



RECIPE

SUDOE MONTCLIMA

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SUDOE MONTCLIMA Project: climate and natural risks in the SUDOE mountains

Improving the coordination and effectiveness of instruments for prevention, disaster management and rehabilitation of affected areas



Fires - Fire risk depends on many factors, including climatic conditions, vegetation, forest management practices and other socio-economic factors...



Droughts - Drought is one of the most complex natural disasters, impacting more people in the world. The frequency and severity of meteorological and hydrological droughts have increased in most parts of Europe....



Erosion - Soil erosion is the displacement of the upper layer of soil; it is a form of soil degradation. This natural process is caused by the dynamic activity of erosive agents...



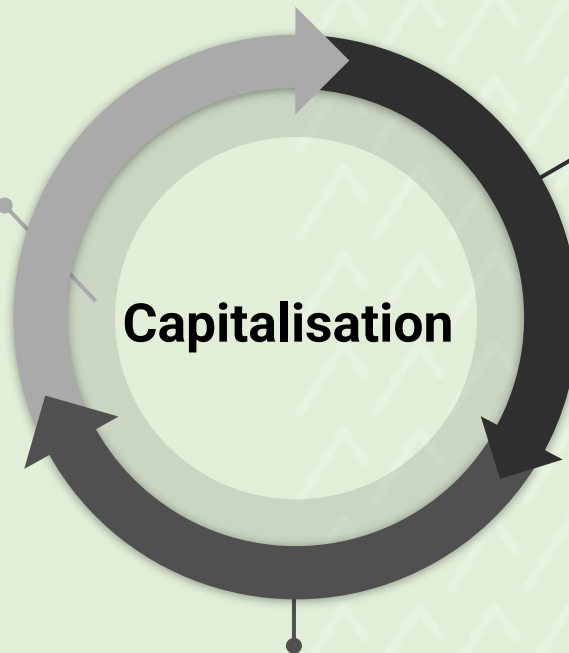
Floods - A flash flood is a rapid flooding of low-lying areas: washes, rivers, dry lakes and depressions. 'Flood risk' is defined as the likelihood of a flood occurring combined with its associated effects on people, commerce and the environment...

1. Improve knowledge on the management of natural climate risks in mountain areas
2. Implement pilot cases to improve knowledge on natural risk prevention and management strategies
3. Define a Transnational Strategic Framework with recommendations
4. Transfer risk prevention and management tools in mountain areas to priority stakeholders.



GT 1: Capitalisation

1.3. Technical and legal analysis of natural risk management in the study area



1.1 State of the art of natural risk management practices in mountain areas

1.2 Information system on past and future vulnerability to 4 hazards in mountain areas of SUDOE

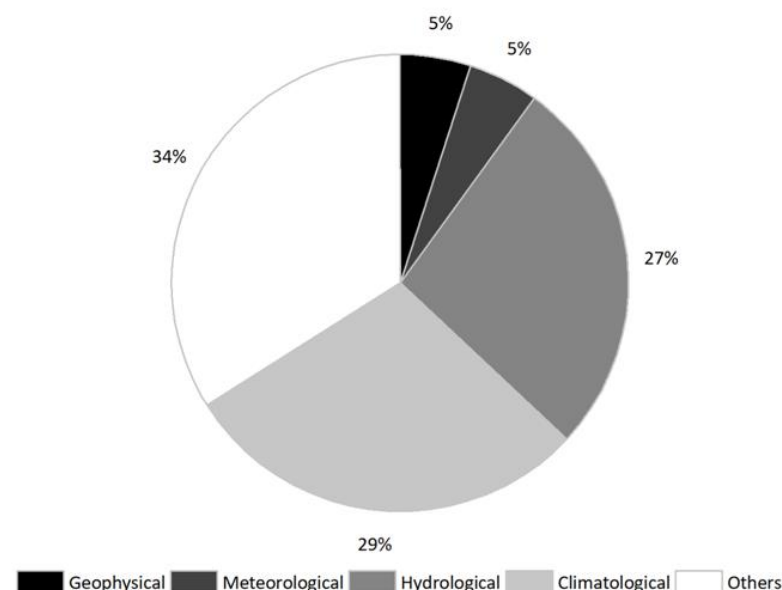
GT 1: Capitalisation

1.1 State of the art of natural risk management practices in mountain areas

- 70 projects analysed in the SUDOE mountain area
- Report "State of the art study of risk management and prevention practices with a transnational approach in the SUDOE area"
- Online database of good practices

Disaster Subgroup	Number of projects*
Climatological	
Wildfire	25
Drought	17
Hydrological	
Flood	11
Landslide	5
Meteorological	
Extreme temperature	3
Storm	1
Geophysical	
Earthquake	2
Mass movement	2
Multirisks	
Multi-hazards	28

