



Experiences and lessons from the EU-funded project "PastorAlp"

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Position EuroGEO with view to the new GEO strategy.



Identify and exploit synergies across national and EU projects and initiatives.



Support a nexus approach to address the triple pollution-climate-biodiversity crises.



Create a dialogue among scientists, policy makers and end-users to support the co-design of EO based tools, knowledge, and policies.

EUROGEO WORKSHOP 2023

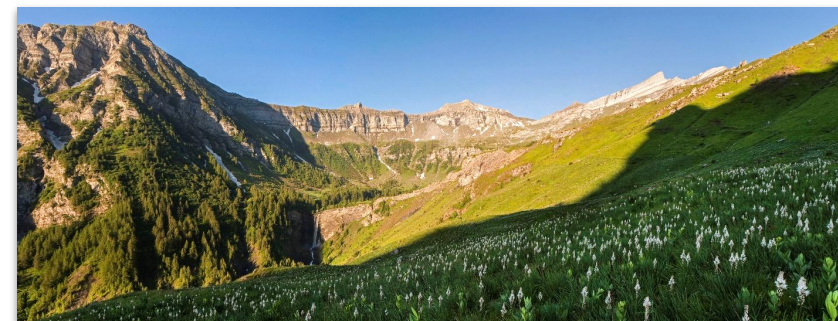
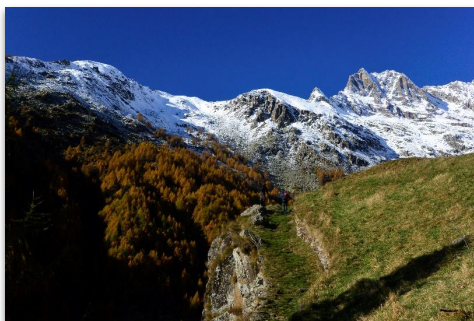


DURATION: 01/10/2017 - 31/03/2023 (5.5 YEARS)

BUDGET: 2,314,400 €



COFUNDED (60%) BY THE EUROPEAN COMMISSION (LIFE PROGRAMME, *CLIMATE CHANGE ADAPTATION*)



BOLZANO 2-4 OCTOBER 2023



PASTORALP FINAL CONFERENCE 15-17/03/2023

"Global challenges in mountain agropastoral systems - Scientific evidence on impacts, adaptation and policies"

~150 attendees

Policy makers

Scientists

Socio economic sector

End-users

Citizens



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(b) Observed impacts of climate change on human systems

Human systems	Impacts on water scarcity and food production				Impacts on health and wellbeing				Impacts on cities, settlements and infrastructure			
	Water scarcity	Agriculture/crop production	Animal and livestock health and productivity	Fisheries yields and aquaculture production	Infectious diseases	Heat, malnutrition and other	Mental health	Displacement	Inland flooding and associated damages	Flood/storm induced damages in coastal areas	Damages to infrastructure	Damages to key economic sectors
Global	±	-	○	-	-	-	-	-	-	-	-	-
Africa	-	-	-	-	-	-	-	-	-	-	-	-
Asia	±	±	-	-	-	-	-	-	-	-	-	-
Australasia	±	-	±	-	-	-	-	not assessed	-	-	-	-
Central and South America	±	-	±	-	-	-	-	not assessed	-	-	-	-
Europe	±	±	-	±	-	-	-	-	-	-	-	-
North America	±	±	-	±	-	-	-	-	-	-	-	-
Small Islands	-	-	-	-	-	-	-	-	-	-	-	-
Arctic	±	±	-	-	-	-	-	-	-	-	-	±
Cities by the sea	○	○	○	-	○	-	-	not assessed	○	-	-	-
Mediterranean region	-	-	-	-	-	-	-	not assessed	±	-	○	-
Mountain regions	±	±	-	○	-	-	-	-	-	na	-	-

IPCC AR6 Figure SPM.2

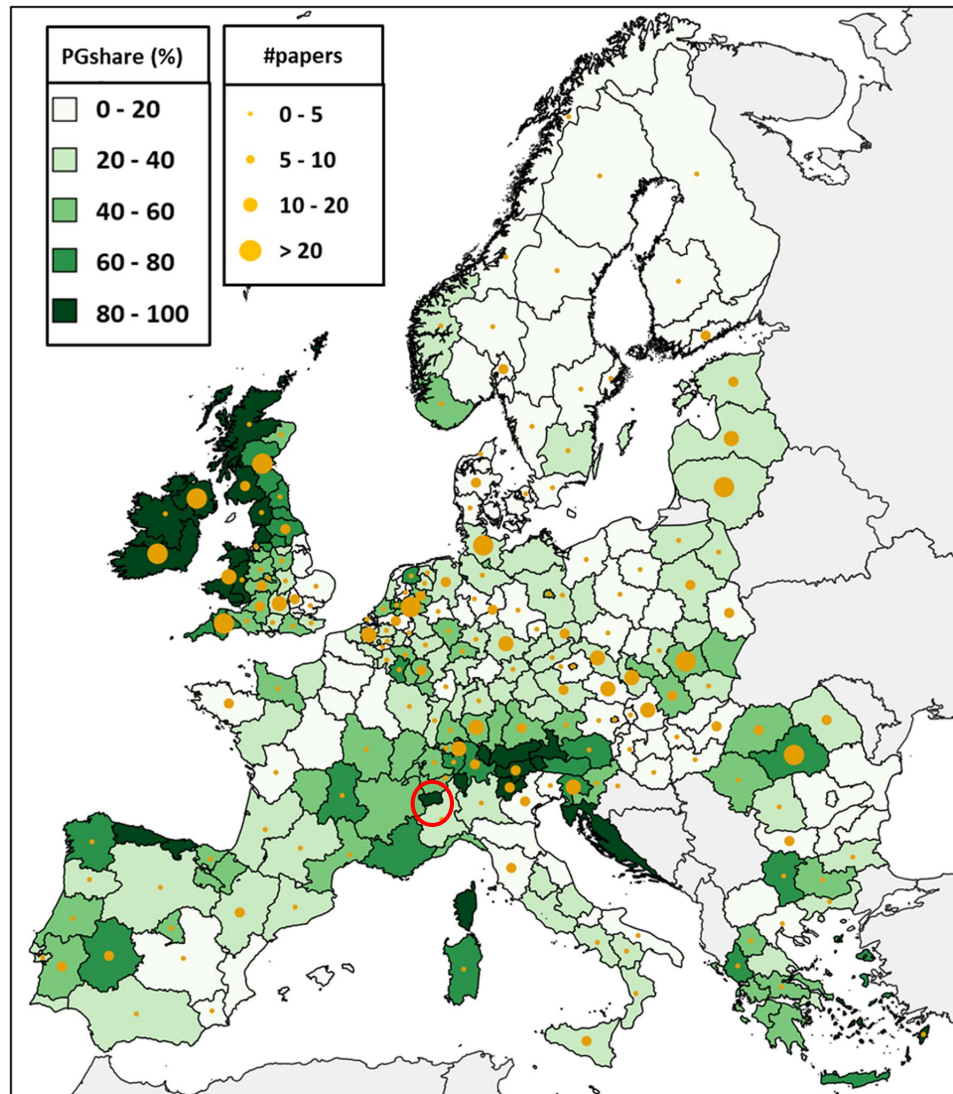
Confidence in attribution to climate change

