



A conservation stakeholder network to monitor rare alpine pioneer formations in the context of global changes

The Réseau Alpes-Ain de Conservation de la Flore
monitoring the *Caricion bicoloris atrofuscae*

Context : *Caricion bicoloris atrofuscae* and global changes

What do we call « *Caricion bicoloris atrofuscae* »?

- Pioneer plant communities
- Substrates soaked by cold water
- Alpine belt
 - Alluvial conditions : glacial torrents, moraines
 - Slope conditions : springs, rivulets
- Soil frost over a long period or permanently
- Natura 2000 habitat : 7240



Context : *Caricion bicoloris atrofuscae* and global changes

What do we call « *Caricion bicoloris atrofuscae* »?

Very different contexts throughout the french Alps

Northern Alps (Vanoise)

-> cold water from permanent glaciers



Southern Alps

-> along alpine rivulets and lake shores



Context : *Caricion bicoloris atrofuscae* and global changes

What do we call « *Caricion bicoloris atrofuscae* »?



Open vegetation on alluviums

- Mineral soils
- Frequent disruptions

Fens on gentle slopes

- Peaty soils
- Stable conditions



- Low vegetation composed mainly of arctico-alpine species of *Carex* and *Juncus*



Context : *Caricion bicoloris atrofuscae* and global changes

What species make up the Caricion?

8 species but rarely all at once!

Carex atrofusca

Carex bicolor

Carex maritima

Carex microglochin

Juncus arcticus

Kobresia simpliciuscula

Tofieldia pusilla

Trichophorum pumilum



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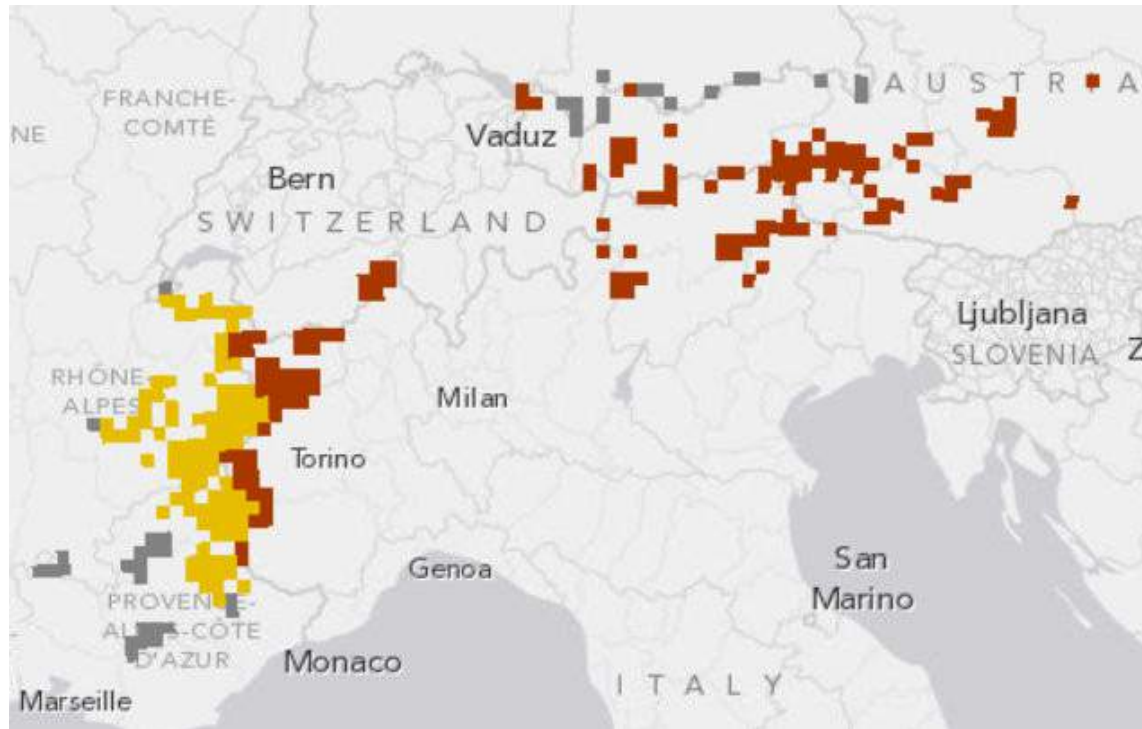
Trichophorum pumilum