Composition of our database according to the EM-DAT classification



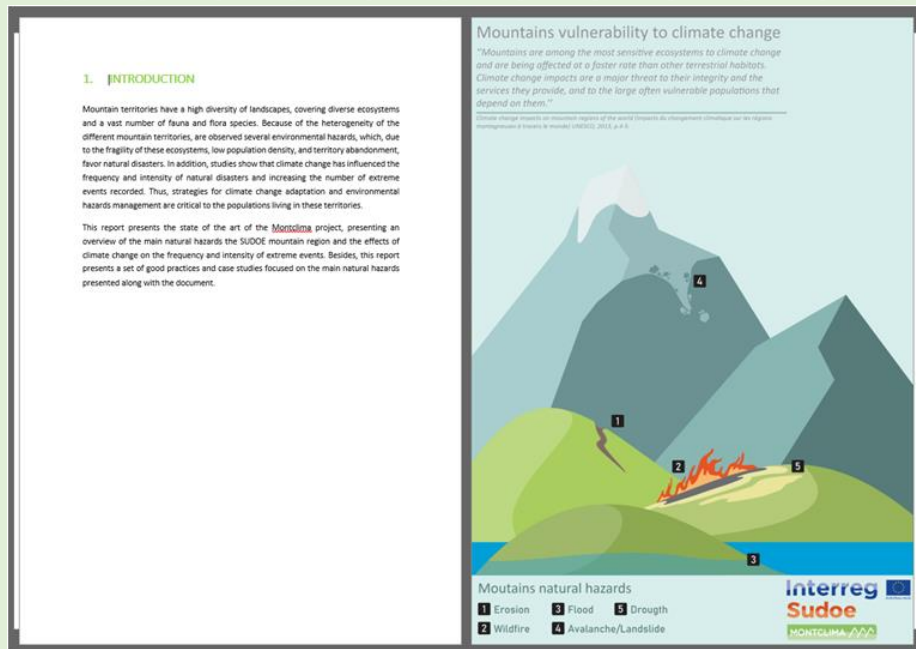
GT 1: Capitalisation

Projects selected for capitalisation missions

Report: to be published in November 2021

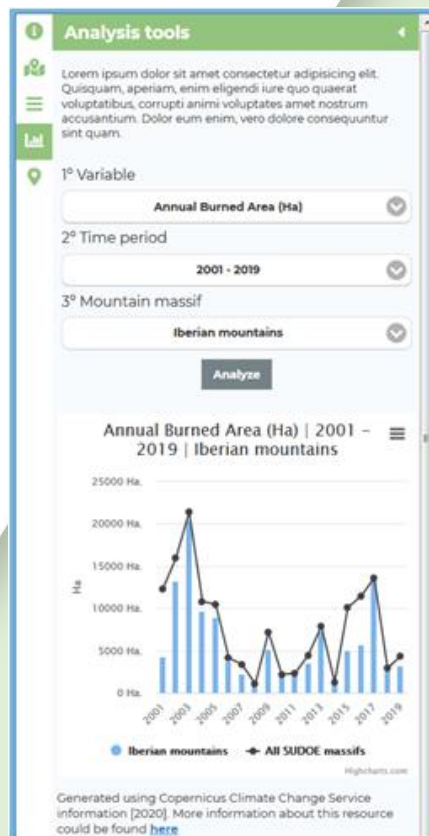
Acronym		
1 st group	2 nd group	3 rd group
BINGO	PEG	LIFE+ DEMORGEST
LIFE Montado-Ada pt	LIFE Landscape Fire	LIFE MONTERRAT
PIRAGUA	ECTAdapt	RISK-AQUASOIL
PHUSICOS	PLURIFOR	AA-FLOODS
REINFFORCE	LIFE MIDMACC	SECURUS2
FORLAND	ROCKTHEALPS	FLORAPYR
GREENRISK4ALPS	CANOPEE	AGEO

- On-site visit
- Interviews with project leaders
- Detailed (cartographic) information on each good practice
- Integration of the results in the map viewer



GT 1: Capitalisation

1.2 State of the art and analysis of the past and future (potential) vulnerability of the project areas to natural hazards



Web application - Map viewer

- **Vulnerability Information System**
- **Historical data**
- **Future forecasts - potential risks**
- **A section with local resources of interest**
- **4 risks: fires, erosion, floods, droughts**
- **Best practice section**
- **Pilot cases section**
- **Customised analysis section**

More than just a map viewer

<https://montclima.eu/en/geoportal>

GT 1: Capitalisation



Forest fires

- ☐ Active Fire Hotspots MODIS (7 days)  
- ☐ Areas affected by wildfires (2000 - 2017)  
- ☐ Projected forest fire danger (2071-2100)  
- ☐ EFFIS Fuel Map  
- ☐ Fire Danger (FWI)  



Droughts

- ☐ Droughts frequency 1950-2012  
- ☐ Projected trends in drought frequency 2041-2077  
- ☐ Sensivity to Desertification Index (SDI)  
- ☐ Combined Drought Indicator  



