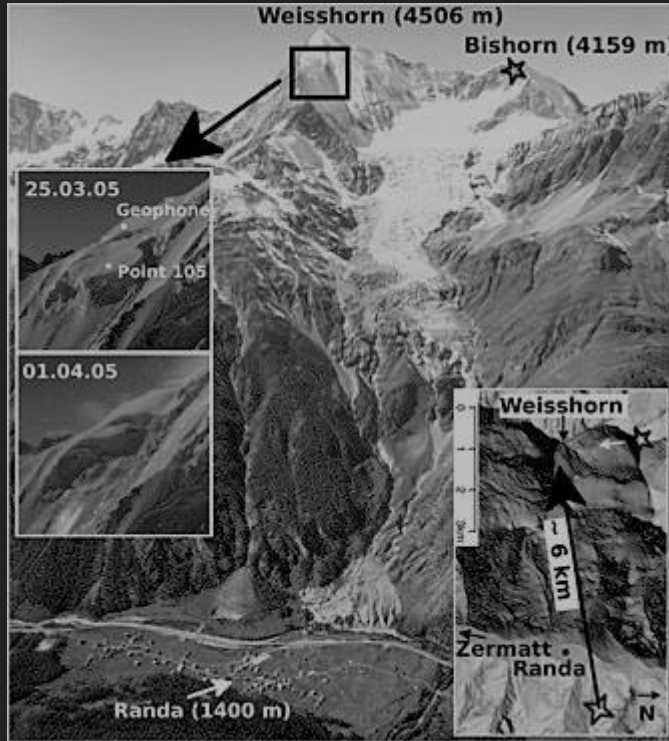
Fenomeni misti:

Rock-ice
Avalanches

Cascading events

TIPOLOGIE DI RISCHI GLACIALI

Casi studio di riferimento: Weisshorn 2005 (CH) – G. Jorasses 1998 (IT)



Instabilità
gravitative in
ghiaccio:

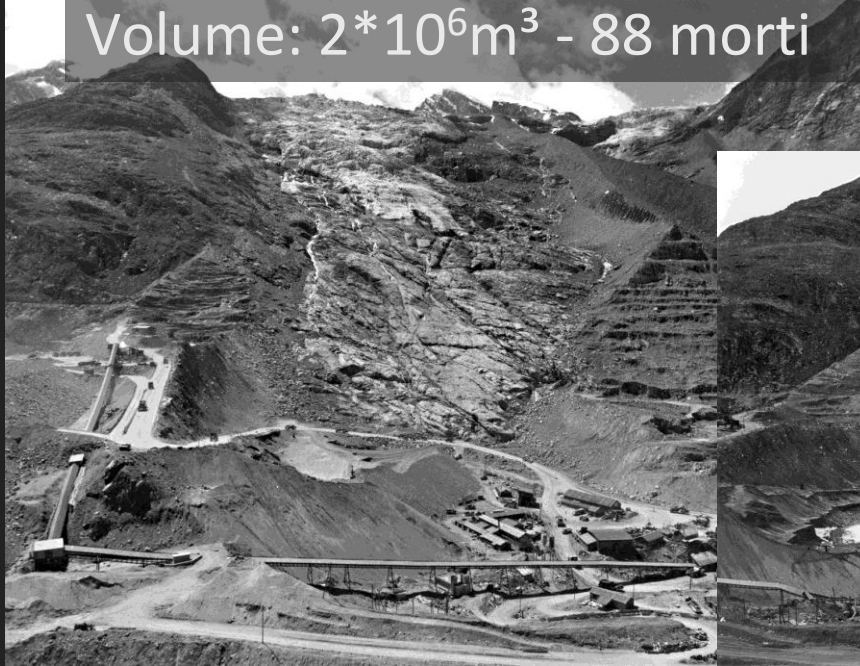
Crolli di
seracchi

Riferimenti: Faillettaz, Jerome & Funk, Martin & Vincent, Christian. (2015). Avalanching glacier instabilities: Review on processes and early warning perspectives. Reviews of Geophysics. 53. 203-224. 10.1002/2014RG000466.