- High or very high
- Medium
- Low
- Evidence limited, insufficient

Impacts to human systems in panel (b)

- Increasing adverse impacts
- ± Increasing adverse and positive impacts

PGshare = share of permanent grassland in the total utilised agricultural area

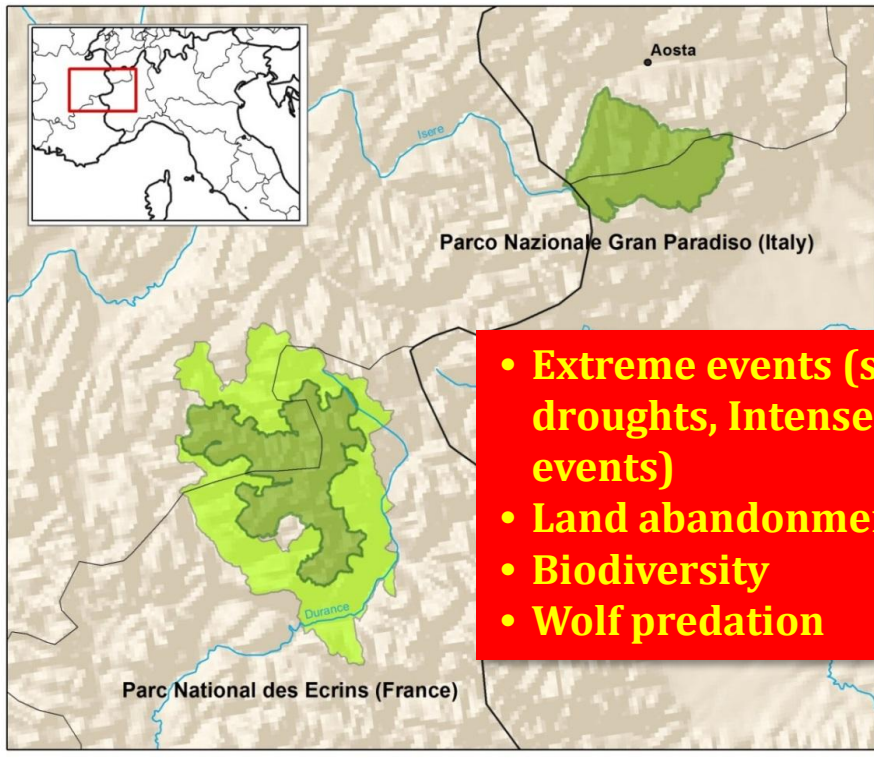


From Schils et al. 2022 Agriculture, Ecosystems and Environment



Project main goal:

Reduce the **vulnerability** and increase the **resilience** of **alpine mountain pastures** and **pastoral communities** by assessing **impacts of climate change** and **testing feasible, integrated and improved adaptation technical measures** and **policies recommendation** in intended case study areas (**PNE and PNGP**) – two open air laboratories



- **Extreme events (summer droughts, Intense rainfalls events)**
- **Land abandonment**
- **Biodiversity**
- **Wolf predation**

- **70.000 ha of extensive pastures grazed by sheep, cattle goats, horses**
- **70% national collective properties regulated by national laws (creation of pastoral units and breeder consortia)**
- **First National protected area in Italy (1922)**
- **Protect the Alpine ibex (*Capra ibex* L.) at risk of extinction, now >2800 individuals.**
- **71.000 ha of rural area and 8.400 habitants**
 - **Cattle and sheeps**





STAKEHOLDER ENGAGEMENT

In the original proposal, the terms:
Stakeholder engagement occurs ~**50 times**
Stakeholders occurs ~**220 times**

LIFE16 CCA/IT/000060

 LIFE 2016	FOR ADMINISTRATION USE ONLY LIFE16 CCA/IT/000060
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LIFE Climate Change Adaptation project application

Language of the proposal:

English (en)

Project title:

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

Project acronym:

LIFE PASTORALP

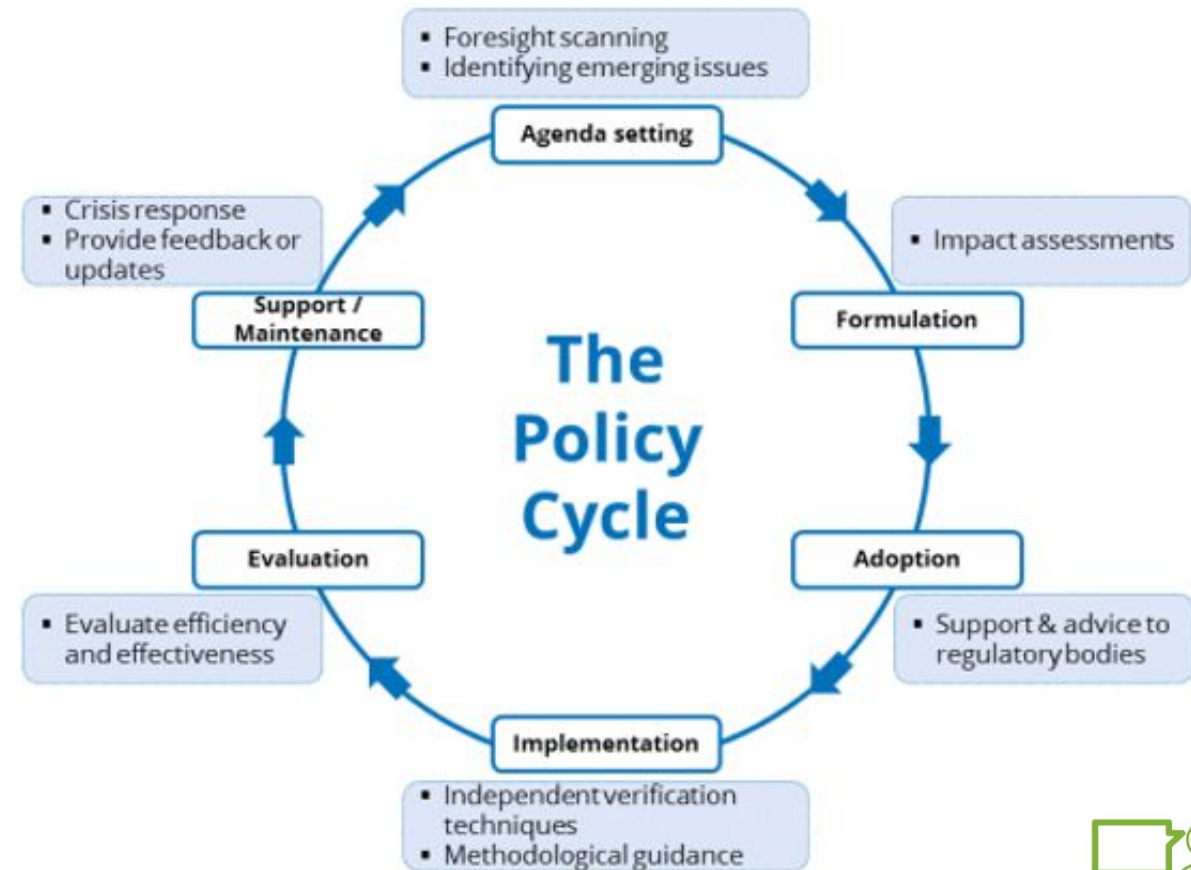
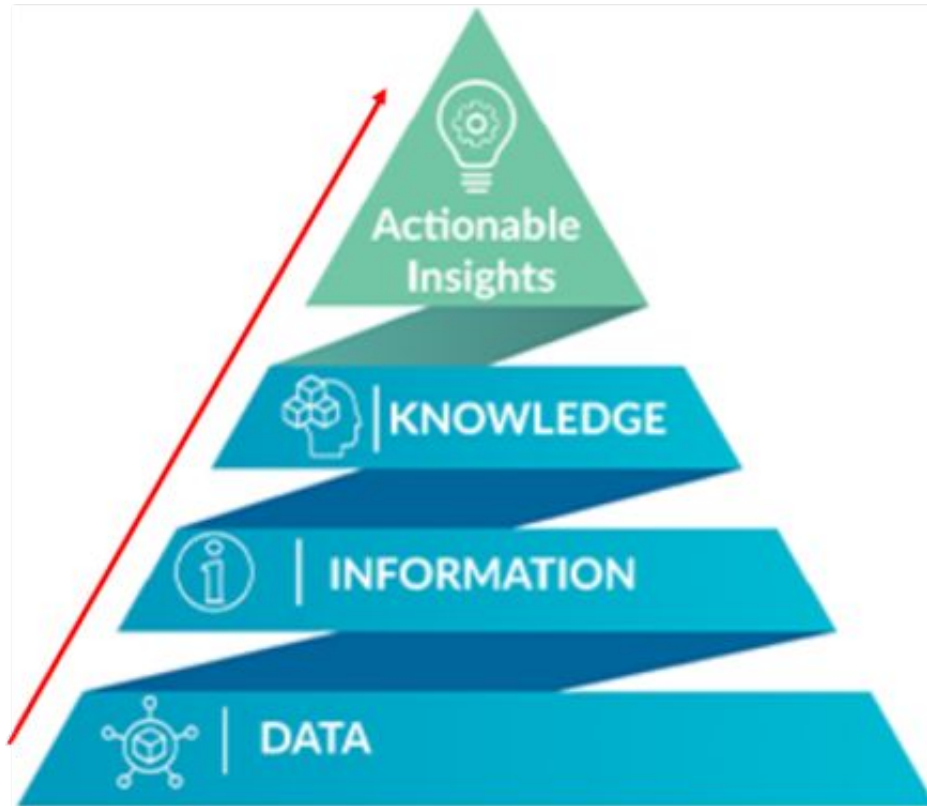
The project will be implemented in the following Member State(s) and Region(s) or other countries:

France	Provence-Alpes-Côte d'Azur Auvergne
Italy	Valle d'Aosta Piemonte

Expected start date: 01/10/2017

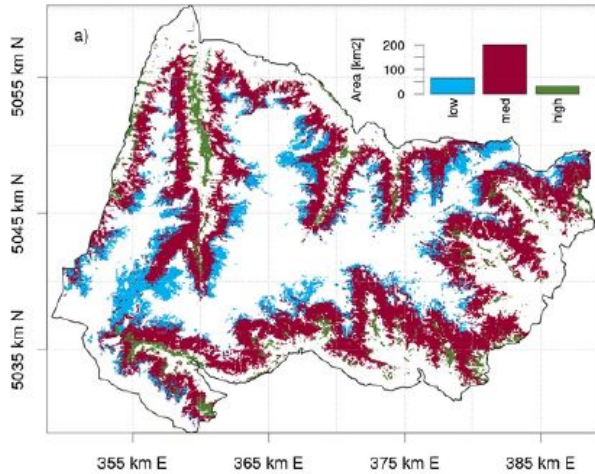
Expected end date: 30/03/2022



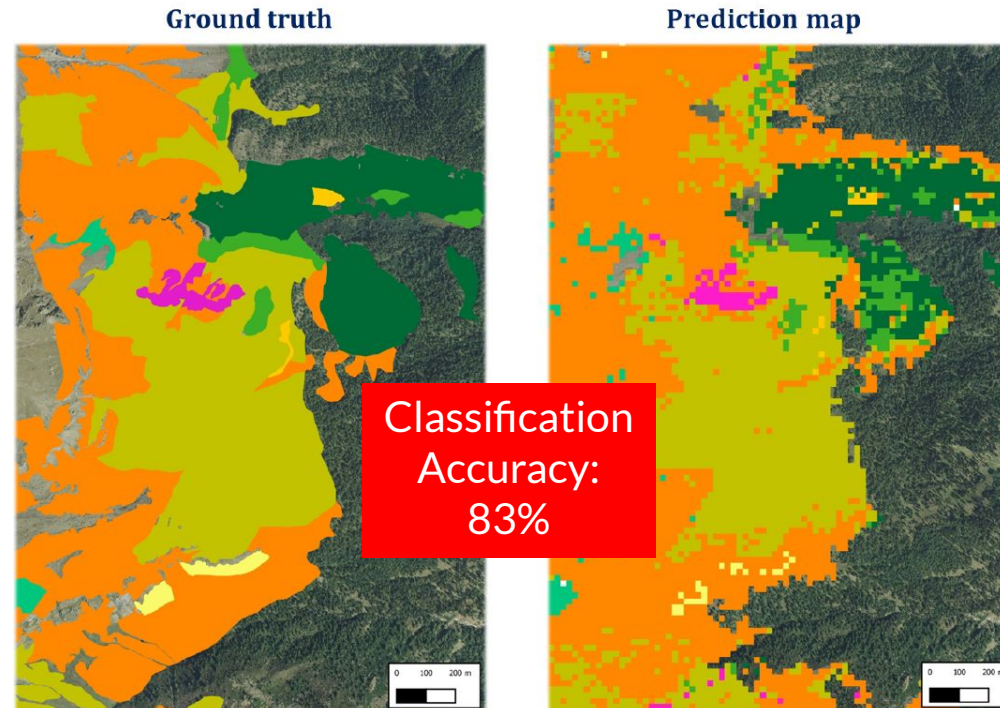
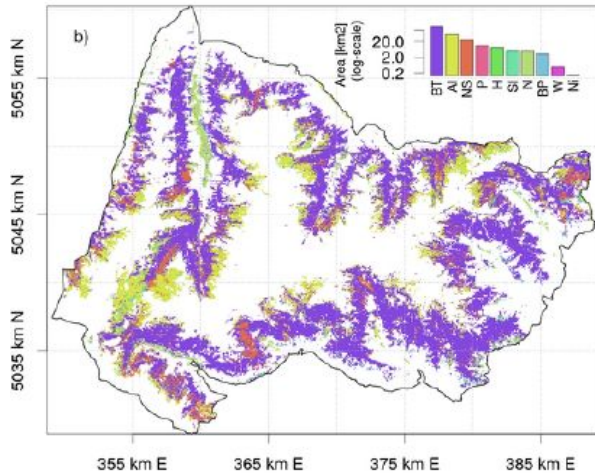