Erosion

- ☐ Global soil erosion 2012  
- ☐ Soil erosion by water  
- ☐ Soil erosion in forestland  
- ☐ Soil Erosion Control  

^ Rainfall Erosivity

- ☐ Global Rainfall Erosivity  
- ☐ Future erosivity 2050  
- ☐ Erosivity density  
- ☐ Annual R Factor  
- ☐ Spring R Factor  
- ☐ Summer R Factor  
- ☐ Autumn R Factor  
- ☐ Winter R Factor  

^ Soil Organic Carbon

- ☐ Soil organic carbon (mean 1971-2000) (t/ha)  
- ☐ Soil organic carbon (2°C period) (t/ha)  
- ☐ Climate change signal for 2°C period (%)  

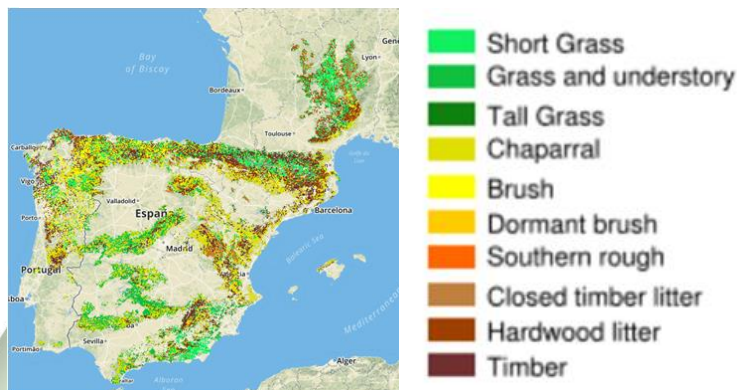


Floods

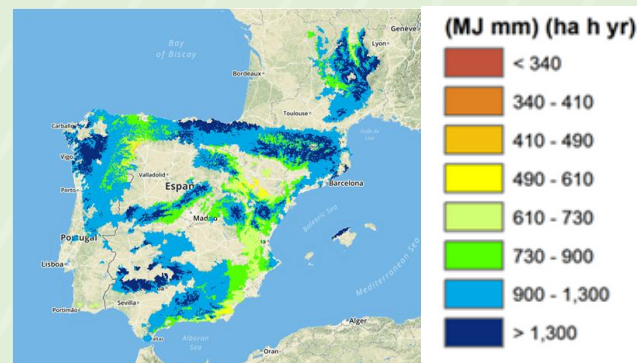
- ☐ Accumulated Precipitation (mm)  
- ☐ Extreme precipitation 1971-2000 (mm/day)  
- ☐ Change in extreme precipitation for +2°C (mm/day)  
- ☐ Reporting Points  
- ☐ Flood hazard map 50-year return period  
- ☐ Flood hazard map 100-year return period  
- ☐ Flood hazard 10 years - Spain (m)  
- ☐ Flood hazard 100 year (m)  
- ☐ 20 Year Return Period Exceedance (%)  
- ☐ Flood Protection Levels  
- ☐ ERIC Affected area  
- ☐ Landslide Susceptibility  
- ☐ Projected relative change of mean discharge at +1.5°C warming level  
- ☐ Projected relative change of mean discharge at +3.0°C warming level  
- ☐ Projected relative change of extreme low discharge at +1.5°C warming level  
- ☐ Projected relative change of extreme low discharge at +3.0°C warming level  
- ☐ Projected relative change of extreme high discharge at +1.5°C warming level  
- ☐ Projected relative change of extreme high discharge at +3.0°C warming level  

