Pastures vulnerability and adaptation strategies to climate change impacts in the Alps

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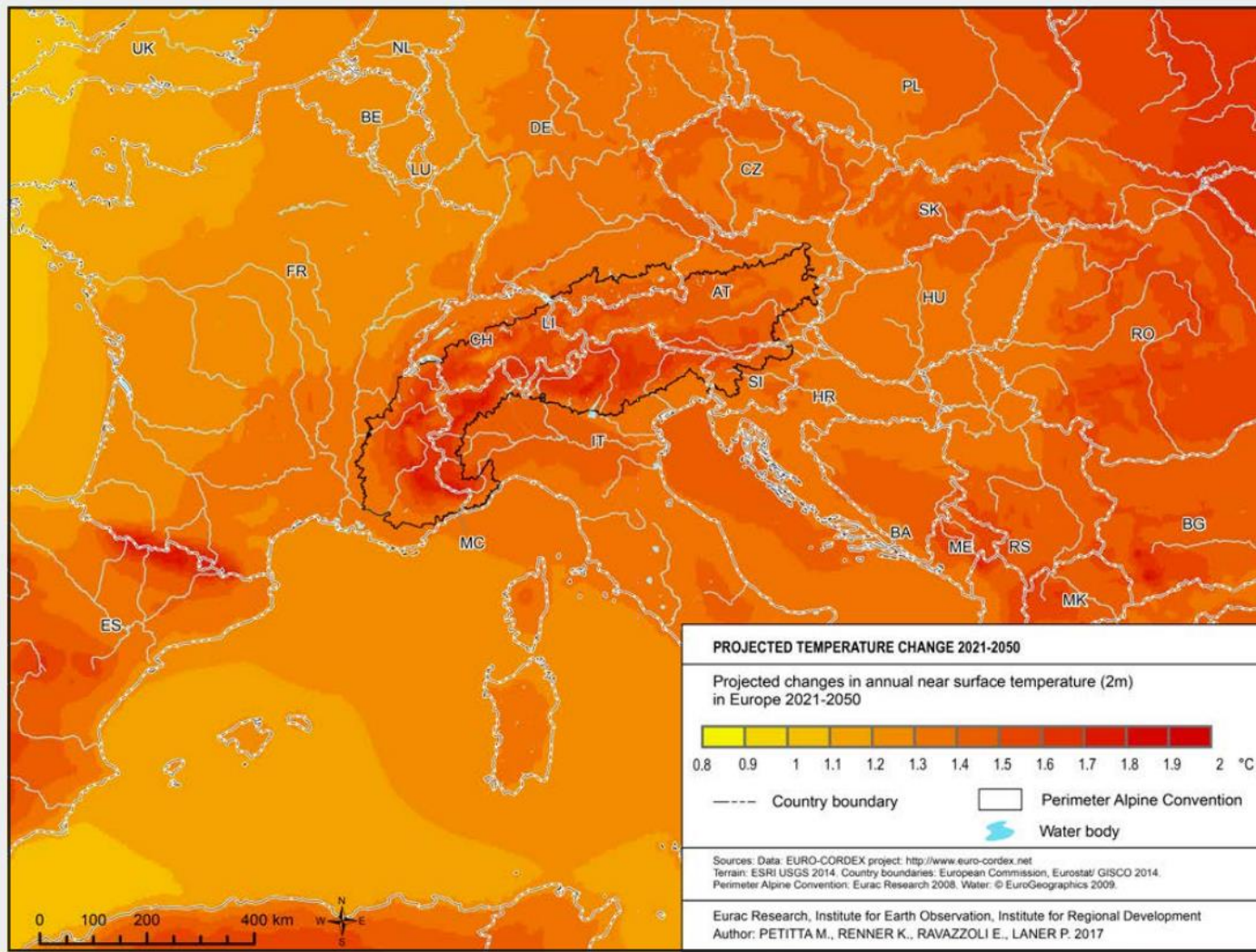
www.pastoralp.eu

IPROMO

Gressoney-La-Trinité, 9-10 July 2019

Temperature: future projections

Average annual temperature increases in the middle of the century (2**021-2050**) compared to the reference period (1971-2000)

For Western Alps + 2 ° C

Euro-cordex project

Alpine pastures

- Alpine pastures are a **sentinel** element for climate change
- **Climate change** can have **direct** (on grazing period, phenology, floristic composition, use value of pastures) and **indirect consequences** on pastoral systems (changes in the socio-economic structure of local communities)
- Alpine pastures are multi-**functional**

