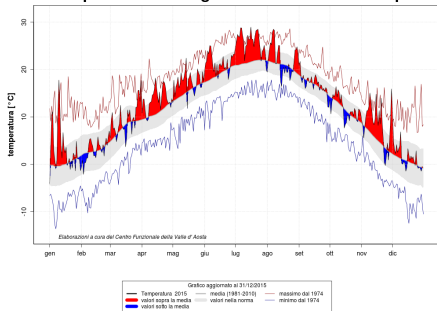


Outline for section 1

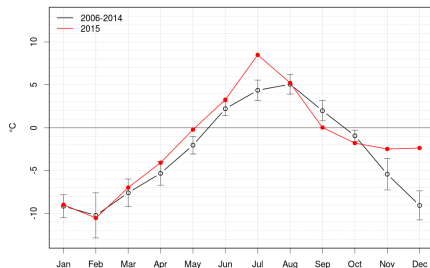
- 1 Meteorological Conditions
 - Air Temperature
 - Precipitation
- 2 Permafrost response
 - Slope - Cime Bianche
 - Rock Walls - Matterhorn
 - Rock Glacier - Gran Sometta
- 3 Conclusions



Temperatura media giornaliera - Saint-Christophe



Cime Bianche - AIRT



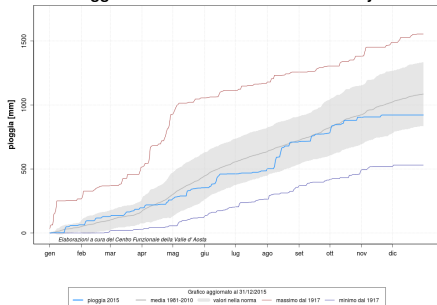
- Winter and Spring: **warm**, most values above the mean
- Summer: **extremely hot** from the end of June to mid August
- Autumn: **extremely hot** from November to mid December

Outline for section 1

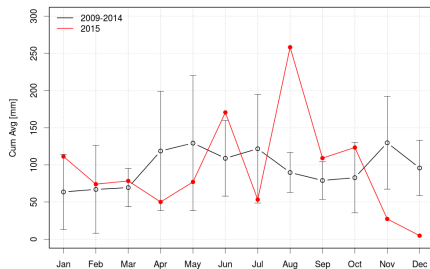
- 1 Meteorological Conditions
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Pioggia totale da inizio anno - Gressoney L.T.



Cime Bianche - Prec.



- Winter and Spring: **on average** until end March, **dry** during April and May
- Summer: **extremely dry** from mid June to begin of August
August 2015 the second wettest since the late nineteenth century!
- Autumn: **extremely dry** during November and December



Outline for section 2

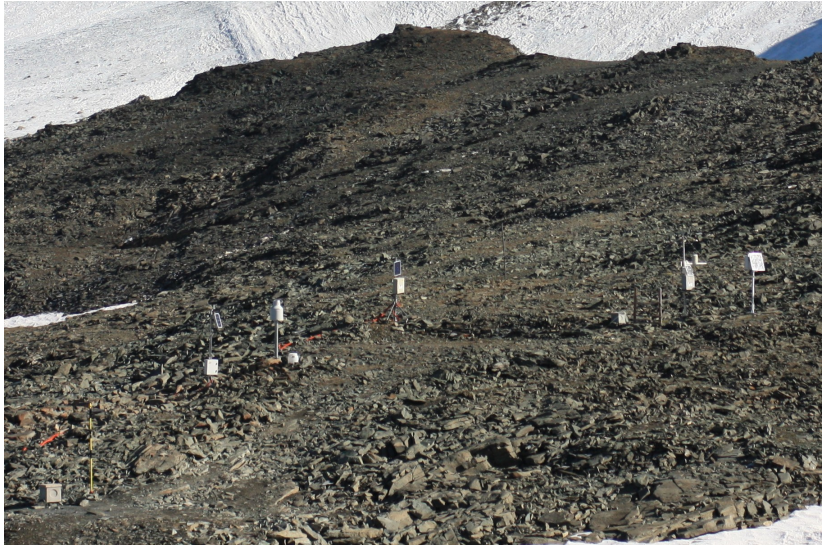
- 1 Meteorological Conditions
 - Air Temperature
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 - Slope - Cime Bianche
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- 3 Conclusions