GT 1: Capitalisation

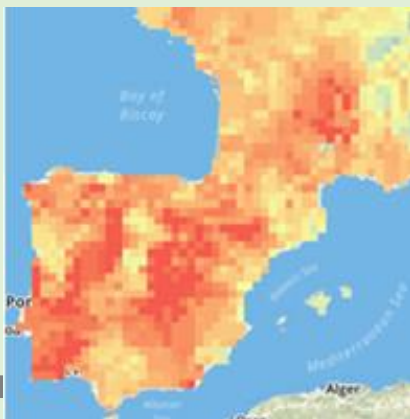
Fuel model map



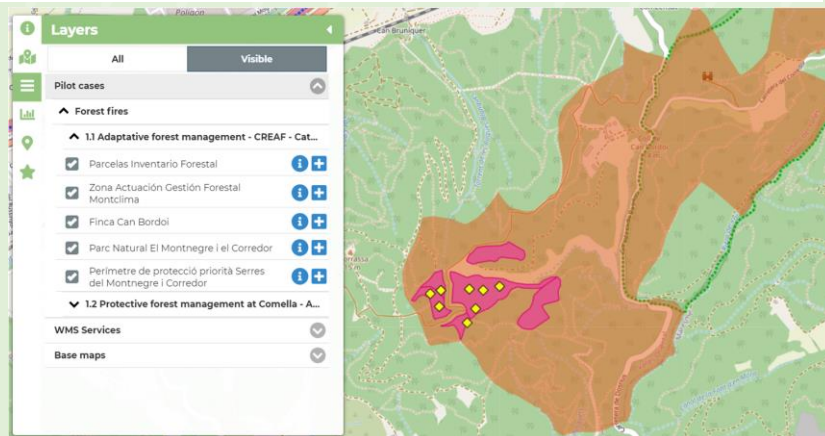
Potential erosion in 2050



Drought frequency 1950 - 2012



Map details of the 5 MONTCLIMA pilot cases



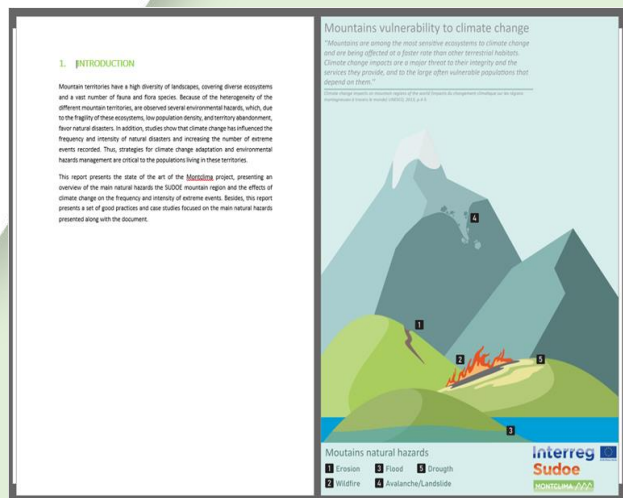
GT 1: Capitalisation

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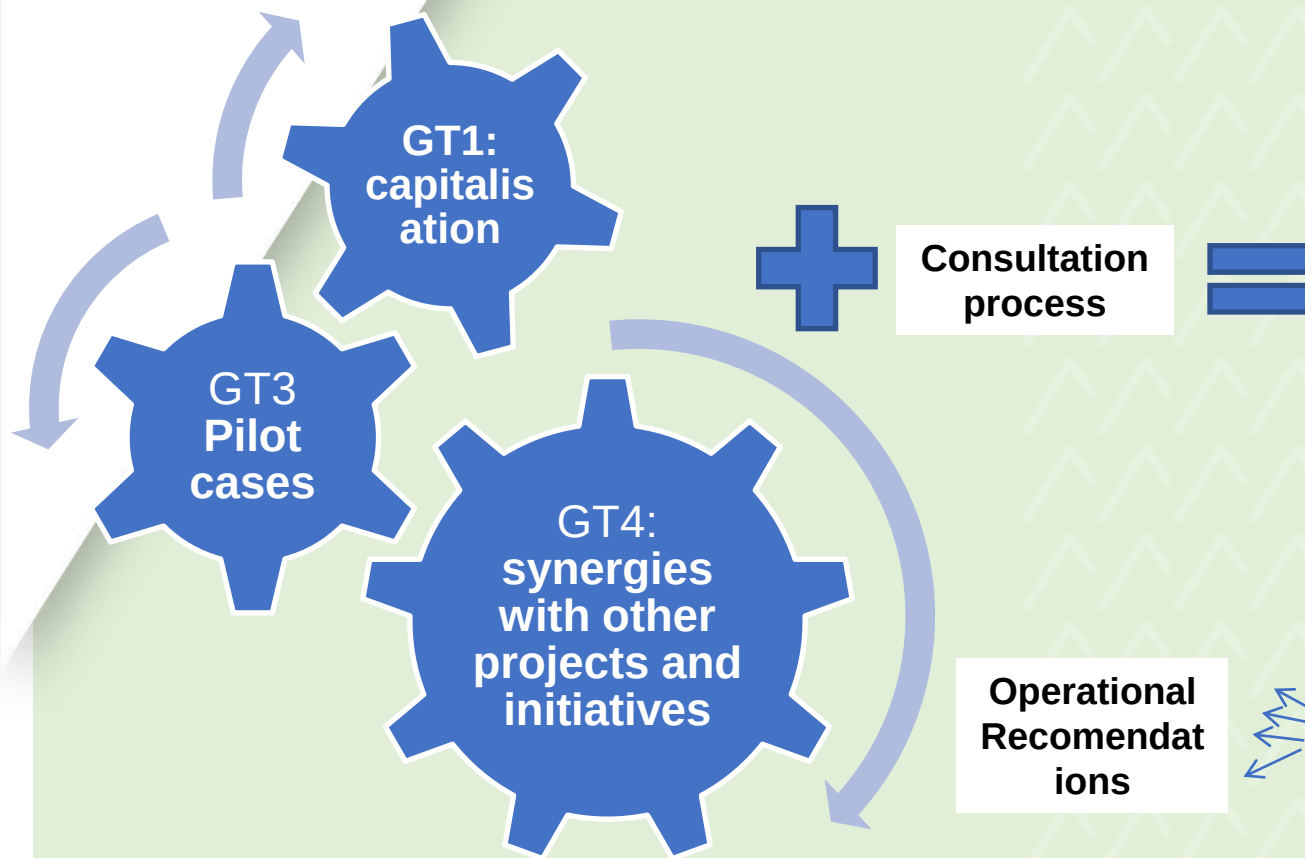
Report: november 2021

A report with the conclusions of the technical and legal analysis of the strategic documents, analysed from a transnational perspective

- Collaborative research of the main technical and legal documents on the 4 risks of the SUDOE mountain area.
- Comparative analysis of the literature.
- Recommendations to improve the management and prevention of these 4 risks from a transnational perspective.