Context : *Caricion bicoloris atrofuscae* and global changes

The Caricion threatened at different levels

Global threats ... Climate change



Favourable: A habitat is in a situation where it is prospering and with good prospects to do so in the future as well
Unfavourable-Inadequate: A habitat is in a situation where a change in management or policy is required to return the habitat to favourable status but there is no danger of extinction in the foreseeable future
Unfavourable-Bad: A habitat is in serious danger of becoming extinct (at least regionally)
Unknown: There is insufficient information available to allow an assessment

Sources:

■ [Conservation status 2013 - Experts web tool](#)

Past changes ?

Hard to grasp and quantify

Future changes : what could affect the *Caricion* in the context of climate changes?

Changes in temperature and in precipitation
glacier melting speed, disruption of hydrology and sedimentology
reduction of snow cover duration



The *Caricion* distribution and richness may change

Context : *Caricion bicoloris atrofuscae* and global changes

The Caricion threatened at different levels

Local threats ... Local land-use change



Past and current threats ?

- Dams
- Skiing complex
- Drainage, removal of sediments

Future changes : what could affect the *Caricion* at the local level ?

Increased grazing pressure
Human caused disturbances



Changes in floristic composition ue to soil nutrients content or
trampling

Destruction, changes in quality, fonctionning

Who is concerned with the Caricion?

The Réseau Alpes-Ain de Conservation de la Flore (RAACF)

- aims to put **people** together
- in order to **monitor** rare species and habitat
- the same way through the **french Alps** and Ain
- designs nested **protocols** to monitor species and habitats at different scales

Network of 26 organisations set up in 2008 and led by the Conservatoire botanique national alpin

Working groups : protocols for species monitoring, conservation species lists, habitats (« frosted screes », cliffs, ...)

Caricion working group composed of

- Vanoise national park
- Ecrins national park
- Mercantour national park
- Queyras regional park
- Ristolas-Mont Viso national reserve
- N2000 Hautes-Alpes network
- Conservatoire d'espaces naturels de Savoie
- Conservatoire d'espaces naturels de Haute-Savoie
- Conservatoire botanique national alpin



Methodology

Objective : to track changes in extent and quality at two spatial levels

A 2-levels monitoring protocol was designed by all the partners

First level

- Monitoring changes in extent
 - Throughout the French Alps
 - Related to climate change
- Global monitoring

Second level

- Recording local conditions and floristic composition
 - Subset of sites
 - Local disturbances and management changes
- Local monitoring

Methodology

Global monitoring

Sampling scheme

- Random sampling
- 100 cells (100 x 100 m)
- Among geographic grid of 1255 cells containing the habitat

Collected Data

- On site recording of the *Caricion* 8 species
- Derived from MODIS data
 - Snow cover
 - Temperatures
 - Precipitations

Expected outcomes

- Changes in species richness and weighted richness (= conservation value)
Relations to changes in climate variables