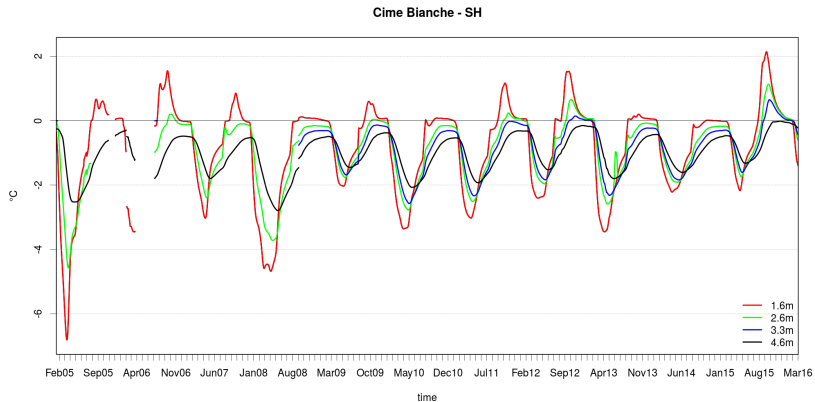
Cime Bianche monitoring site (3100 m)



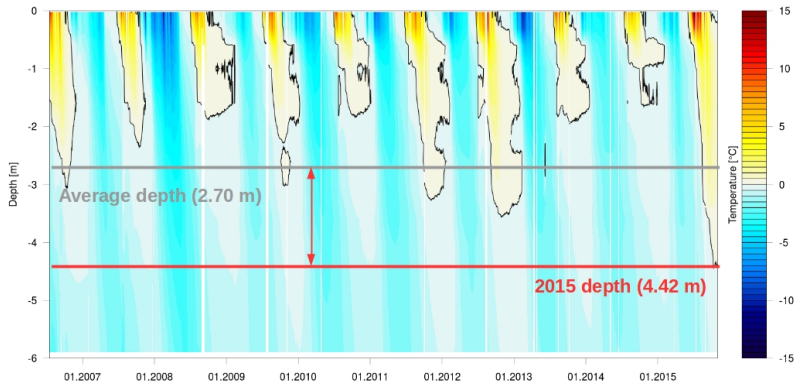
Cime Bianche monitoring site (3100 m)



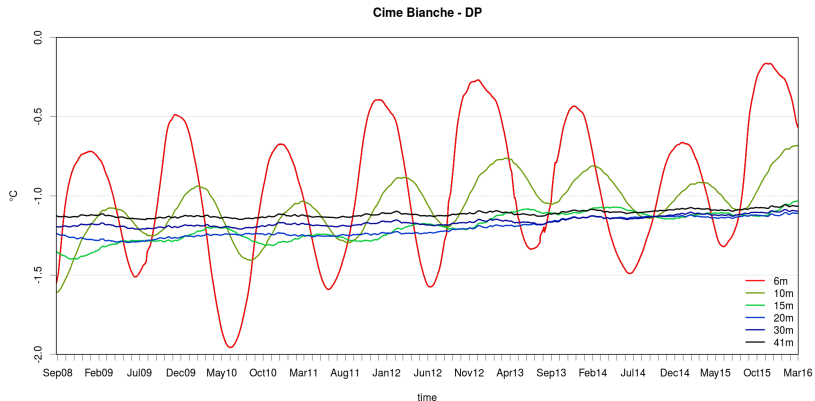
Borehole SH (from 0 to 6 meters)



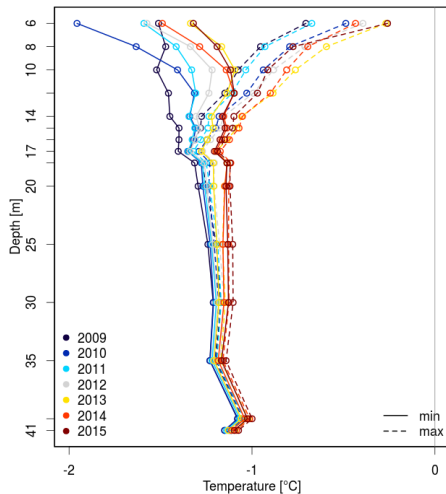
Borehole SH (from 0 to 6 meters)