Some results - sustainability of data



More than 10,000 hectares of pastureland mapped



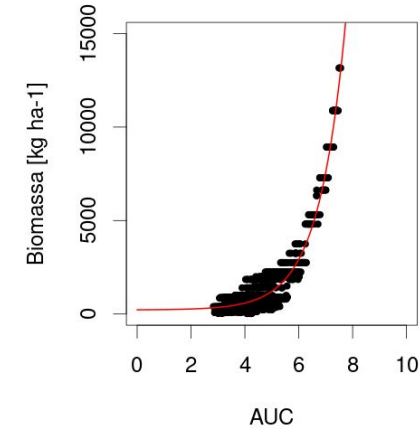
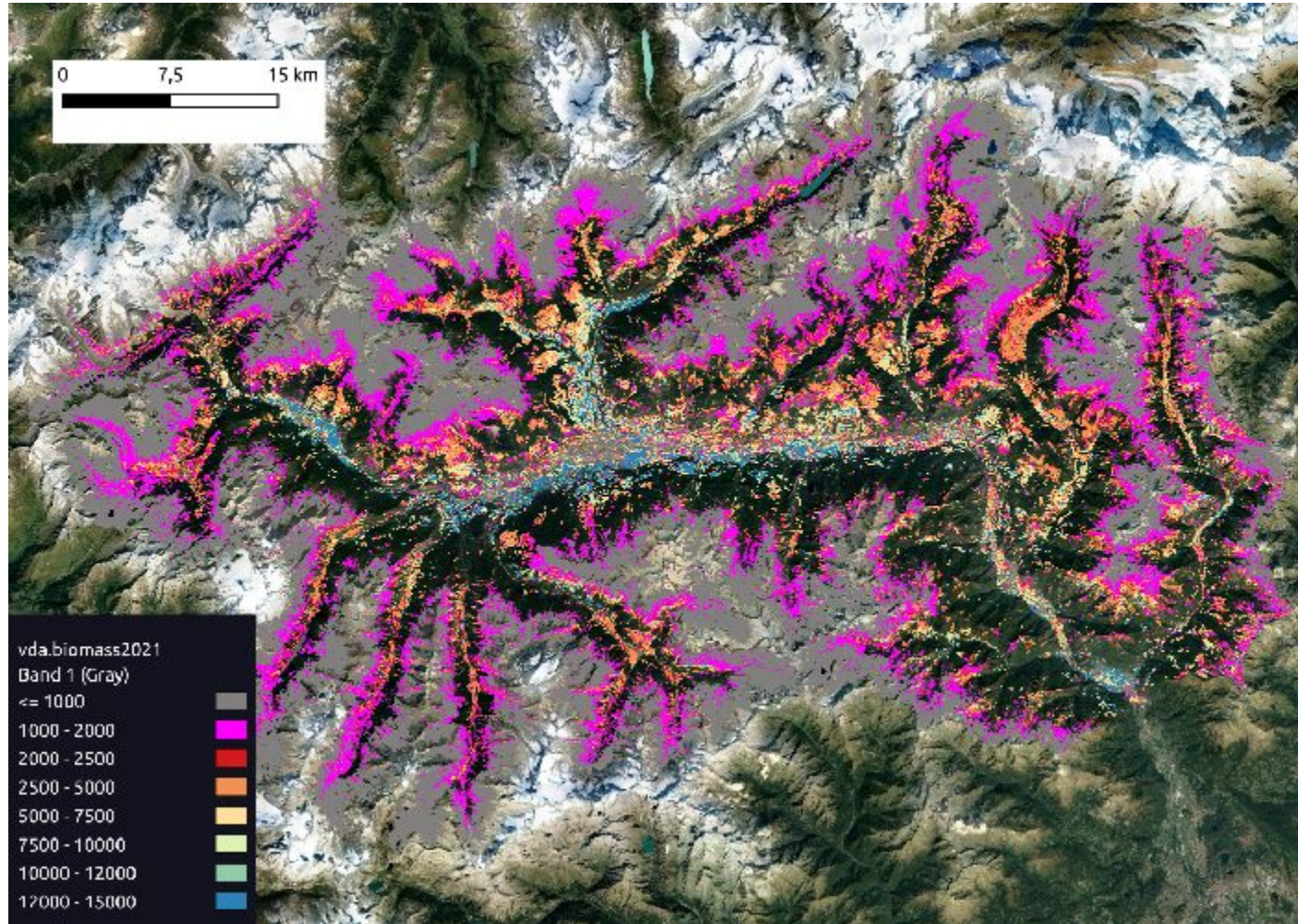
- Field surveys & remote sensing (Sentinel 2) & modelling
- Harmonized legend: Grasslands (Y-N) / productivity / 13 pastoral categories



Filippa et al 2022 On the distribution and productivity of mountain grasslands in the Gran Paradiso National Park, NW Italy: A remote sensing approach



Some results - sustainability of data

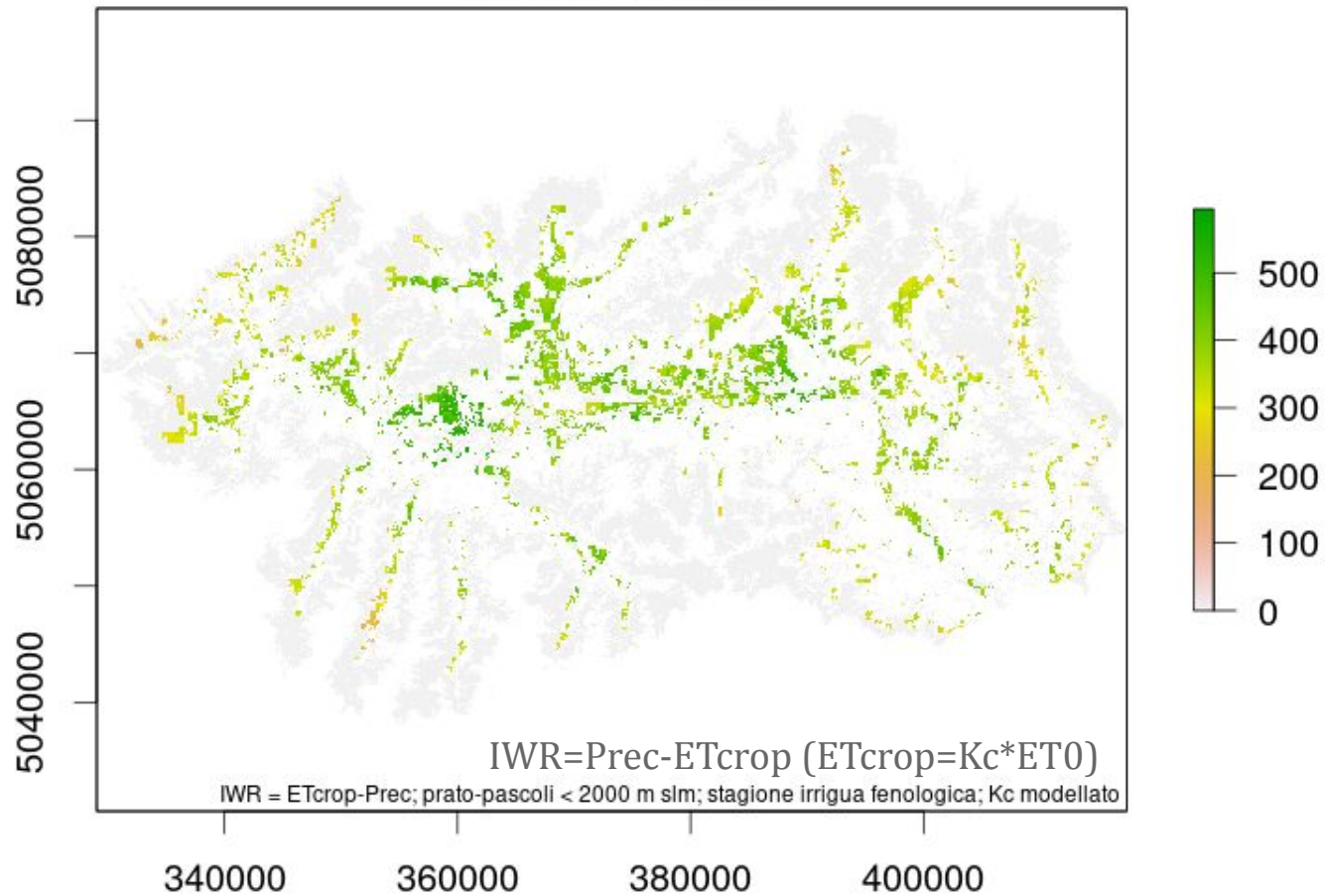


- Pasture productivity map [KgDM/ha]
- Yearly update
- Planning



Some results - sustainability of data

Irrigation Water Requirements
Mean 2005-2021 [mm]