Initial data collection 2013-2014

Frequency : 5 years at first (2013, 2018, 2023) then every 10 years

Methodology

Local monitoring

Sampling scheme

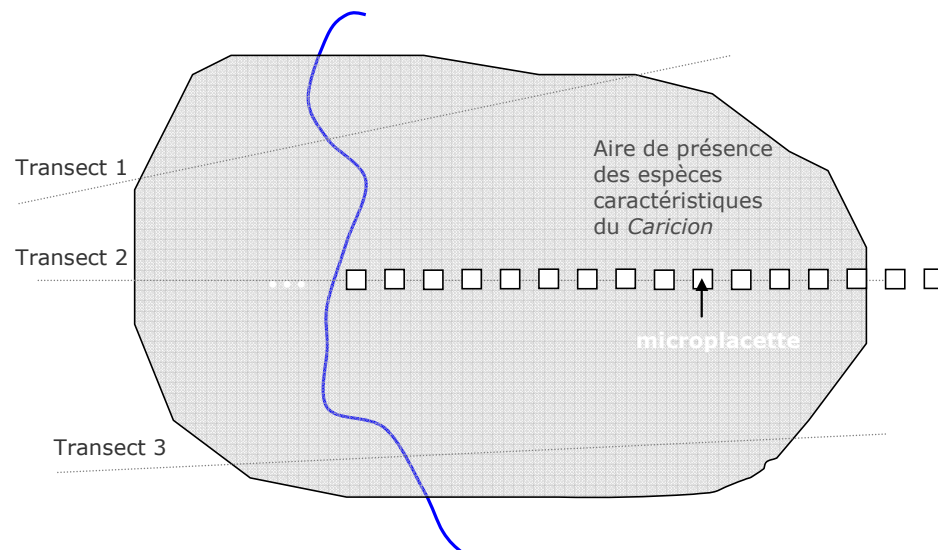
- Subset of sites
- 50 plots (50 x 50 cm) along transects covering the habitat

Collected data

- Floristic composition
- Local disturbances (grazing or trampling tracks, ... depending on disturbance type)

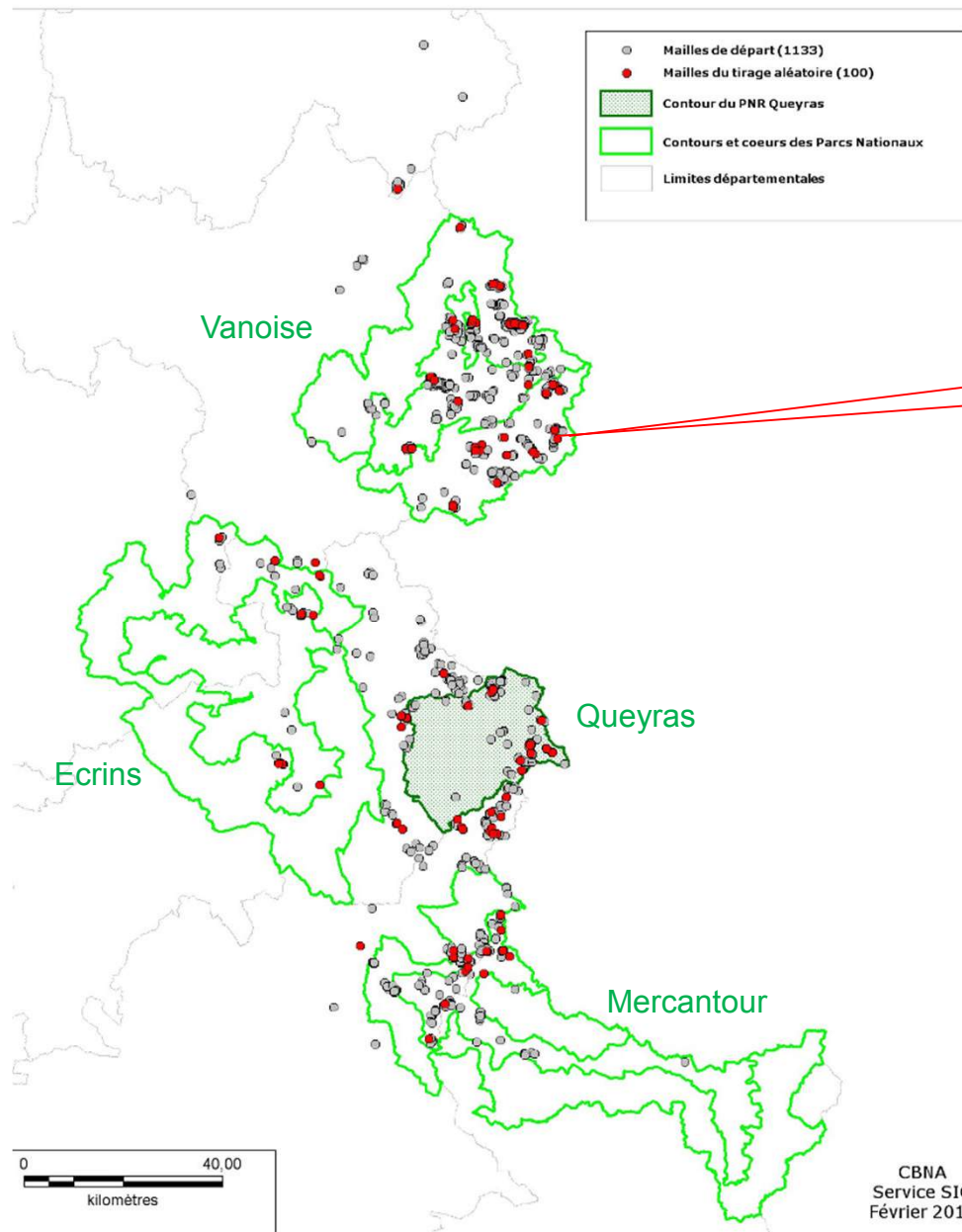
Expected outcomes: changes in species frequency in relation to changes in disturbances