Borehole DP (from 6 to 40 meters)



Borehole DP (from 6 to 40 meters)

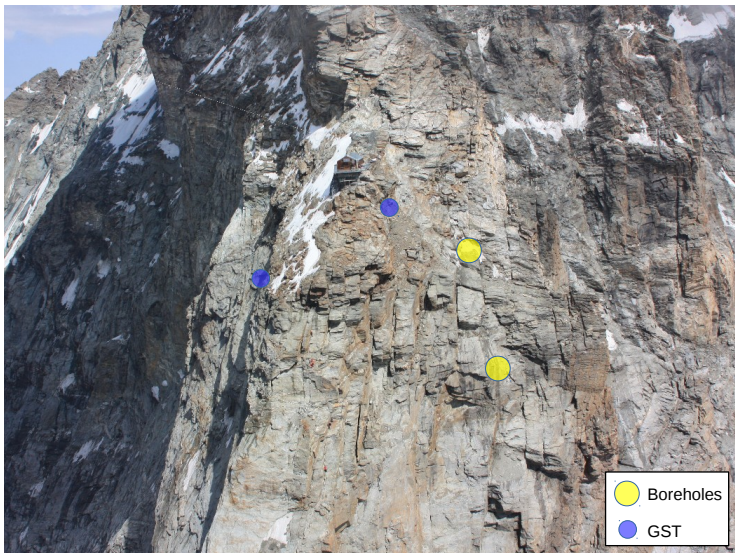


Outline for section 2

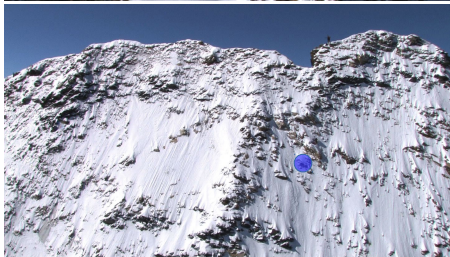
- 1 Meteorological Conditions
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- 3 Conclusions



Capanna Carrel monitoring site (3800 m)

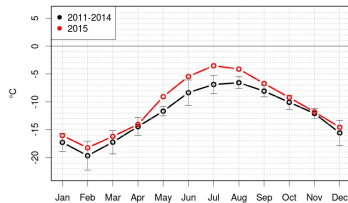


Matterhorn Summit monitoring site (4450 m)

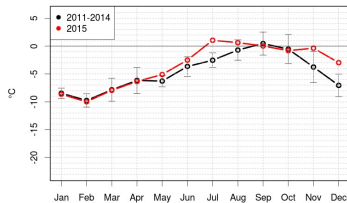


Ground Surface Temperatures

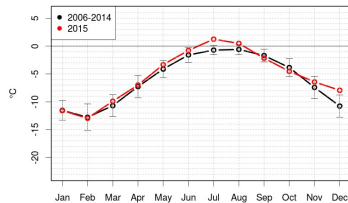
Deviation from reference monthly mean - VCN



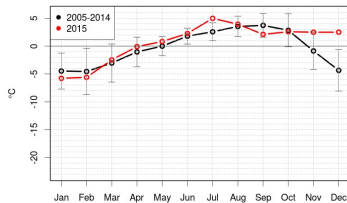
Deviation from reference monthly mean - VCS