TIPOLOGIE DI RISCHI GLACIALI

Caso studio di riferimento: Ghiacciaio dell' Allalin (CH) - 1965

Volume: $2 \cdot 10^6 \text{m}^3$ - 88 morti



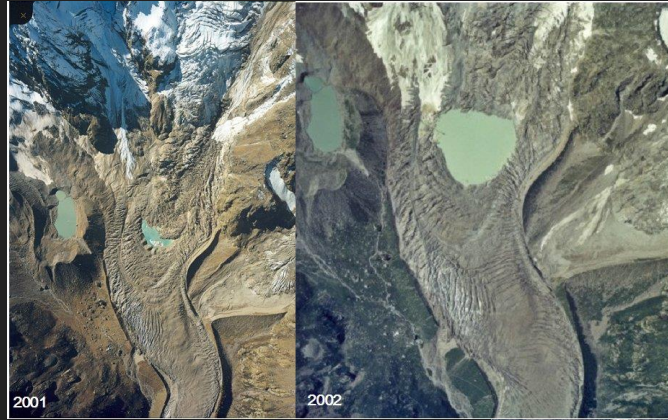
Instabilità
gravitative in
ghiaccio:

Destabilizzazioni
di ghiacciai
temperati

Faillietaz, Jerome & Funk, Martin & Sornette, Didier. (2012). Instabilities on Alpine temperate glaciers: New insights arising from the numerical modelling of Allalingletscher (Valais, Switzerland). *Natural Hazards and Earth System Sciences*. 12. 2977-2991. 10.5194/nhess-12-2977-2012.

TIPOLOGIE DI RISCHI GLACIALI

Caso studio di riferimento: Lago del Belvedere 2003 – Rocciamelone 2004



Instabilità
idrauliche:

GLOF

Laghi marginali e
supraglaciali

Riferimento: Huggel, Christian & Käab, Andreas & Haerberli, Willy & Mortara, G. & Chiarle, M. & Epifani, F.. (2002).
Glacier Instability, Rapid Glacier Lake Growth and Related Hazards at Belvedere Glacier, Macugnaga, Italy. AGU Fall Meeting Abstracts.

TIPOLOGIE DI RISCHI GLACIALI

Caso studio di riferimento: Tete Rouse 1892



Instabilità
idrauliche:

GLOF

Laghi subglaciali e
intraglaciali



Vincent, C., Desclotres, M., Garambois, S., Legchenko, A., Guyard, H., & Gilbert, A. (2012). Detection of a subglacial lake in Glacier de Tête Rouse (Mont Blanc area, France). *Journal of Glaciology*, 58(211), 866-878. doi:10.3189/2012JoG11J179

TIPOLOGIE DI RISCHI GLACIALI

Caso studio di riferimento: Brenva 1997



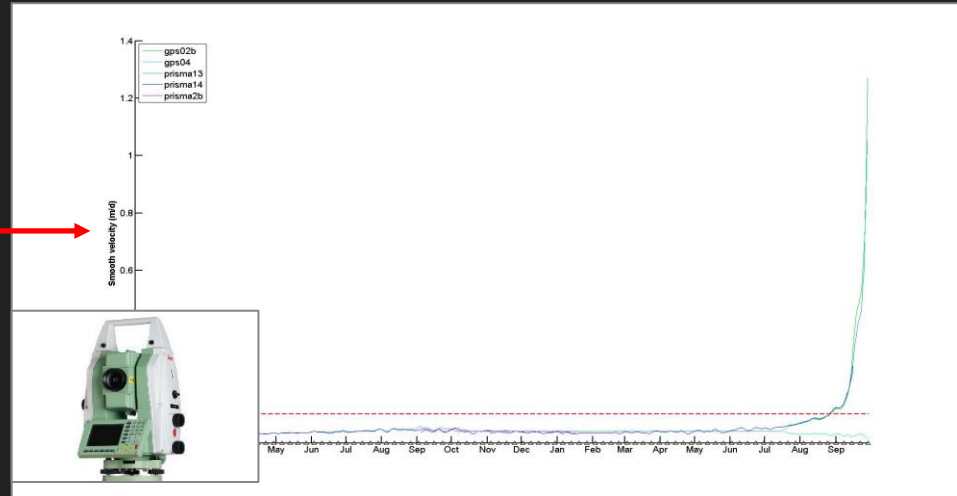
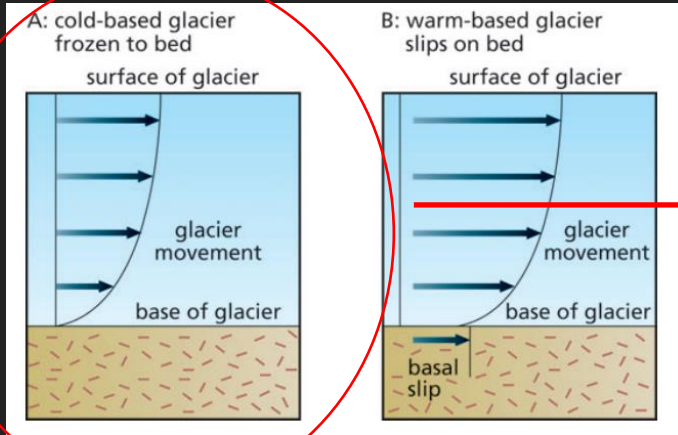
Fenomeni misti:

Rock-ice
Avalanches

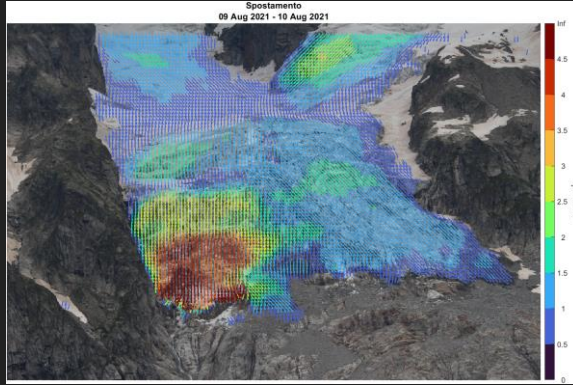
Cascading events

Riferimenti: Giani, G., Silvano, S., & Zanon, G. (2001). Avalanche of 18 January 1997 on Brenva glacier, Mont Blanc Group, Western Italian Alps: An unusual process of formation. *Annals of Glaciology*, 32, 333-338. doi:10.3189/172756401781819157

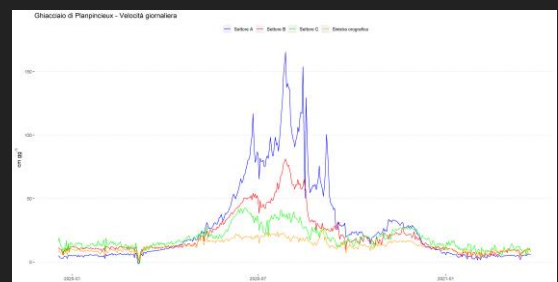
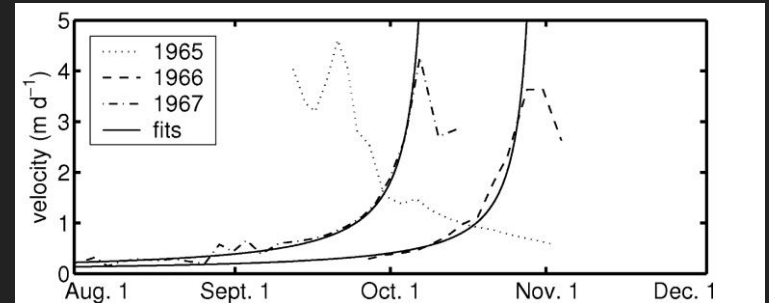
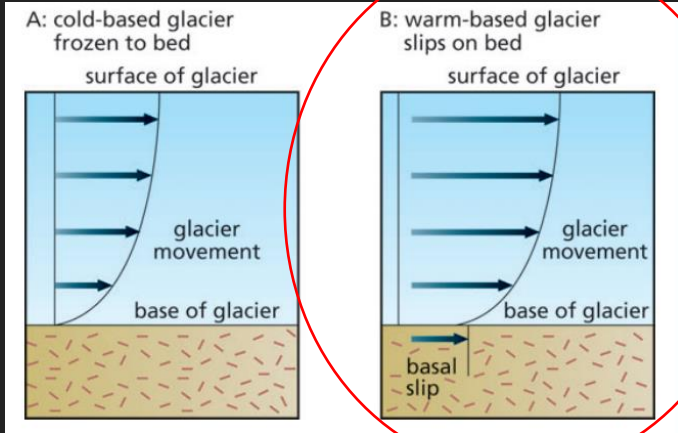
Instabilità gravitative in ghiaccio: Crolli di seracchi