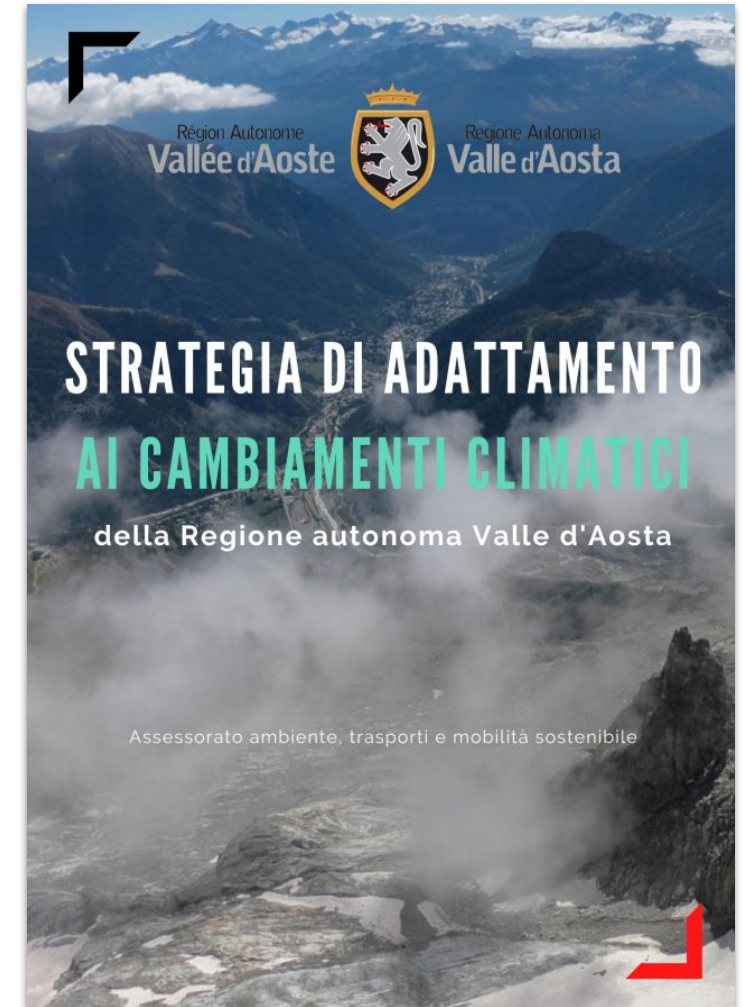
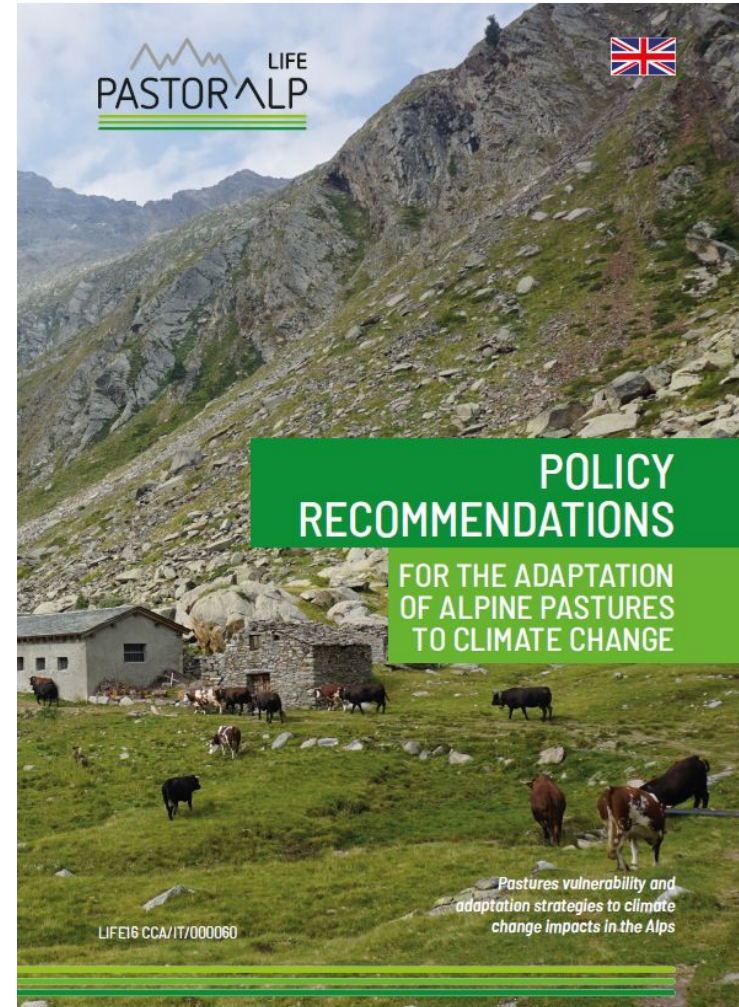
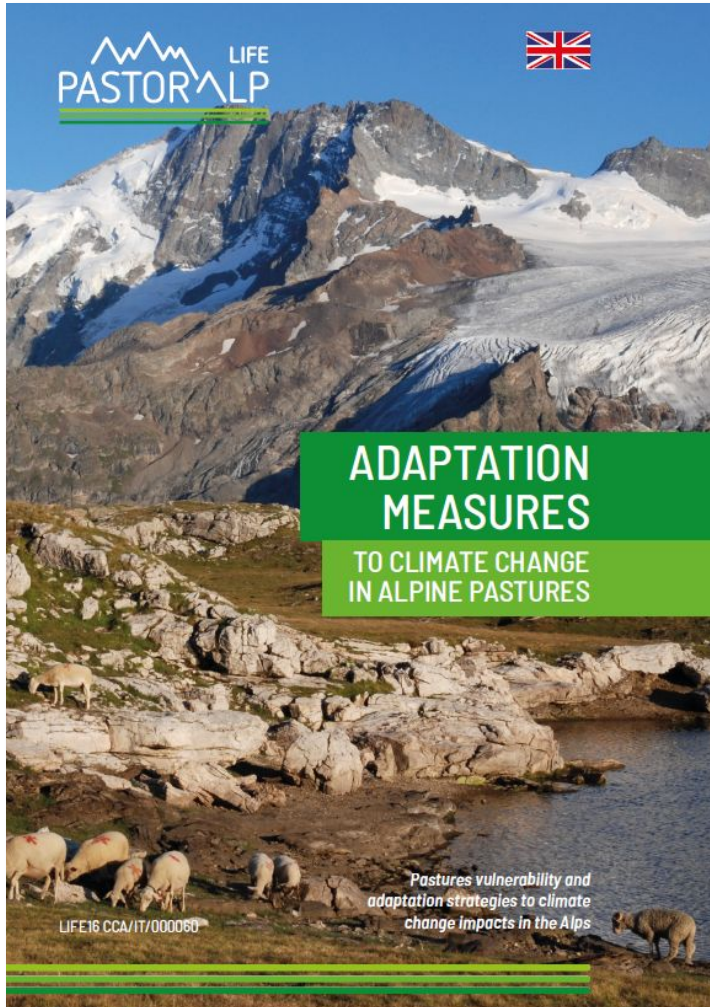