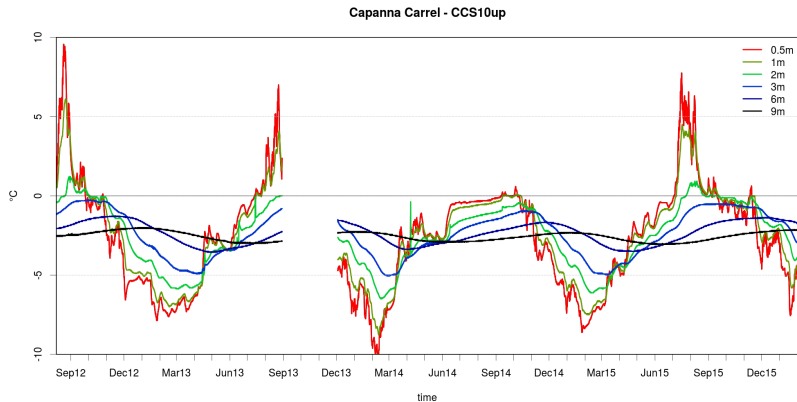
Deviation from reference monthly mean - CCW



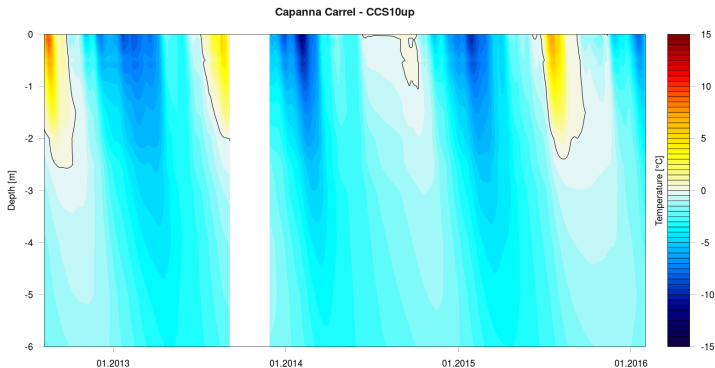
Deviation from reference monthly mean - CCS



Deep Boreholes (10m) and ALT



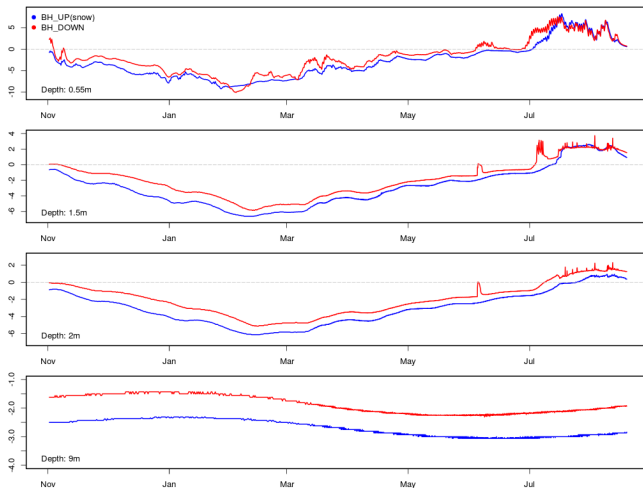
Deep Boreholes (10m) and ALT



2012, 2.5m
2013, 2.0m
2014, 1.0m
2015, 2.4m



Effect of thin and persistent snow cover



Outline for section 2

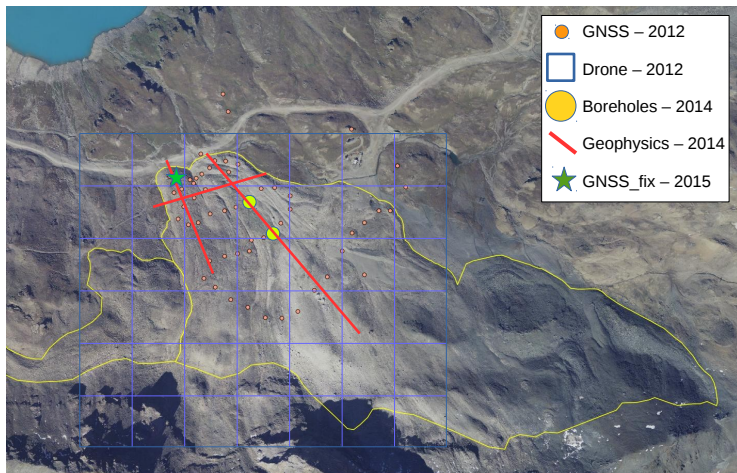
- 1 Meteorological Conditions
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Gran Sometta monitoring site (2700 m)