CRITICAL ISSUES

- Other factors of uncertainty: **abandonment** of mountain areas, increase in **costs** (feed, labor, etc.), **wolf**
- Lack of **specific EU measures** to tackle climate change for pastures
- Importance of predicting **future scenarios**, to promote **adaptation strategies**

General objective

Reduce **vulnerability** and increase the **resilience** of alpine pastures in **climate change** scenarios using **two case studies** represented by two National Parks (PNE and PNGP)
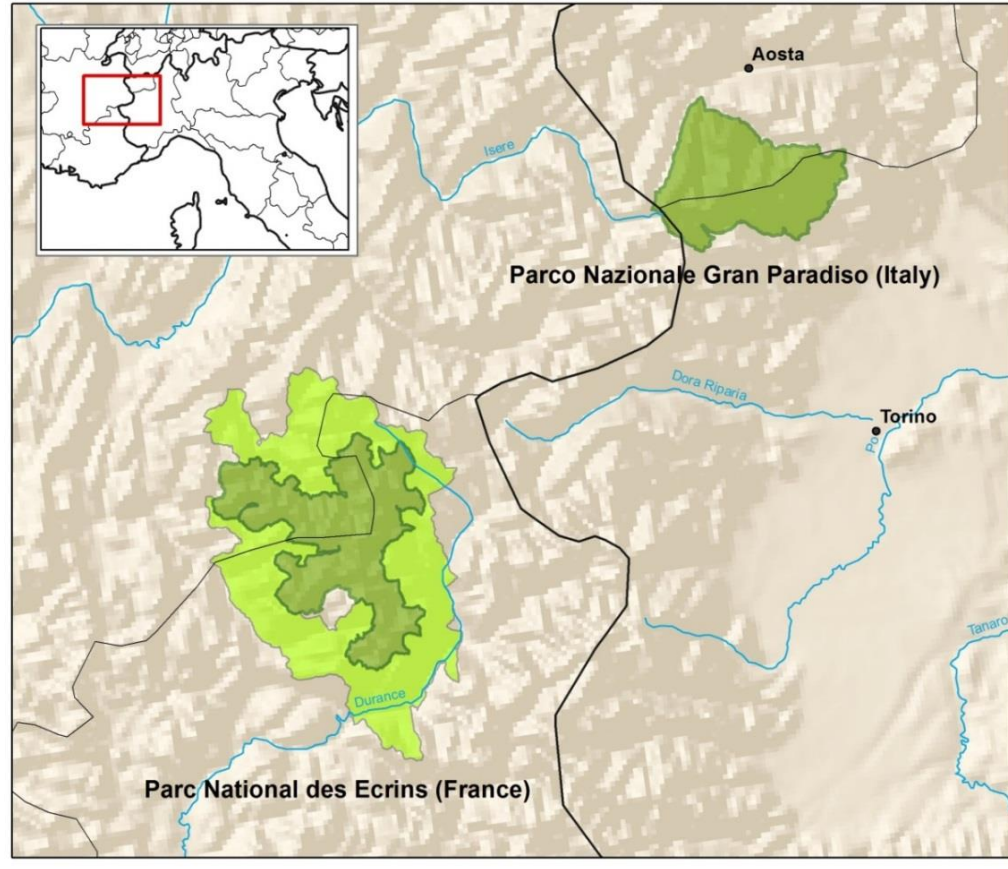
Specific objectives

1. **Mapping** of the main pastoral typologies

2. Analysis of the vulnerability of pastures through the **analysis of the impacts** of climate change

3. **Management** adaptation measures

4. Development of a **web platform** to propose solutions to support management choices by farmers and local decision makers

5. Strategic adaptation plan in the two parks and to propose **repeatability strategies** also in other contexts of the Alps and mountains

6. Promote the adoption of **specific measures and policies** in the financing regulations in agriculture (CAP, RDP, etc.)