WG 2: Transnational Strategic Framework for Natural Risk Management



Strategic recommendations

- S.R.1. Knowing the natural risks, the exposure and the vulnerability of the territory
- S.R.2. Reduce the vulnerability of territories
- S.R.3. Reduce the impacts of phenomena
- S.R.4. Improving the resilience of mountain territories

WG 2: Transnational Strategic Framework for Natural Risk Management

Operacional Recomendaciones approach

- Promotion of the **use of innovative methodologies** for the valuations and identification of areas subject to natural hazards, their assessment, etc. (remote sensing)
- Promotion of **active management** of the territory through: (illustrate with examples of good practices and pilot cases)
- **Adaptive forest management** as a tool for enhancing agro ecosystems and improving resilience.
- Maintain **traditional agriculture**, extensive breeding as...
- **Conciliation, Compensation and Valuation formulas for the rural population of mountain territories**
- **Cross-border dimension**: look for formulas that unite the territories either in the shared management of the territory (ex: pastoral associations on both sides of the Pyrenees), than in the exchange of knowledge (ex: cross-border technical-scientific groups), as well as in the fight and prevention against catastrophic events (...).
- Recommendations for **integrating climate variability in DDR** strategies
- To establish **synergies with adaptation to climate change**

WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

- Development of 5 pilot cases (France, Spain and Andorra)
- Practical guides
- Pilot test report



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Elaboration of a multi-risk management plan - Valentin Valley - Pyrénées Pyrénées Atlantiques

Forest management in a Mediterranean holm oak forest: Catalunya

Erosion tests in sloping vineyards: Rioja

Restoration of a microdiike system with plant material: Andorra

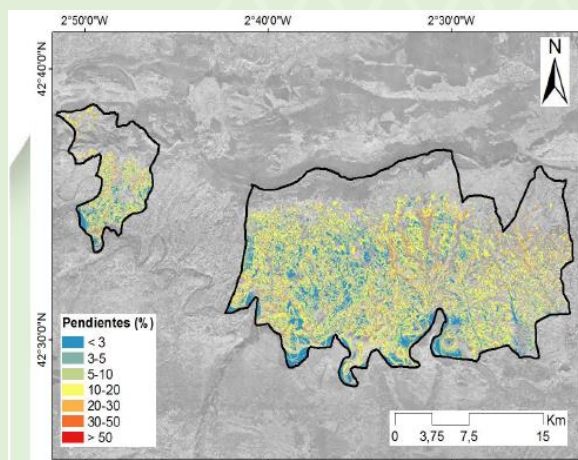
Adaptive forest management to minimise forest fire risk: Andorra

WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

Erosion tests in sloping vineyards : Rioja Alavesa



- In the Basque Country, RIOJA ALAVESA is the vineyard area with a Mediterranean climate (see map below).
- It represents an area of approximately 13,000 hectares.
- There is a very important part at risk of erosion (slopes >10%).



Pendiente	Area (ha)	% superficie
<3%	1914,7	14,34
3-5%	1761,5	13,19
5-10%	4052,53	30,35
10-20%	4314,11	32,31
20-30%	1106,66	8,29
30-50%	201,64	1,51
>50%	0,86	0,01

WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

THE OBJECTIVES OF THE TRIAL :

- Demonstrate the benefits of using vegetative covers in vineyards at risk of erosion (no tillage, intermediate tillage with vegetative cover, conventional).
- Evaluate the agronomic and oenological differences depending on the management.