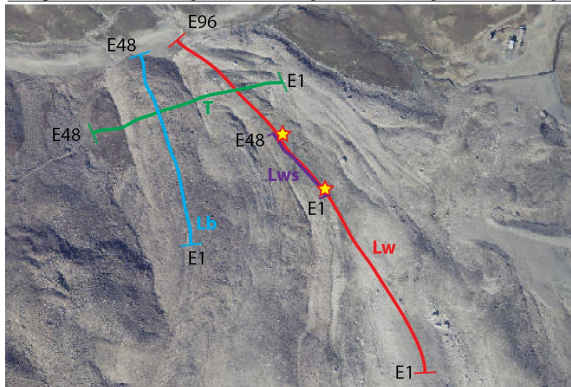


Gran Sometta monitoring site (2700 m)

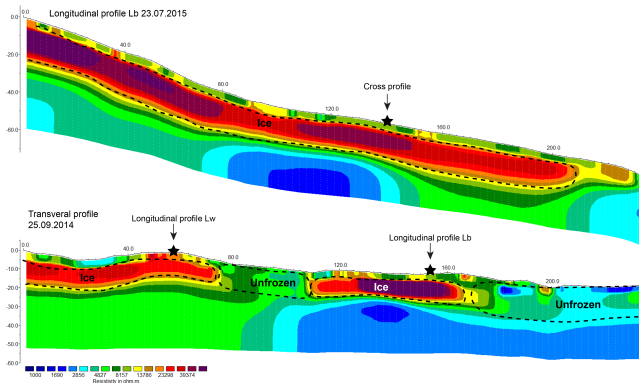


Geophysics (by Uni.Fribourg)

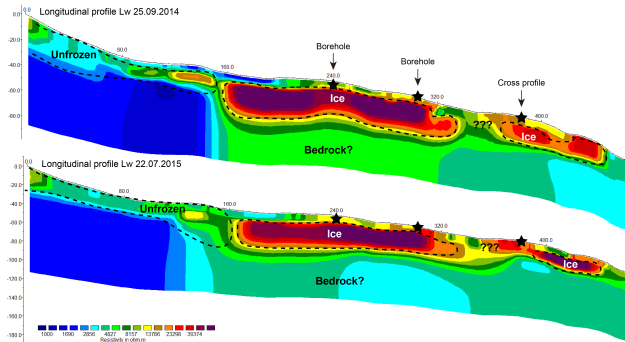
	Lw (bianco)	Lws (bianco small)	Lb (nero)	T (trasversale)
Date	25.09.2014 22.07.2015	23.07.2015	23.07.2015	25.09.2014
Spacing	5m (in 2014) 10m (in 2015)	2m	5m	5m
Electrodes	96 (in 2014) 48 (in 2015)	48	48	48
Length	470m	94m	235m	235m
Configuration	Wenner-Schlumberger	Wenner-Schlumberger	Wenner-Schlumberger	Wenner-Schlumberger



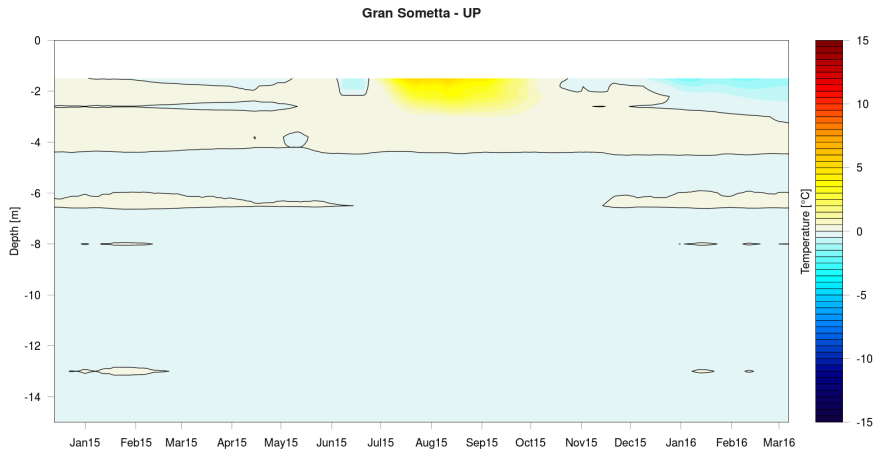
Geophysics - Black Lobe (by Uni.Fribourg)