Initial data collection: 2011 & Frequency of data monitoring: every 3-4 years



Initial data collection – Global monitoring

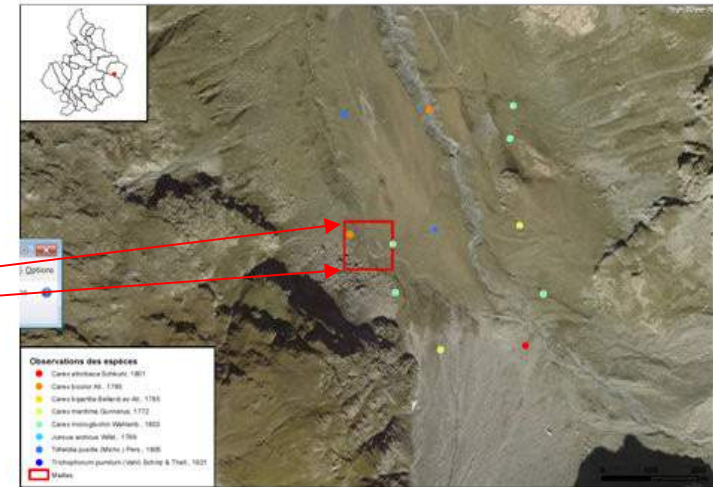
Field sheet snapshot



SUIVI GLOBAL DU *CARICION BICOLORI-ATROFUSCAE*

Secteur : _____
Maille n° : _____

Photo
aérienne :



Cochez les espèces caractéristiques du *Caricion bicolori-atrofuscae* présentes sur la maille :

Espèce caractéristique	Indice	Présence (1/0)	Richesse totale	Intérêt floristique
<i>Carex atrofusca</i>	3	0		
<i>Carex bicolor</i>	1	1		1
<i>Carex maritima</i>	2	0		
<i>Carex microglochin</i>	3	1		3
<i>Juncus arcticus</i>	2	0		
<i>Kobresia simpliciuscula</i>	1	0		
<i>Tofeldia pusilla</i>	2	0		
<i>Trichopogon pumilus</i>	2	0		
			Σ présences	Σ (indice x présence)
			2	4

Qualifiez le type de gestion qui s'applique à la maille :