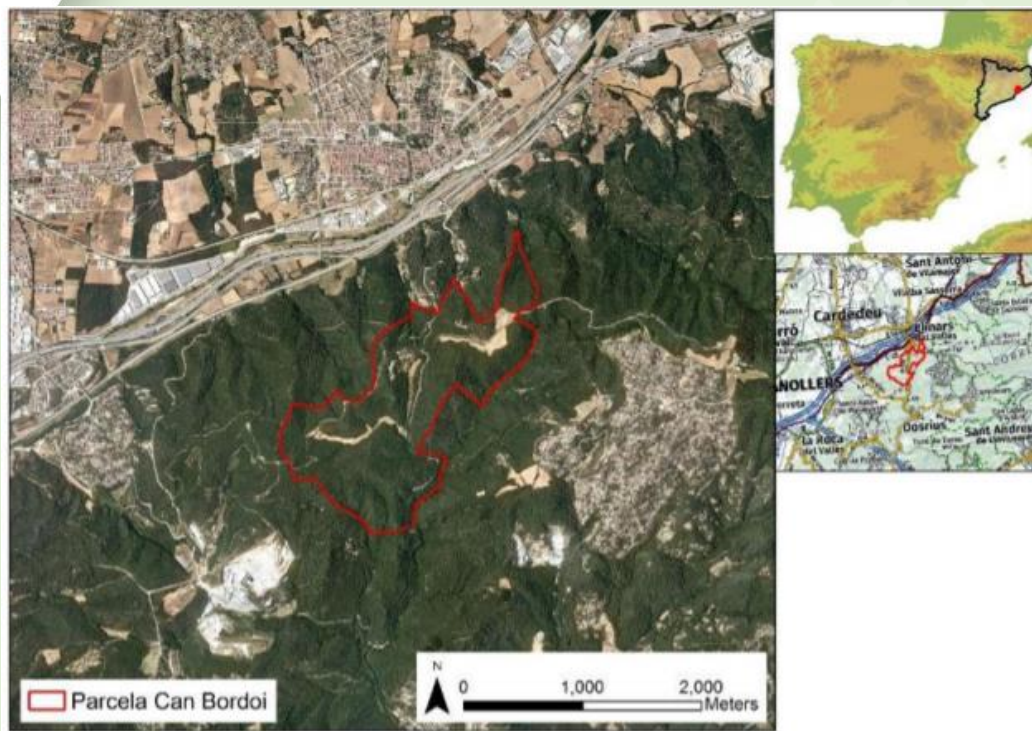
WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

Preliminary results: erosion

Tratamiento	Tierra acumulada (Caja Gerlach)			Tierra en agua escorrentía			TIERRA TOTAL EROSIONADA		
	(g/m2)	(kg/ha)	*Vol (m3/ha)	(g/m2)	(kg/ha)	*Vol (m3/ha)	(g/m2)	(kg/ha)	*Vol (m3/ha)
Cubierta Vegetal Espontánea (CV)	78	775	1,2	66	659	1,0	143	1434	2,2
Laboreo Convencional (LAB)	302	3021	4,5	95	950	1,4	397	3970	6,0
<i>Dif. CV vs LAB</i>	-74%			-31%			-64%		

WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

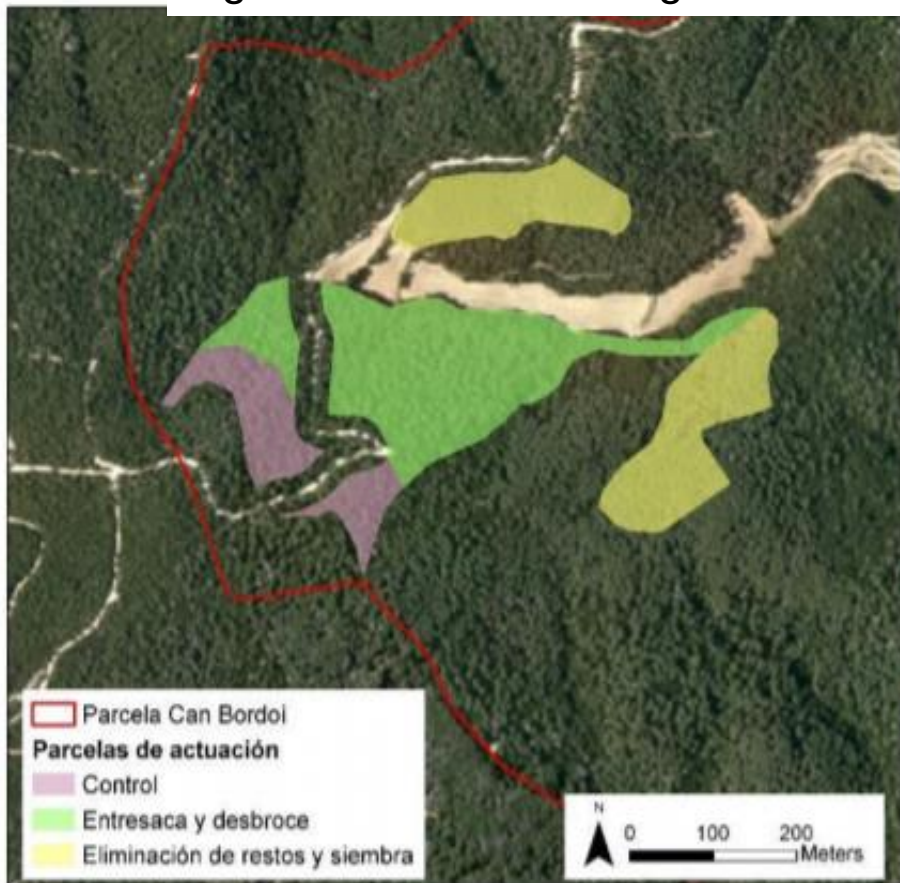
Pilot trial of adaptive forest management in a Mediterranean holm oak forest at high risk of fire: Montnegre-Corredor massif (Catalunya)



WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

MONTCLIMA

Pilot trial of adaptive forest management in a Mediterranean holm oak forest at high risk of fire: Montnegre-Corredor massif (Catalunya)



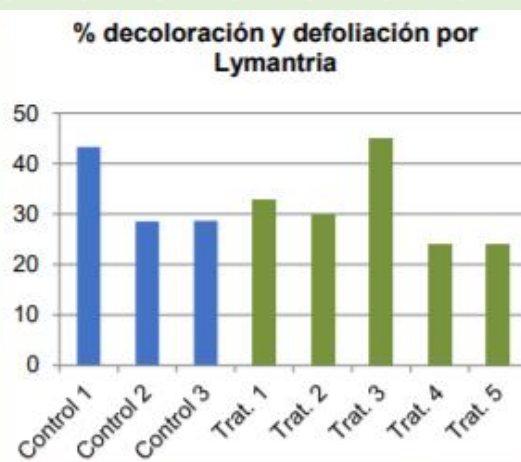
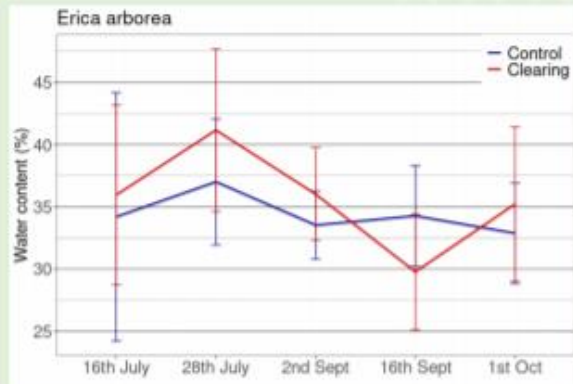
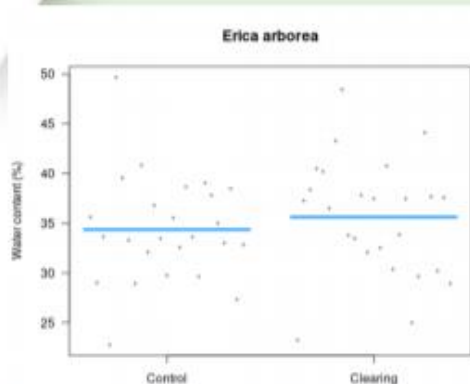
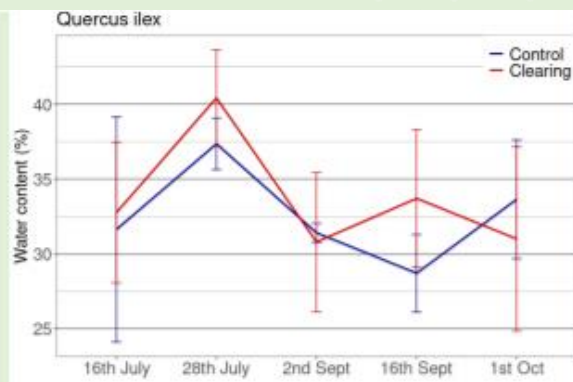
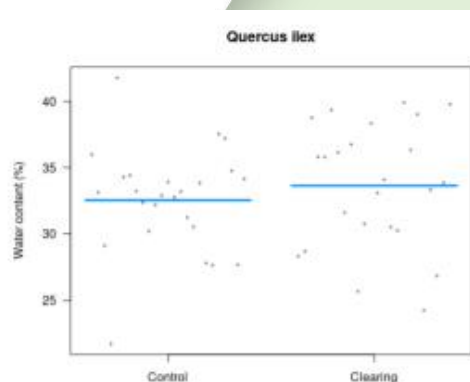
Adaptive forest management

- Thinning or selective cutting and clearing (yellow)
- Control plot of 1.87 ha. (purple)
- Recovery of the agrosilvo-pastoral mosaic on 4.7 ha:

Elimination of the remains of stone pines and pasture sowing (green).

WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

Treatment results on: **Fuel moisture** and **forest health**



The measures applied increase :

- the moisture content of the fuel
- Slightly improve health status

WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

Application of adaptive forest management measures to minimise the risk of forest fires in a forest with a protective function: **Andorra**

Bosc del Maïans, de la Obaga de la Parròquia d'Andorra la Vella 1575m.



- Protective function against the dissipation of rocks and boulders generated by erosion.
- This area is very popular with visitors, with a network of paths running through it.

WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

Ongoing measures

- Characterisation of the protection forest and its vulnerability to forest fires.
- Simulations of fire and fire behaviour to implement the best preventive measure in 2 areas.
- Implementation of a preventive forest management action to reduce the risk of large-scale fires.
- + Restoration of a micro-dike system with plant material: recovery of nature-based measures to reduce the risk of erosion in a protected area (public water system at risk).