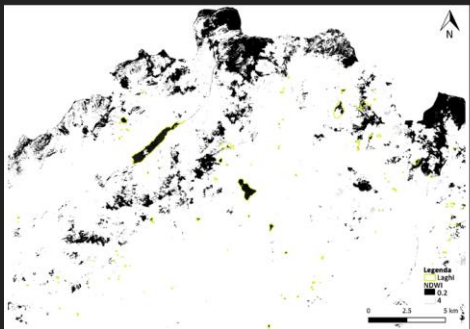
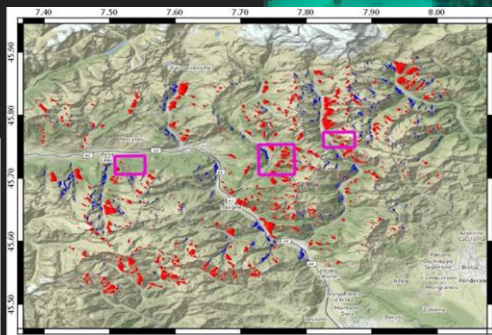
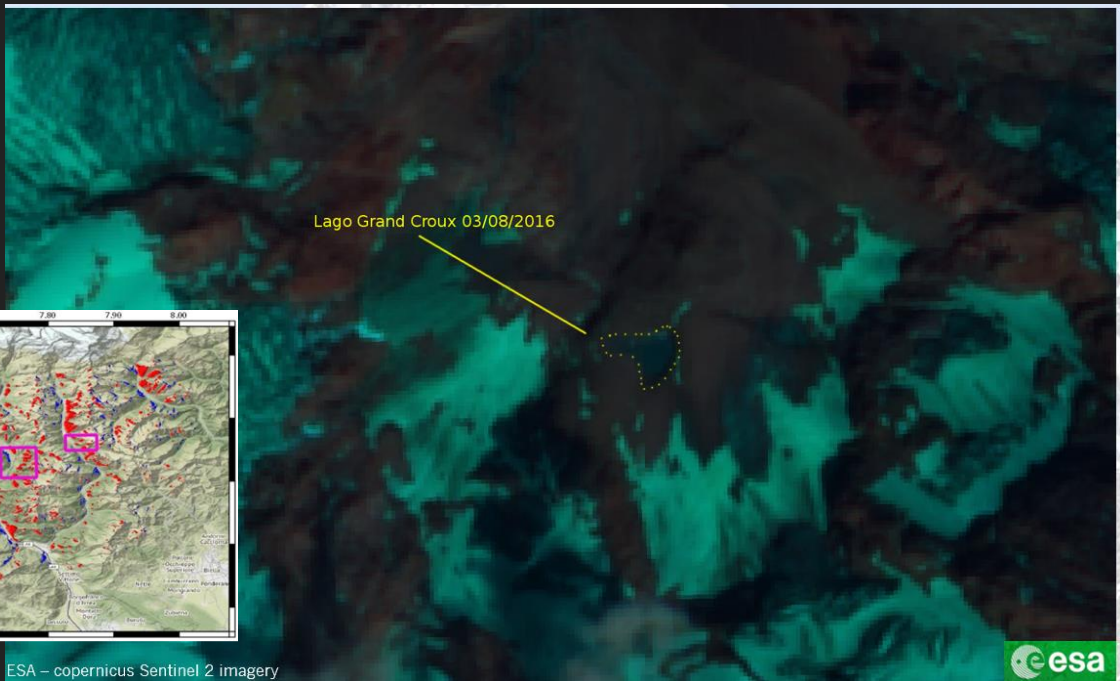
Instabilità gravitative in ghiaccio: destabilizzazioni ghiacciai temperati



