



**29.06**

**01.07**

**2018**

# Regional field trip

## Mountain permafrost in the Ecrins massif

### French Alps

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## LOCATION

Ecrins massif (French Alps) : Lautaret Pass, Laurichard rock glacier and Deux Alpes ski resort.

## ORGANIZERS

Philippe Schoeneich, Xavier Bodin and Marco Marcer.

## UNIVERSITIES AND LABS

- Institute for Urban Planning and Alpine Geography, University Grenoble Alpes, France
- EDYTEM lab, CNRS/University Savoie Mont Blanc, France



## DESCRIPTION

The field trip aims at visiting some of the main monitoring sites of the PermaFRANCE network, the French permafrost observing system, mainly : rock glaciers, seasonal frost and borehole sites. It will take place along the Northern side of the beautiful Ecrins massif and National Park. The scientific part will focus on **long term monitoring, impact of climate change on rock glacier dynamics, ski infrastructures on permafrost and on monitoring techniques.**

**Day 1**, excursion to the Laurichard rock glacier, the longest rock glacier monitoring series in the Western Alps (displacement measurements since the 1980's, surface temperatures since 2003), on which various monitoring techniques are tested.

**Day 2**, visit to the monitoring sites on the Deux Alpes ski resort, including the 100 m deep borehole Deux-Alpes-3065 (equipped for fiber optic DTS measurements) and the Bellecombes rock glacier, on which the arrival station of a chair lift is affected by movements.

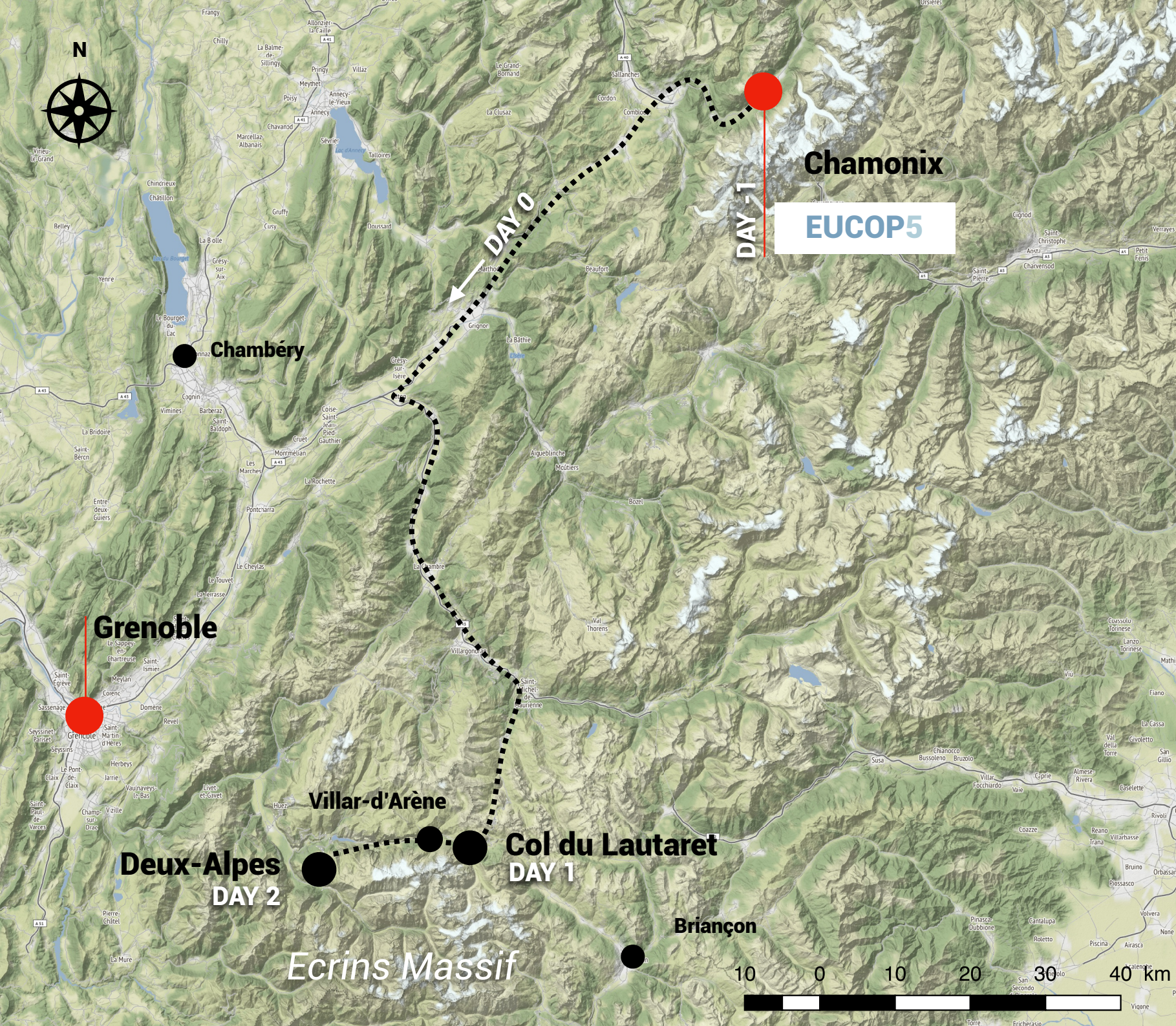
The excursion will take place in alpine environment, most often at altitudes between 2000 and 3000 m a.s.l. A moderate hike is planned on day 1, starting with an ascent of 500 m in elevation (from 2000 to 2500 m a.s.l.). On day 2, we will go by cable car to 3200 m a.s.l, and walk down to 2600 m (*optional: cable car back down to 2600*). Adequate equipment (good hiking shoes and all-weather clothes) and a fit physical condition are expressly required.