WG 3: Design and implementation of joint action plans for the prevention and management of natural risks

Forest fires, erosion and torrential hazard in the Eastern Pyrenees

Action 1: State of knowledge on the impact of fires on forest vegetation and consequences on erosion and torrential hazard

Action 2: Instrumentation in public forests

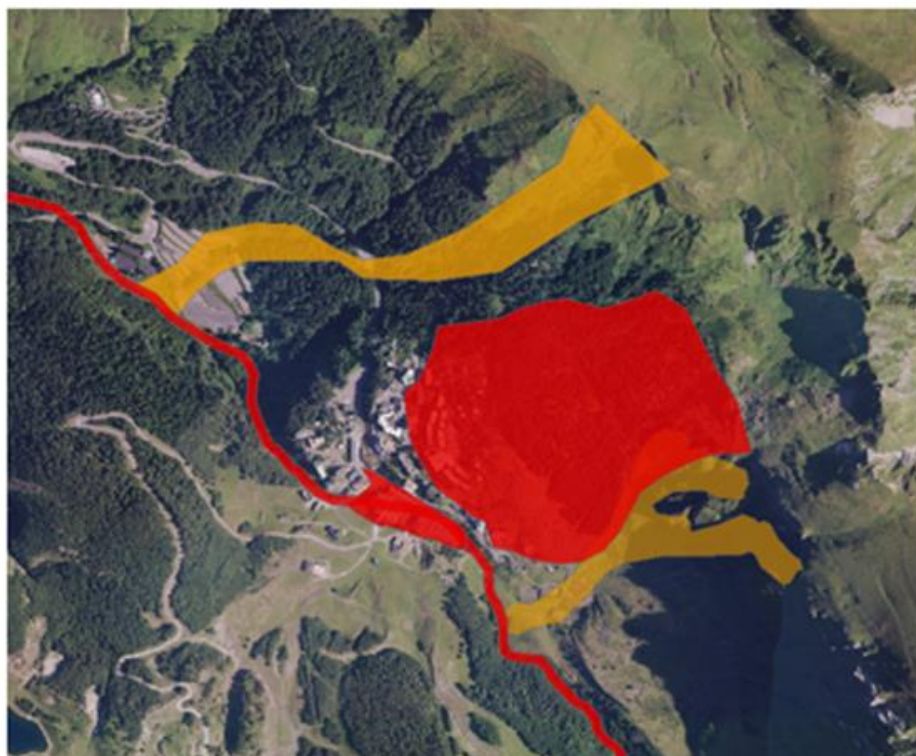
Action 3: Departmental mapping of areas where fires have the greatest impact on the torrential hazard

Elaboration of a multi-risk management plan - Valentin Valley - Pyrénées Pyrénées Atlantiques



Elaboration of a multi-risk management plan - Valentin Valley - Pyrénées Pyrénées Atlantiques

Evaluation des enjeux :



 Enjeu Fort

 Enjeu Moyen

Next steps

- risk qualification
- Definition of an action programme
- Application of a methodology for prioritising actions to optimise resilience (with elected representatives)



604 Avalanches

11 Chutes de blocs



33

Glissements/Coulées de Boue

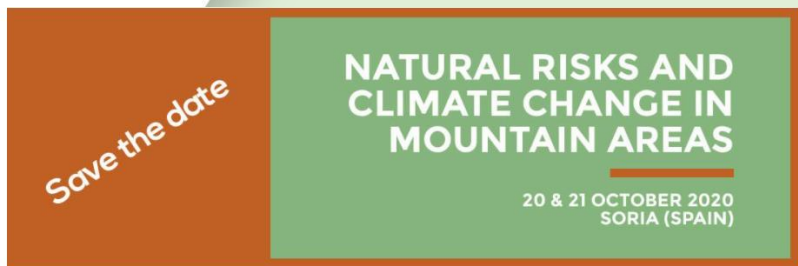
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Événements torrentiels

WG4 transfert

Transferability seminars

Soria (Espagne): 60 participants



Nouvelles : [ici](#)

Rapport de transférabilité :



Andorra la Vella (Andorra):
Flood risk prevention in
mountain areas



www.montclima.eu

Leiria (Portugal): 110 participants



Nouvelles : [ici](#)

Rapport de transférabilité : à venir

Barcelona (Spain): 110 participants



Climate change and risk management in the Pyrenees: next steps



Pyrenean Climate Change Strategy

A cooperation strategy for climate action



 **Climate**

 **Resilient Natural Spaces**

 **Adapted Mountain Economy**

 **Governance**

 **Population & Territory**

Population & Territory

- A** Ensure levels of preparedness, prevention and training in the face of climate extremes, emerging diseases and natural hazards.
- B** Exploit emerging opportunities in the Pyrenees in the face of the demographic challenge.
- C** To achieve optimal levels of environmental awareness and education of citizens in the face of climate change.

Thanks for your attention!