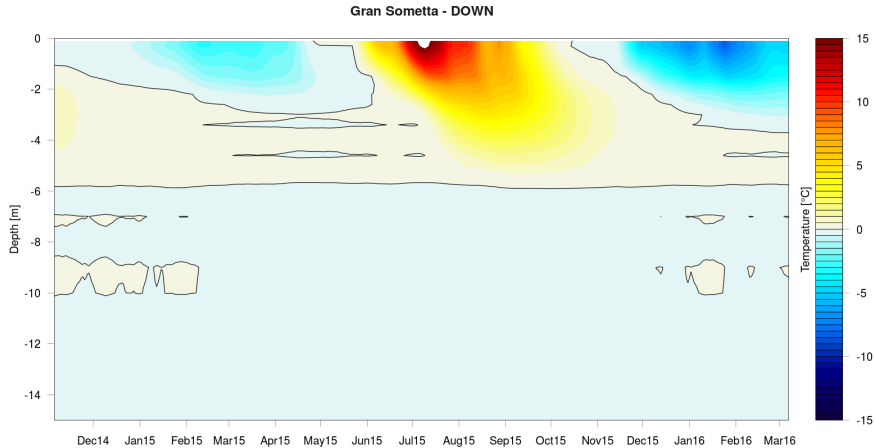
Geophysics - White Lobe (by Uni.Fribourg)