## DURATION

29th June to 1st July (return on 1st July afternoon)

## CONTACT

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# Regional Map

Regional map

# Program

## D-1 : Information meeting

Place and time to be defined

## DAY 0

Transfer from Chamonix (France) to Col du Lautaret / Villar d'Arène by bus.

Meeting point at 4.30pm in front of the Chamonix Gare station. Departure from Chamonix at 5:00pm, arrival in Villar d'Arène at 7:00pm. On the way, stop at a seasonal frost monitoring site.

Dinner and overnight in Villar d'Arène (Hôtel Le Faranchin).

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## DAY 1 : Laurichard rock glaciers

Walk from Col du Lautaret (2000 m a.s.l.) to the front of the Laurichard rock glacier (2450 m a.s.l.), about one and a half hour of hiking. All day on the site: presentation of the rock glacier and of the various monitoring techniques and results: geomorphological mapping, geodetical + GPS displacement measurements, LiDAR, automated cameras and photogrammetry, surface temperature measurements, geophysical exploration (ERT and seismics), seismic monitoring. Possibility to hike up to the rooting zone of the rock glacier (200 m additional elevation). This site is the reference site for rock glacier monitoring in the French Alps, and has the longest series in the Western Alps, allowing a good correlation of velocity variations with climate parameters.

In the afternoon: walk back to Col du Lautaret. Possibility to visit the alpine botanical garden (Jardin Alpin du Lautaret) and the ecological research station, as well as the exhibitions at the Galerie de l'Alpe du Lautaret. Around the pass, various ecological measurements are performed, including a flux tower.

Dinner and overnight in Villar d'Arène (Hôtel Le Faranchin).



*Laurichard rock glacier (Day 1, 29/06)*

# Program

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## **DAY 2 : Monitoring sites on Deux Alpes ski resort - Boreholes and infrastructures on permafrost**

Bus transfer from Villar d'Arène to Les Deux Alpes. Cable car up to 3200 m a.s.l. and walk down to the deep borehole site at 3065 m a.s.l. (easy walk). The 100 m deep borehole Deux-Alpes-3065 is the southernmost deep borehole in the Alps, and is situated at 45.0° Latitude. It is equipped for both classical sensor chain and fiber optic DTS measurements. Hopefully, a DTS measurement demonstration will be performed. From the borehole site, 360° view on the French Alps.

Walk down to 2600 m a.s.l. and to the Bellecombes rock glacier (optional: walk back to 3200 m a.s.l. and cable car to 2600 m a.s.l.). The Bellecombes rock glacier is one of the best investigated rockglaciers in the French Alps, and serves as test site for geophysical exploration methods. Two boreholes allow the calibration and control of geophysical methods. Various geophysical exploration methods were used on the site.

The arrival station and the two uppermost pylons of a chair lift are built on the rock glacier, and are affected by vertical subsidence movements due to ice melt. Problems of infrastructures on permafrost will be discussed.

Walk back to 2600 m, and cable car down to the resort.

Bus transfer to Grenoble train and bus station, from which the airports of Lyon-St Exupéry and Genève-Cointrin can be reached either by train or by special bus. Arrival at Grenoble station planned around 4 pm. If special time constraints, please contact the organizers.



*1 The Bellecombes rock glacier, with chair lift station.*

*2 Les Deux-Alpes - 3065 borehole site, with view on the French Alps.*

*3 Compensation for pylon subsidence.*



# General Informations

## TRANSPORTATION

All travels by bus.

## MEAL

Everyday, breakfast and dinner will take place at the hotel. Backup lunches will be supplied for the two main days.

*Please, don't forget to inform us about special diets !*

## PRICE

300€ all inclusive : Organization, accommodation, meals, all transports from Chamonix (day 0) to Grenoble (day 2).

For those people who would like to participate to excursions by their own means, or for any other question regarding the organization, please contact Philippe Schoeneich ([philippe.schoeneich@univ-grenoble-alpes.fr](mailto:philippe.schoeneich@univ-grenoble-alpes.fr))

## PRICE DOESN'T INCLUDE

It's strongly recommended that you are adequately insured for all of the activities that you will be taking part (hiking) and especially to **take out insurance for repatriation in case of accident**. If needed, we would advise you personally about this.

## ACCOMMODATION

Hôtel Le Faranchin, in Villar d'Arène  
[<http://www.lefaranchin.com>]

## NUMBER OF PARTICIPANTS

The excursion is limited to 25 participants with full accommodation (limited hotel capacity).

*A few additional participants can be accepted with accommodation either in a low comfort resort, or in tents. Please contact the organizers.*



## What you need for each hiking day

- Backpack
- Hiking boots (no baskets)
- Hiking socks
- Hiking gear : functional t-shirt (*both breathable and moisture- regulating*), fleece, suitable pair of pants (in case of hazardous weather). *Avoid extra-gear and prefer light ones.*
- Waterproof/windbreaker jacket
- Rain-gear (*poncho can drape over your backpack and save you expense of your waterproof jacket*)
- Water bottle or camel bag
- Cap, sunglasses, sunscreen
- Thin gloves and beanies

## Optional

- Hiking poles
- Gaiters
- First aid kit and personnel medication
- Binoculars

## What you need for the hikes

Lunches for the two main excursion days.

Every evening we will come back to the hotel where you will find your personal stuff again.

## Difficulty, health and fitness

These excursions are of moderate difficulty but participants should nevertheless have a good level of fitness (about 3h of hiking are foreseen on day 1 and 2, most often between altitudes of 2000m and 3000m).

For your own safety, please advise us in advance of any health particular conditions, such as asthma, diabetes, etc.

## Program adaptation

Due to the abundant snow fall this winter, the excursion program is subjected to adaptations, depending on the amount of snow remaining.