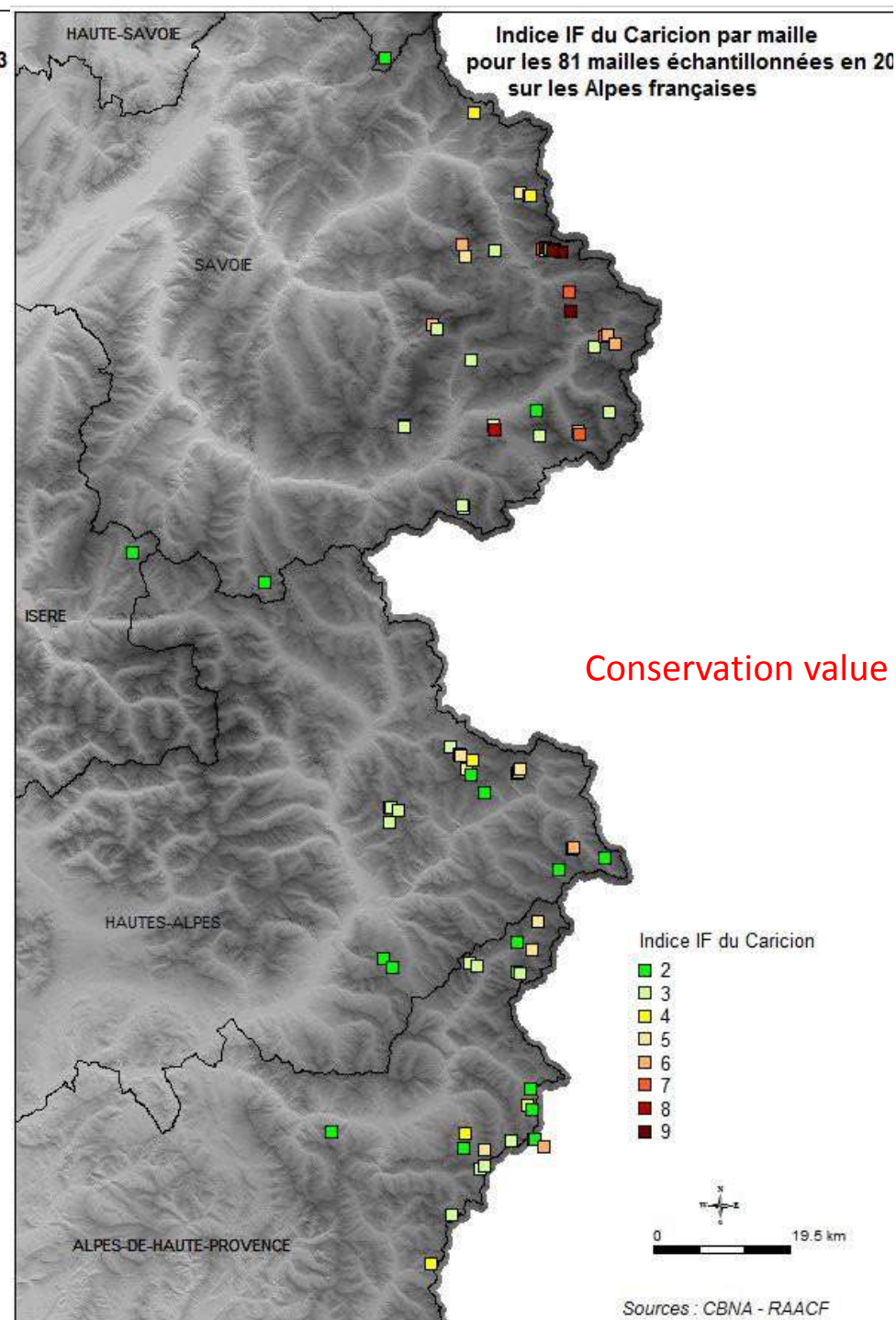