- Irrigation Water Requirements [mm]
- Yearly update
- Planning

EUROGEO WORKSHOP 2023



Some results - sustainability of data



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PASTORALP: the long-term legacy

The PASTORALP activities allowed the Agriculture Department of VdA to adopt the experimentation results from the **pilot sites** to the **regional scale** through:

- A formal **agreement** between the Department of Agriculture and ARPA;
- Preparation of CAP 23/27 payments measures with “**regional specifications**”
- Preparation of a regional **land/pasture registry** (satellite data);
- Development of **pasture plans** based on PASTORALP project results
- Meetings with **DG Agri** and **DG Envi** and with **AGEA**
- Tool for the estimation of **irrigation water requirements** (improvement for water resource management)
- Inclusion of adaptation measures and policy recommendations into the **CC Regional Adaptation Plan** (sector agriculture)



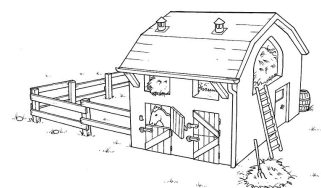
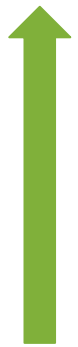


Joint position paper



Different perspectives:

1. Legislative (EU directives)
2. Regulations (State laws)
3. Implementation (LR/regional acts)
4. Administrative (tenders, procedures)
5. Inspection (checks)
6. Participatory (socio-eco-amb partnership)
7. Exploratory (R&D entities)
8. Associative (sector associations)
9. Consultative (technicians)
10. Lively (farmers/herders)





LESSONS LEARNED

- **Stakeholder engagement:** importance of a bi-directional process. (Agro-pastoral systems crucial for the mountains)
- **Local to global:** different visions with a common goal: understanding the complexity of European 'agriculture'
- **Public support:** useful if respecting territorial peculiarities (appropriate level of policy planning)
- **Results** became tools operational and effective





THANK YOU

Marta Galvagno & Pastoralp Team & Friends

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<https://www.pastoralp.eu/home/>





additional slides



Farmers' perception of climate change & capacity for adaptation



Impacts of climate change



Vulnerability of the entire system



Best adaptation strategies for adoption



Biodiversity conservation



Replicability
Governance and adoption

Mountain permanent grasslands (Multifunctionality)

EUROGEO WORKSHOP 2023



Welcome to the LIFE PASTORALP platform

Real time monitoring

Cartography

Impacts

Adaptation

Vulnerability

WebGIS

Phenocam NDVI
Snow cover
Temperature

Summer mean temperature (°C), GCM Ensemble, RCP 85 and period 2041-2070

temperature
<input type="checkbox"/> less coldest month
<input checked="" type="checkbox"/> summer mean temperature
<input type="checkbox"/> winter mean temperature
<input type="checkbox"/> less warmest month
<input type="checkbox"/> autumn mean temperature
<input type="checkbox"/> spring mean temperature

precipitation
<input type="checkbox"/> winter precipitation
<input type="checkbox"/> spring precipitation
<input type="checkbox"/> autumn precipitation
<input type="checkbox"/> summer precipitation

suitability
<input type="checkbox"/> suitability

ADAPTATION MEASURES | **ADAPTATION POLICIES**

Click on the **+** to expand the related elements | the definition for the words with dotted underline can be found in the glossary

Climate risks	Consequences on the environment (soil, vegetation and water) or animals
<ul style="list-style-type: none">Lack of snow, very dry winter (frost exposure) orEarly snowmelt followed by spring frost orLate spring or cold spring	
Early spring	Plant phenological stage already advanced at the arrival on the alpage
Spring drought and very little snow cover	

BIOΣEOΘHΛIZICTYΓ | **ΣOCIOECONOMIC** | **BIOΔIVEPCTIA**

PASTORALP - Suitability

The PASTORALP platform is intended to support pastoral communities to adapt to climate change and to raise awareness of stakeholders, target groups and general public on issues related to high mountain climate change vulnerability, impacts and adaptation.