Planpinceux - Valanga 21 dic. 1952 - ramo orient. Chiesa e Chalet Proment intatti (I. Cerutti)

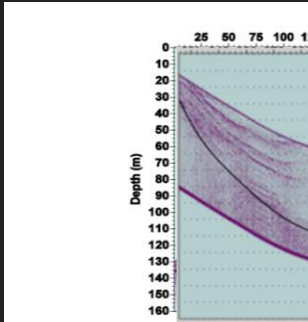
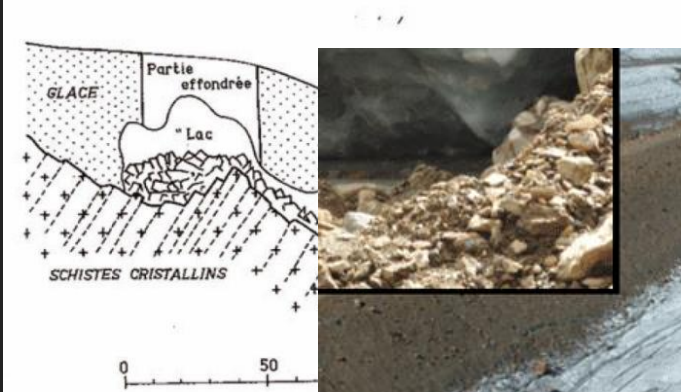
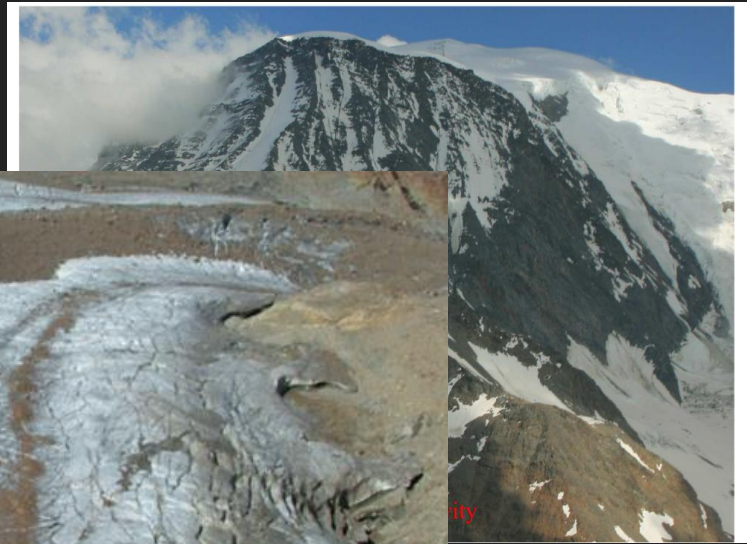