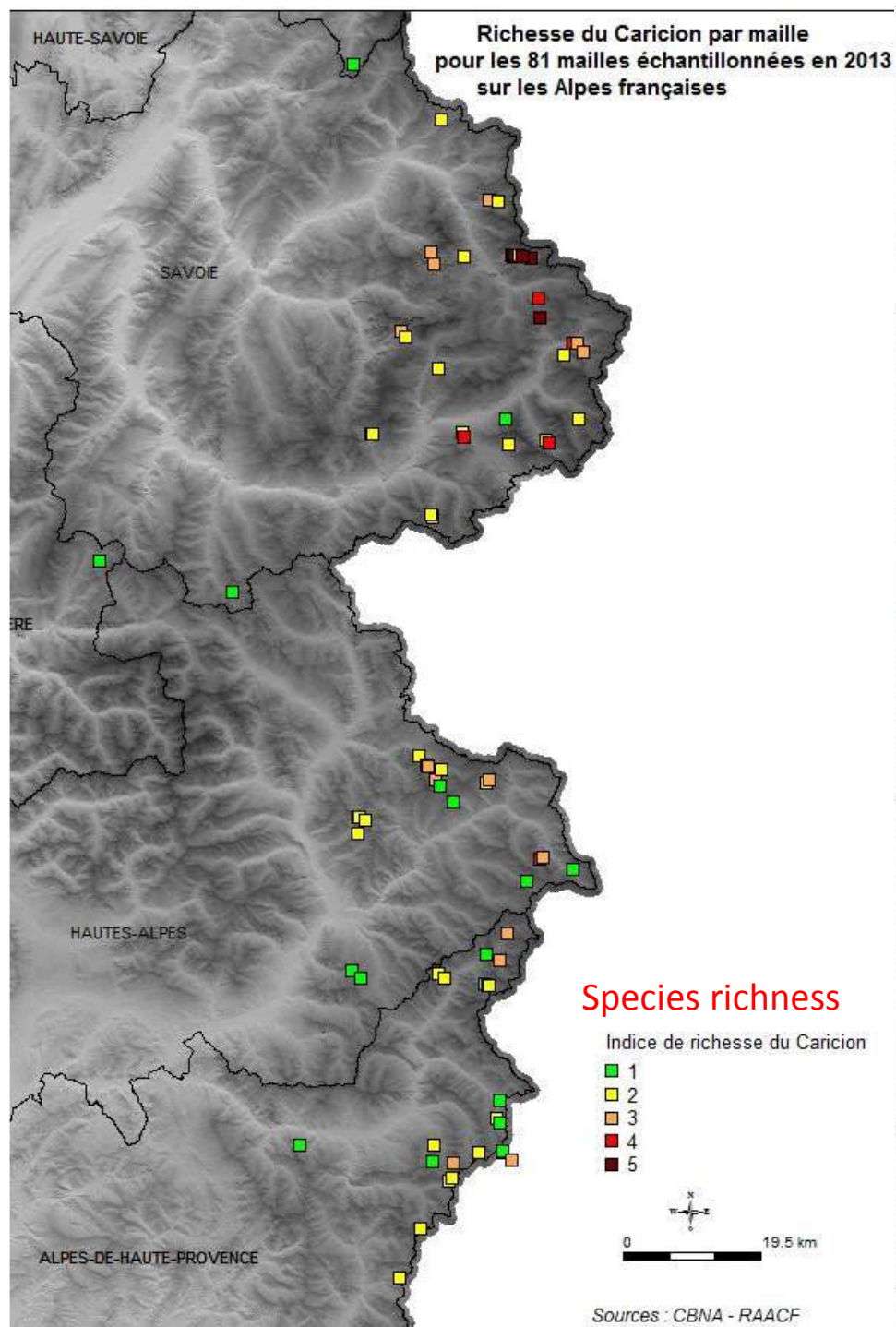
Land-use