BOLZANO 2-4 OCTOBER 2023



Some results - sustainability of data



International Journal of Applied Earth
Observation and Geoinformation

Volume 108, April 2022, 102718



On the distribution and productivity of mountain grasslands in the Gran Paradiso National Park, NW Italy: A remote sensing approach

[Gianluca Filippa](#)^a  , [Edoardo Cremonese](#)^a, [Marta Galvagno](#)^a, [Arthur Bayle](#)^b, [Philippe Choler](#)^b, [Mauro Bassignana](#)^c, [Anaïs Piccot](#)^c, [Laura Poggio](#)^d, [Ludovica Oddi](#)^e, [Simon Gascoin](#)^f, [Sergi Costafreda-Aumedes](#)^{g h}, [Giovanni Argenti](#)^h, [Camilla Dibari](#)^h

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Journal of Environmental Management

Volume 336, 15 June 2023, 117575



Research article

Uncertainties in the adaptation of alpine pastures to climate change based on remote sensing products and modelling

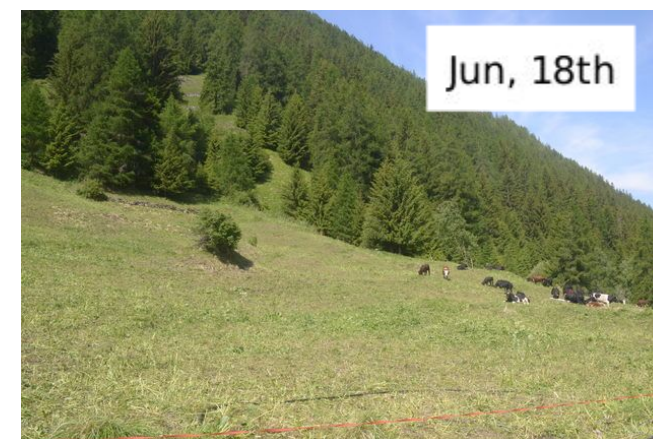
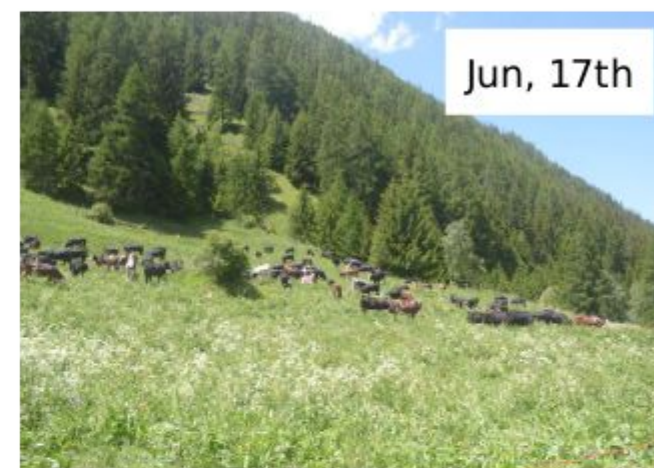
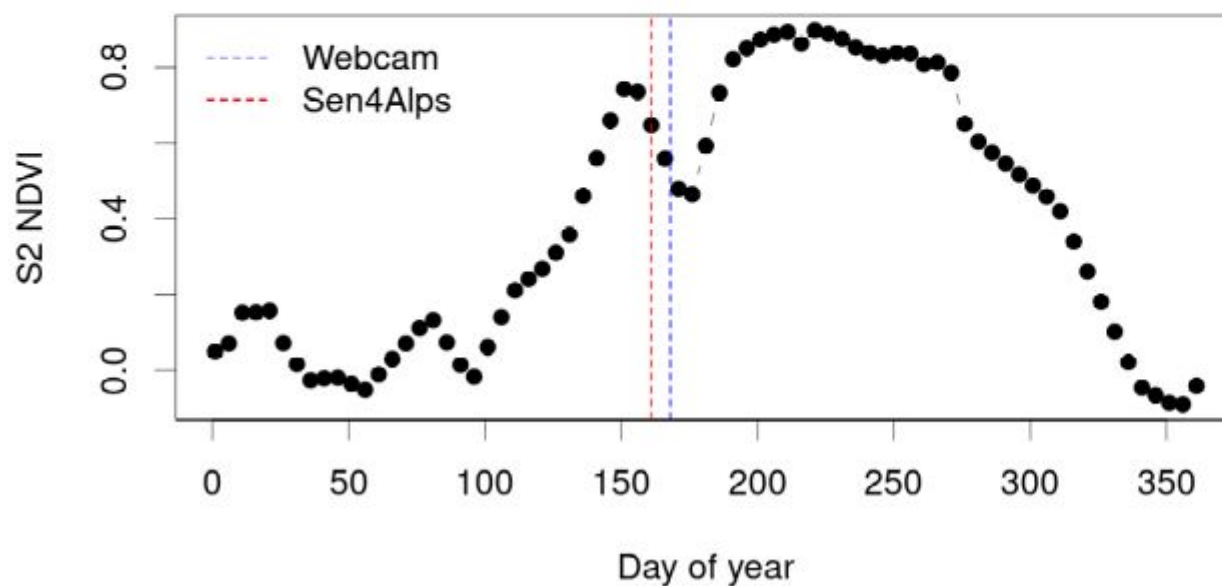
[L. Brilli](#)^{a b}  , [R. Martin](#)^c, [G. Argenti](#)^b, [M. Bassignana](#)^d, [M. Bindi](#)^b, [R. Bonet](#)^e, [P. Choler](#)^f, [E. Cremonese](#)^g, [M. Della Vedova](#)^e, [C. Dibari](#)^b, [G. Filippa](#)^g, [M. Galvagno](#)^g, [L. Leolini](#)^b, [M. Moriondo](#)^{a b}, [A. Piccot](#)^d, [L. Stendardi](#)^b, [S. Targetti](#)^h, [G. Bellocchi](#)^c

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Some results - sustainability of data

Mappatura utilizzi [taglio/pascolamento]





Some results - sustainability of data

Mappatura utilizzi [taglio/pascolamento]