Borehole Temperatures - White Lobe



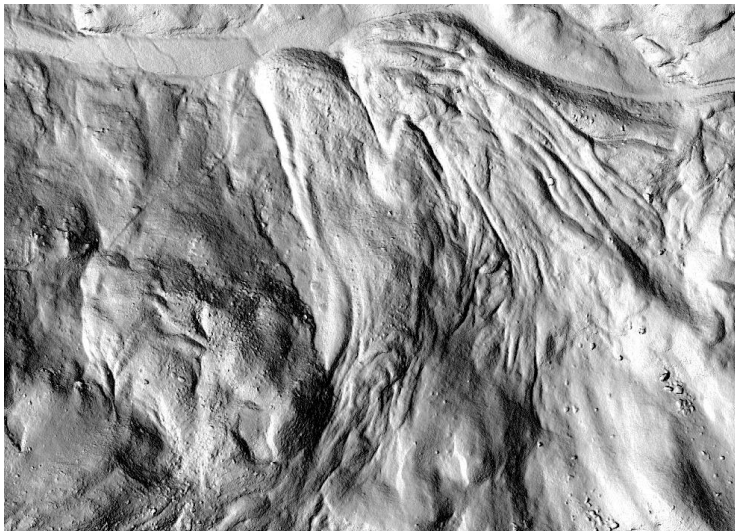
Borehole Temperatures - White Lobe



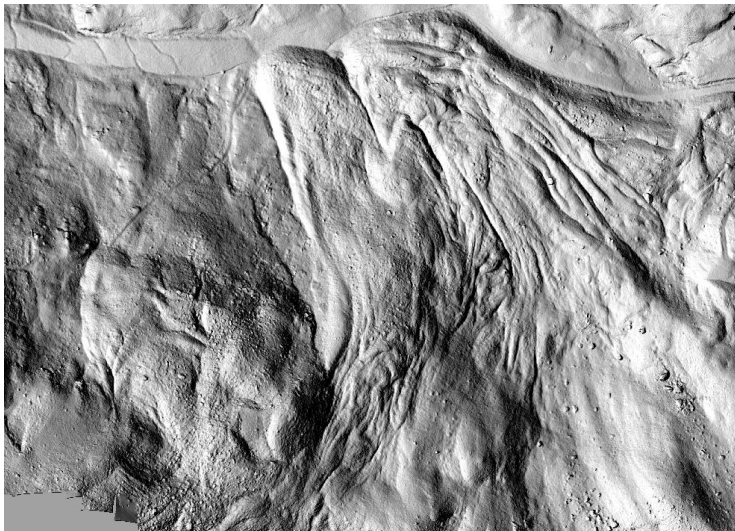
Drone intro



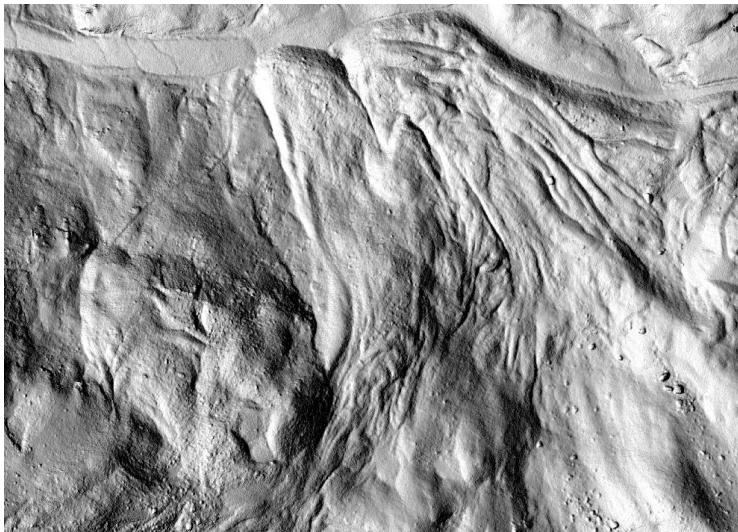
Drone intro - 2012/10



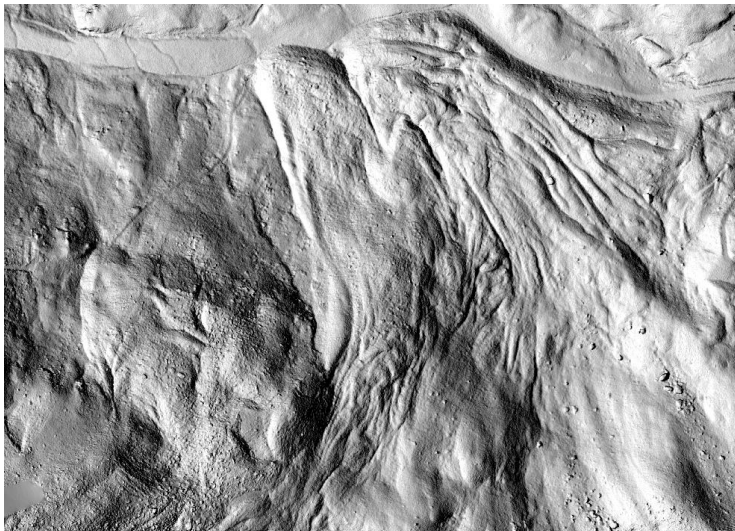
Drone intro - 2014/10



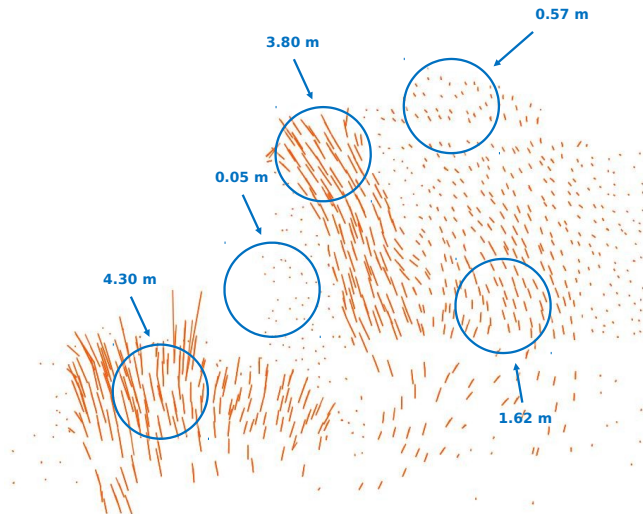
Drone intro - 2015/07



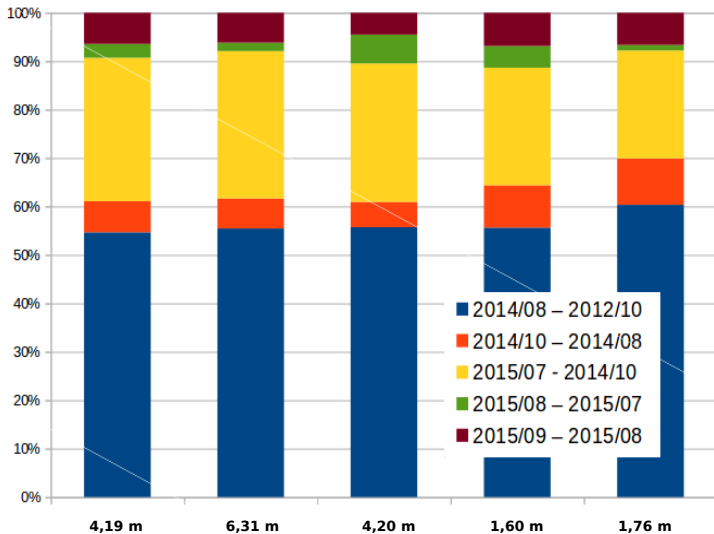
Drone intro - 2015/08



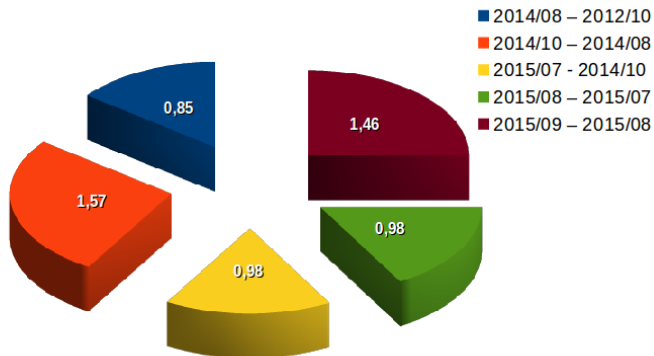
Drone Surface Velocities



Drone Surface Velocities

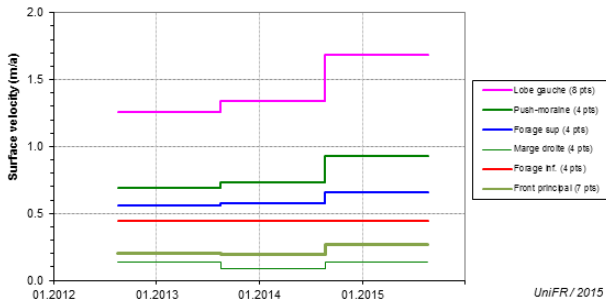


Drone Surface Velocities



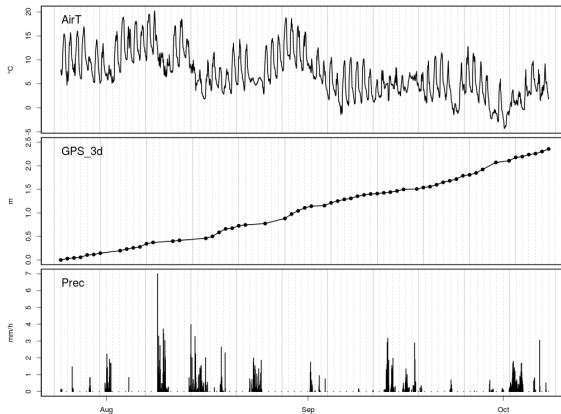
GNSS velocities (by Uni.Fribourg)

Gran Sometta rock glaciers
Annual velocity



Continuous GPS records

75 days



Mean velocity: 3.1 cm/day



Take home message

Effect of the Heatwave 2015 on...

- Cime Bianche: acceleration of permafrost degradation with no consequences for human activities



Take home message

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- Rock walls: increasing of ALT with obvious implications... thin and persistent snow cover effectively reduce the heatwave effect.



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Take home message

Effect of the Heatwave 2015 on...

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Thanks for your attention!!