Instabilità idrologiche: laghi marginali / supraglaciali



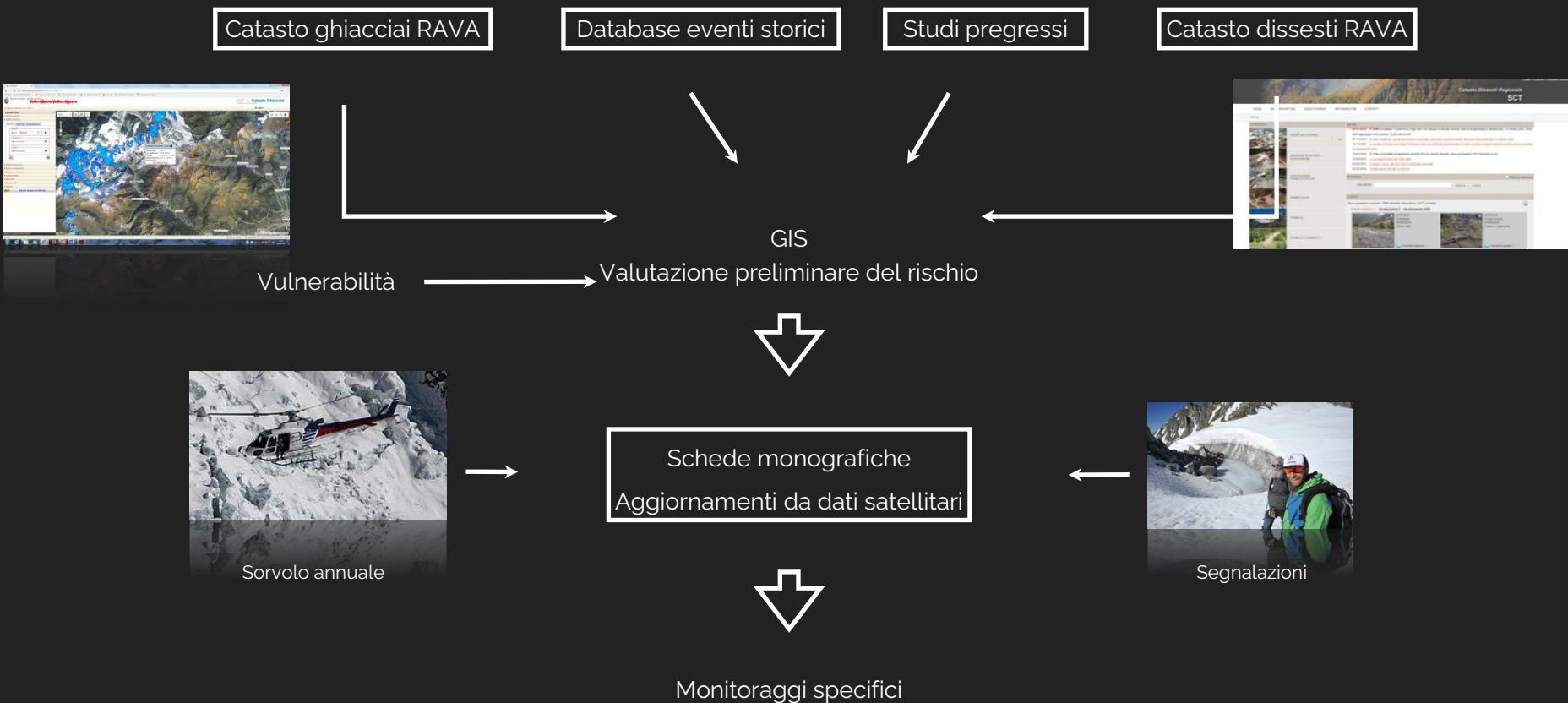
ESA – copernicus Sentinel 2 imagery

Instabilità idrologiche: laghi subglaciali / intraglaciali



Nat. Hazards Earth Syst. Sci., 18, 1055–1071, 2018
<https://doi.org/10.5194/nhess-18-1055-2018>
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Water ? Rocks into glacier ?





Sperone
della Brenva



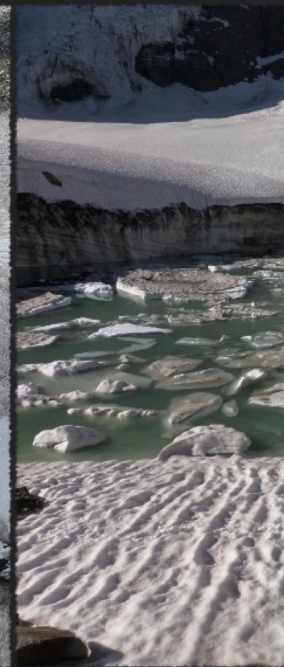
Seracco Whimper
(Grandes
Jorasses)