Increase **knowledge** and **awareness** of climate change effects on pastoral resources in local communities

Activities

Preparatory actions

- Involvement of local operators
- Dissemination and communication plan
- Analysis of legislation related to adaptation measures on climate change

Operational actions

- Collection and harmonization of different datasets
- Pasture mapping (PNGP and PNE)
- Analysis of future climate scenarios
- Modeling of productive, socio-economic and environmental vulnerability of pastures to CC
- Identification of possible adaptation measures through analysis of models and local consultations
- Evaluation of identified adaptation measures
- Creation of permanent pilot areas
- Development of the PASTORALP web platform
- Creation of the strategic adaptation plan, transfer activities and policy proposals
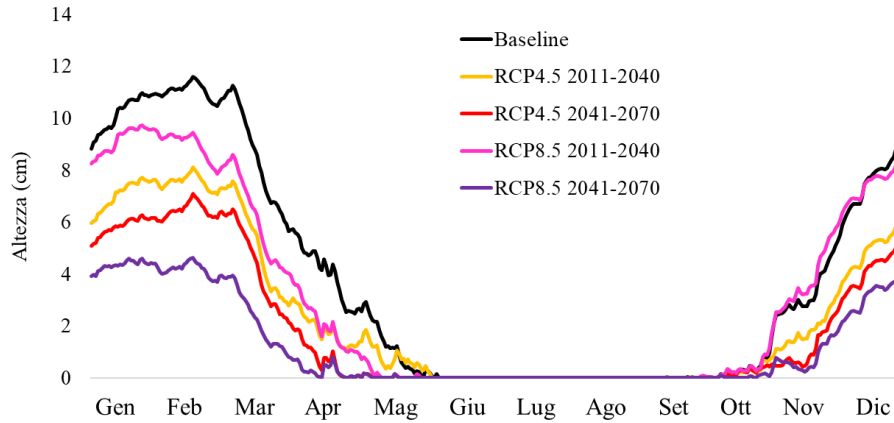
Dissemination and communication of results

- Consultation committees with local stakeholders

- Validation workshop of the identified actions

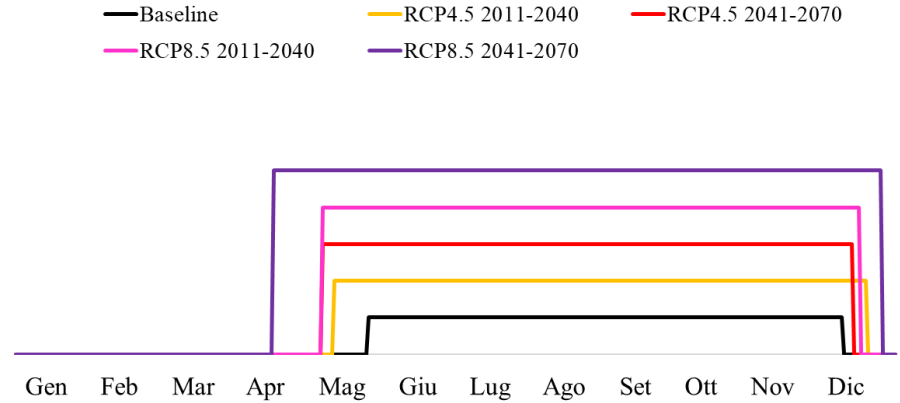- Training seminars

- Newsletter

- Information material

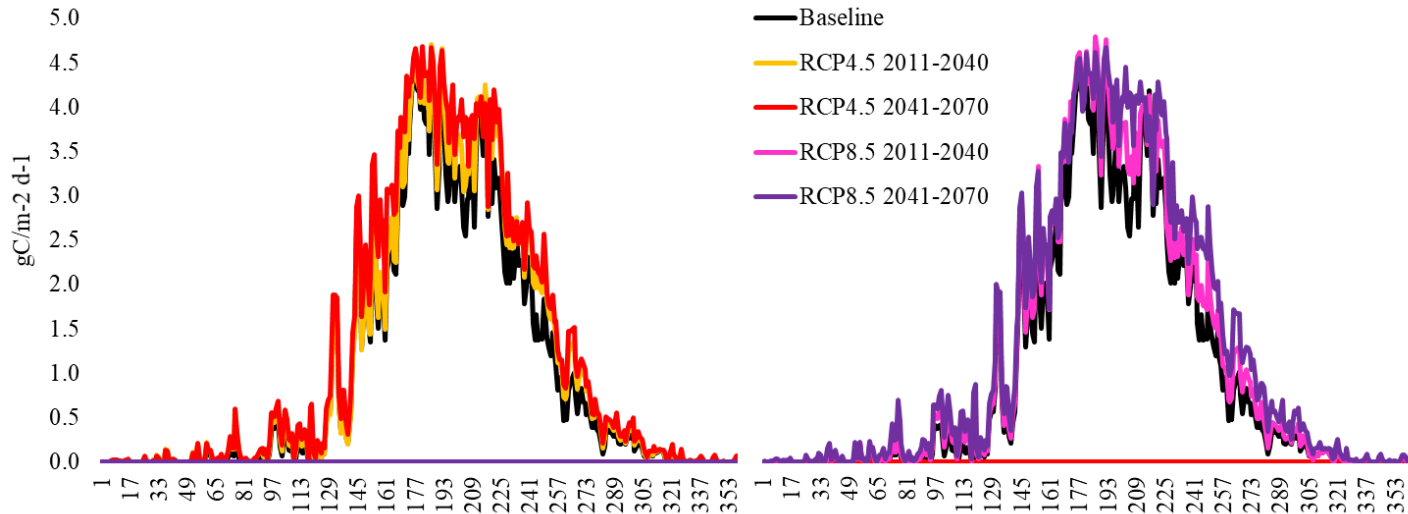# Some results of the analysis of future climate scenarios