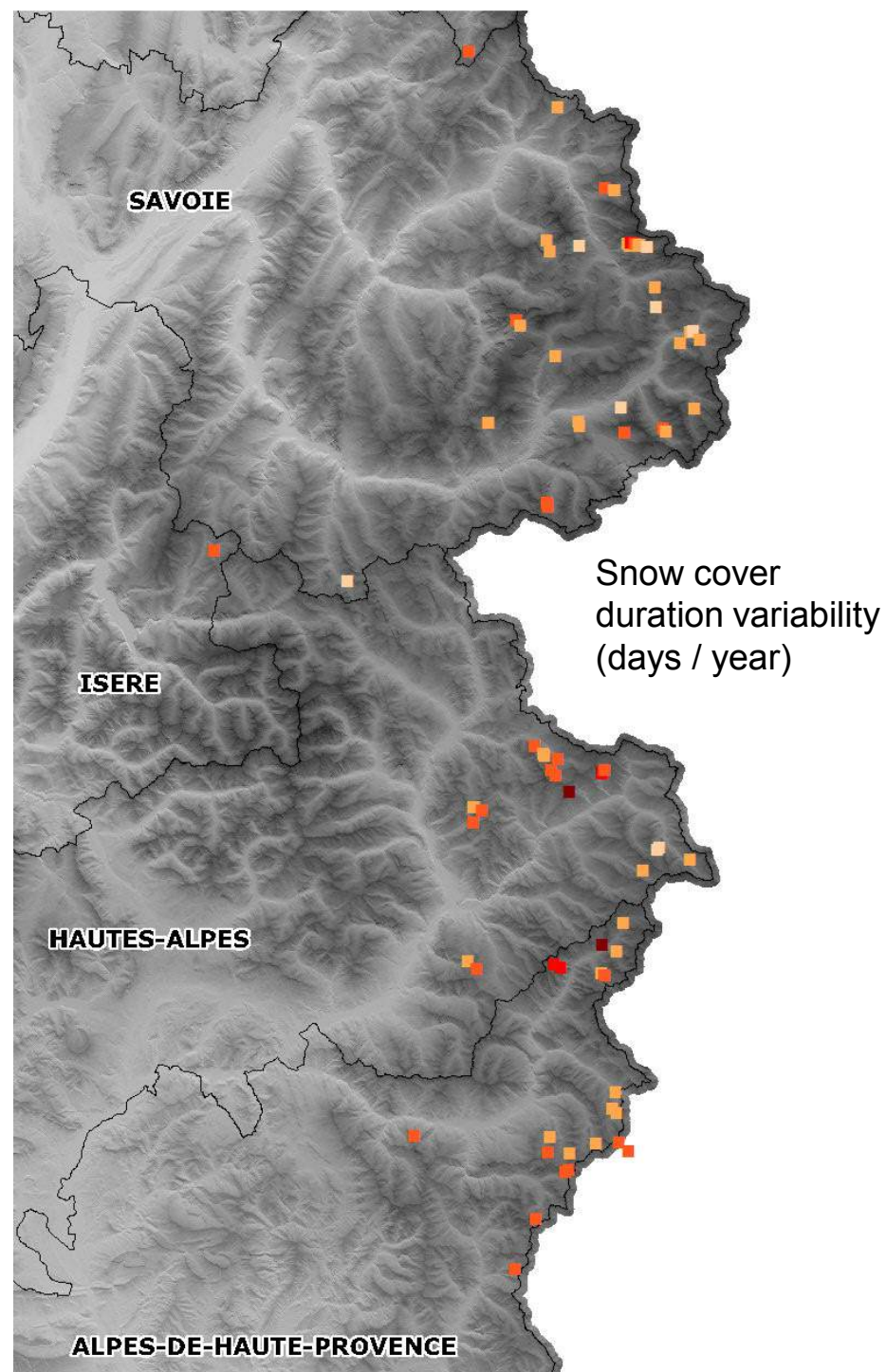
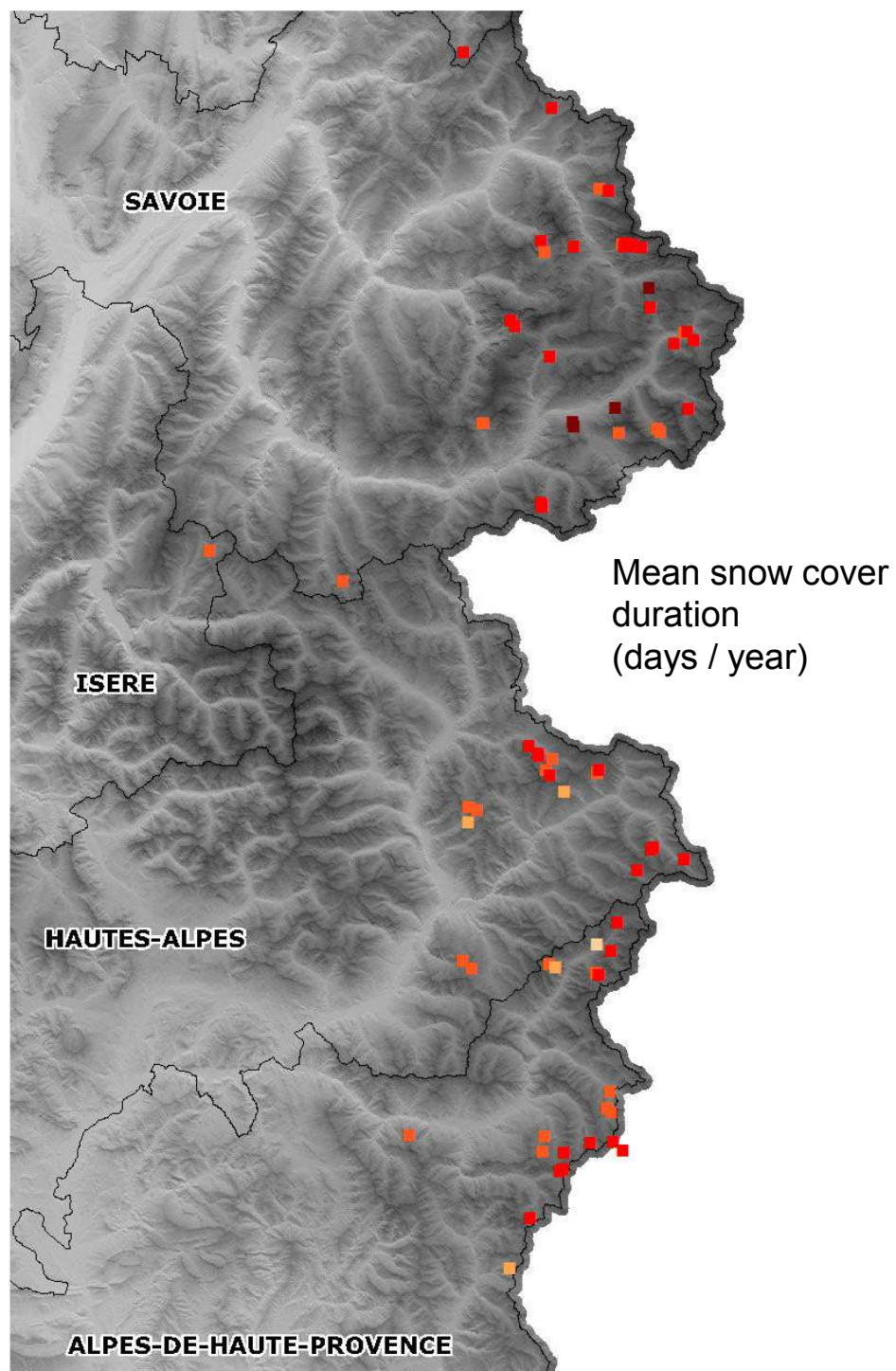
Décrivez les traces de perturbation et menaces éventuelles :

Disturbances, local threats

Observateurs :

Date :





Between 2 and 4
transects per site

[illegible]

Discussion and perspectives

- From N2K conservation status assessment to climate change monitoring

Discussion and perspectives

- From N2K conservation status assessment to climate change monitoring
- What is a good protocol to document climate change ?
- Sensitivity to climate change
 - ✓ biological indicators
 - ✓ measurements and results
- Availability of abiotic data on local effects of climate change (e.g. snow cover duration)

Discussion and perspectives

Improvements of our protocol, sensitivity improvements

- Biological data collection
- ✓ Global level
- ✓ Local level
- Abiotic data (explanatory variables)

Discussion and perspectives

Improvements of our protocol, sensitivity improvements

- Biological data collection
 - ✓ Global level : quantifying each species within cells, stratifying sampling according to marginal/core distribution
 - ✓ Local level : traits measurements on a single species (e.g; *Carex bicolor*)
- Abiotic data (explanatory variables)
 - ✓ Snow cover duration models at landscape scale

Discussion and perspectives

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Keeping data gathering simple and easy with relevant variables -> so that people don't get discouraged!

We'd like your input!

Thank you for your attention !