Ghiacciaio di
Planpincieux



Ghiacciaio di
Chérillon



Lago glaciale del
Gran Croux

SPECIFIC MONITORING SITES







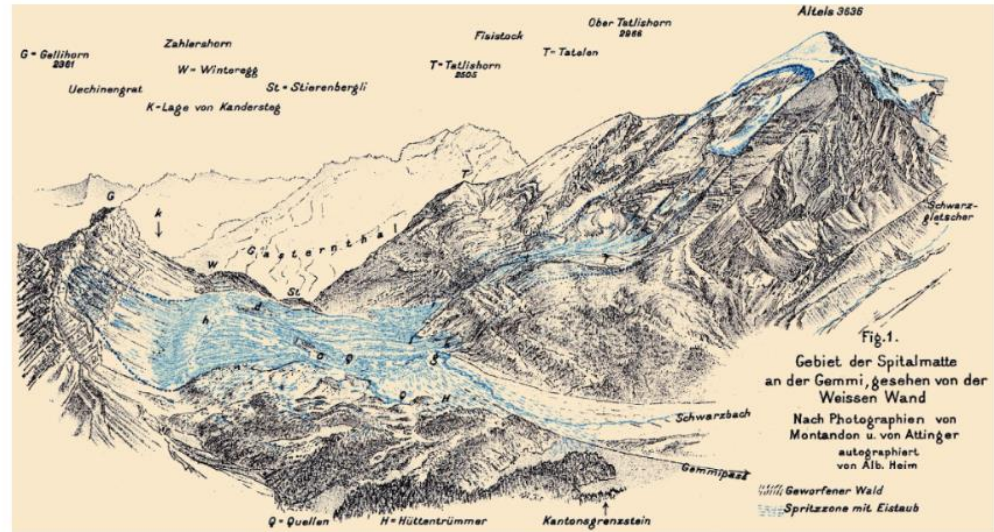


CLIMATE WARMING AND STABILITY OF COLD HANGING
GLACIERS:
LESSONS FROM THE GIGANTIC 1895 ALTELS BREAK-OFF

J. FAILLETTAZ, D. SORNETTE, AND M. FUNK



FIGURE 2. Alteis glacier before and after its break-off (Photo P. Montandon, 25 November 1894 and 15 September 1895; Archiv des Alpiner Museums Bern)



https://doi.org/10.5194/tc-2020-243

Preprint. Discussion started: 22 October 2020

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2 Sudden large-volume detachments of low-angle mountain glaciers – more frequent than thought

4

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Frank Paul³, Simon Gascoïn¹², Etienne Berthier¹³, Jeff Kargel^{14,15}

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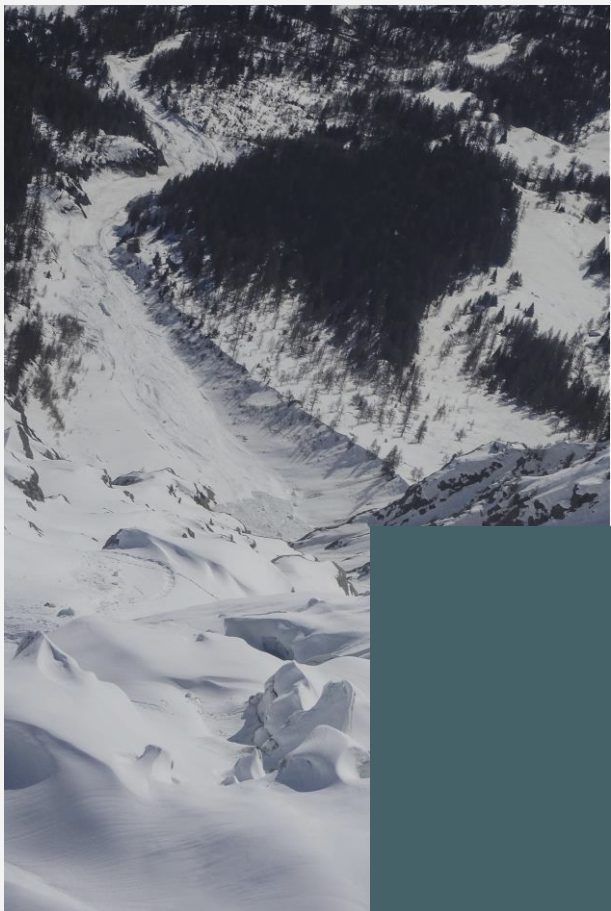
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Thank you for your
attention!

GRAZIE PER L'ATTENZIONE