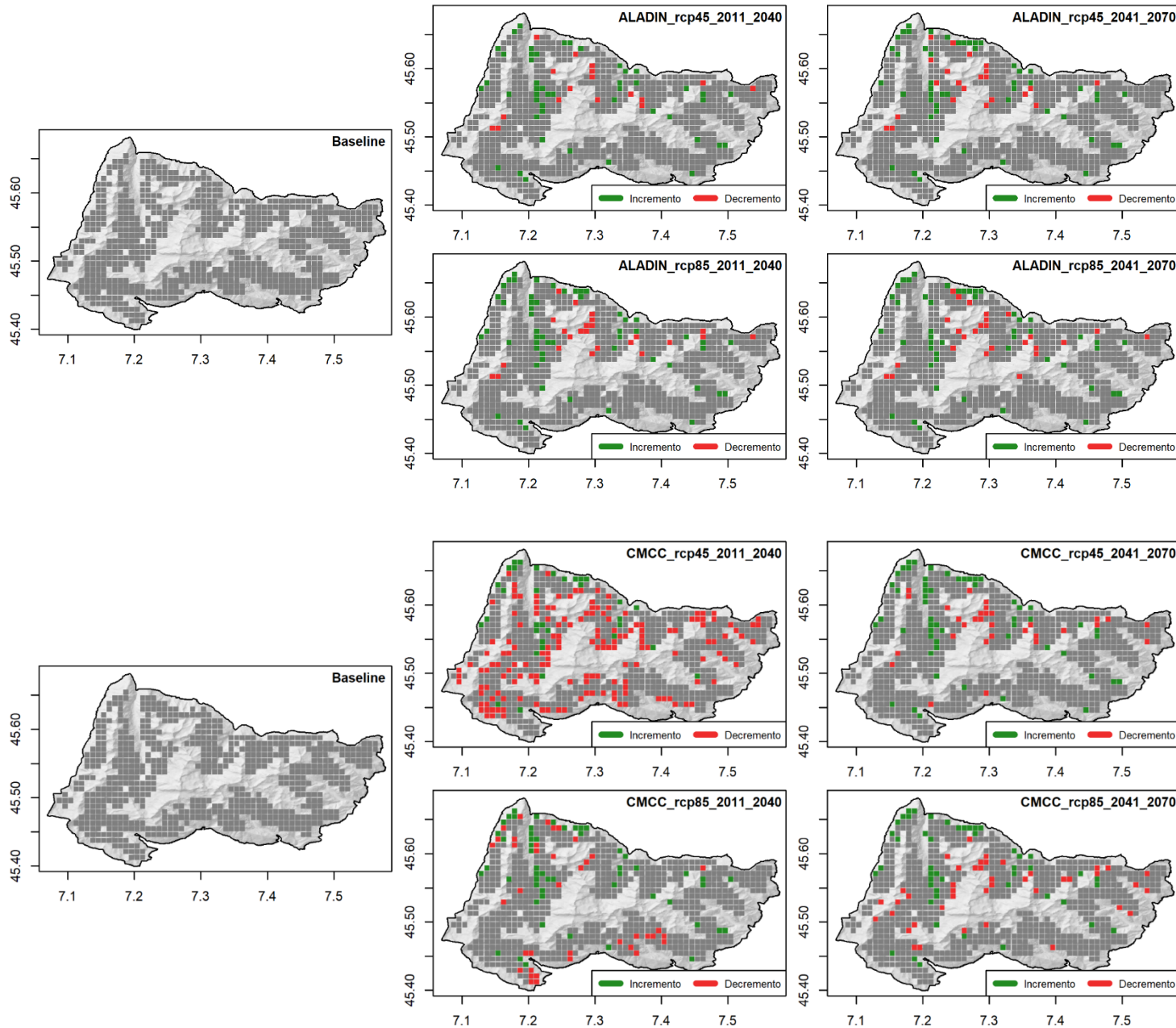## Snow cover

Vegetative season length

Production pattern

Some results of the analysis
of future climate scenarios

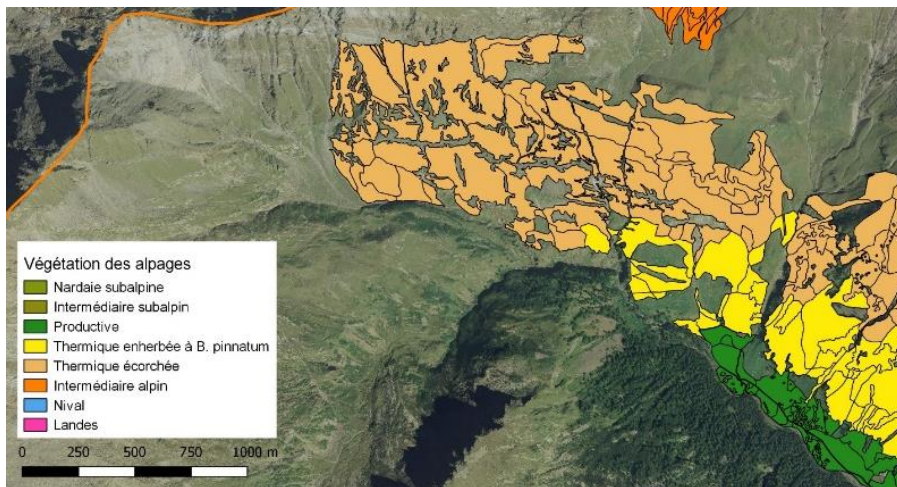# Some results of the analysis of future climate scenarios

- **Future climate:**
  - Increase in T_{min} > of T_{max} (2-3°C vs 1-2°C);
  - Increase in average monthly precipitation, but more concentrated in intense events.
- **Snow cover:** reduction of snow cover with greater evidence in the warmer scenario and period 2041-2070. Possible consequences on water availability.
- **Vegetative season length**: expansion of the vegetative season related to the reduction of snow cover. Greater expansion in the warmer scenario and period 2041-2070.
- **Production pattern** *(DayCent)*: there are no significant differences. Production remains temporally similar to the current period as well as its peak.
- **Pasture distribution** *(RandomForest)*: general increase of the pasture area, but with an altitudinal shift.

Survey and mapping
of pastoral typologies

- **Mapping** of the PNGP and PNE pastures with field surveys and GIS.
- In **PNGP** over 7000 ha of mountain grasslands are being classified on the basis of the pasture types defined for Piedmont (Cavallero et al., 2007) and for Aosta Valley (Bassignana and Bornard, 2001).
- **Harmonization** of PNGP and PNE classifications
- Following the established maps, we are evaluating the potentials and the limits of **remote sensing** in identifying pastoral grasslands, clustered by the dynamics of variation of the phytomass during the growing season.

Végétation des alpages
- Nardaie subalpine
- Intermédiaire subalpin
- Productive
- Thermique enherbée à B. pinnatum
- Thermique écorchée
- Intermédiaire alpin
- Nival
- Landes

0   250   500   750   1000 m

Participatory approach

- **Local stakeholders** have a **direct knowledge** of the territory and its problems and specificity.

- Their **involvement** is a fundamental element of the PASTORALP project: farmers, land owners, trade associations, local administrations, technicians and consultants of the agro-forestry sector, environmental, cultural and non-profit associations.

- Local parts **interact** with **European**, **national** and **regional** policies.

- Direct involvement ensures the **feasibility** of **adaptation measures.**

Participatory approach

✓ 3 project launch events (2 at PNE and 1 at PNGP)
✓ 2 consultation stakeholder workshops (1 PNE and 1 PNGP)
✓ Questionnaire for farmers