Defining Climate Information Needs

Demonstrating the value of climate information across sectors

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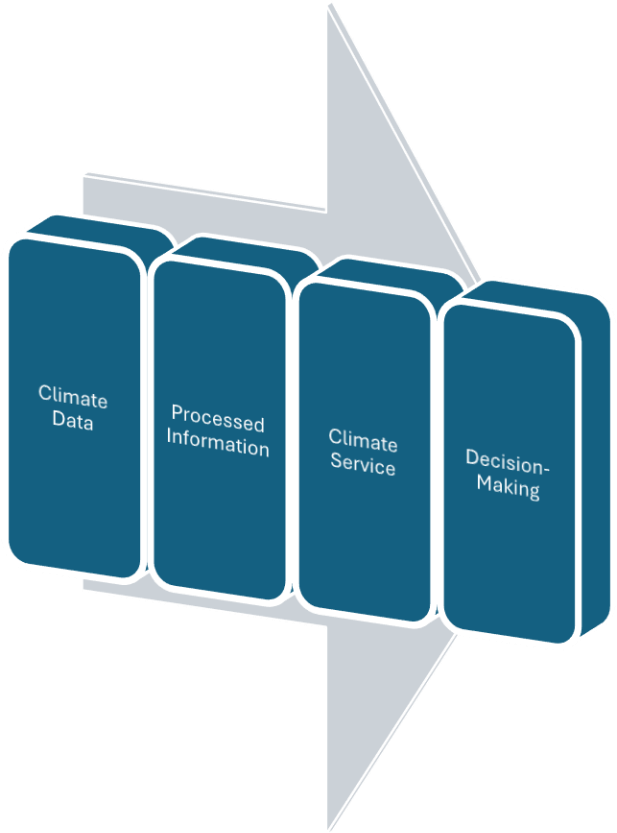
👉 What are climate information needs?

- They are **specific types of climate data or knowledge** required by a user or stakeholder to make decisions.
- Not just about "having data", but about **knowing what information is relevant**, when it is needed, and how it should be delivered.
- Can relate to:
  - **Human well-being (water, agriculture, energy, health and risk management)**
  - **Planning** (e.g., choosing a crop variety)
  - **Operations** (e.g., scheduling outdoor events)
  - **Risk management** (e.g., infrastructure design and maintenance)
  - Leisure (eg: tourism, sports, culture...)



Why is it crucial to define climate information needs?

- Avoids **mismatch** between what is produced and what is needed.
- Ensures **user relevance**: information must be tailored to context and sector.
- Improves **impact and usability** of climate services.
- Enables **effective co-creation** between climate experts and stakeholders.

If you don't ask the right question, you won't get a useful answer.

🎯 Goal of this presentation

- To **demonstrate** how climate information needs vary across sectors.
- To show how each case requires **different variables, formats, and timescales.**
- To make the case that climate services must be **custom-built**, not one-size-fits-all (co-created)
- Show how sectorial activities also aid in identifying climate change

Let’s explore six real-world examples where understanding climate information needs made all the difference.

🏂 Case 1 – Snow Tourism Index: Climate information for winter tourism

- The Snow Tourism Index helps determine which days are suitable for skiing and other winter sports by assessing snow and weather conditions.
- 🎯 **Relevance:**
    - Assists **ski resort managers** in operational planning (e.g., opening days, snowmaking).
    - Supports **tourists** in choosing when and where to travel.
    - Guides **local authorities** in tourism development strategies and season extension.
- 🌡️ **Climate information needed:**
    - **Air temperature** (to assess snow quality and melting risk)
    - **Snowfall** (quantity and frequency)
    - **Snow depth** (ground coverage over time)
    - **Solar radiation** (affects snow melting and visitor comfort)
    - **Wind speed and direction** (safety and comfort for skiers)

Snow Tourism INDEX

Cerrar

INDICADOR DE CONDICIONS METEREOLÒGIQUES

$X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_8 + X_9$

+

INDICADOR DE L'ESTAT DE LA NEU

$X_{10} + X_{11}$

+

INDICADOR D'INFRASTRUCTURES DE NEU

$X_{12} + X_{13} + X_{12} + X_{13}$

INDICADORS DE TEMPORALITAT

$* X_{tdia}$ $* X_{season}$

+

$$(I_{CONDICIONS} + I_{NEU} + I_{INFRASTRUCTURES}) * (I_{tdia}) * (I_{season})$$

Snow Tourism INDEX

- CONDITION INDEX
- USER INDEX
- STAKEHOLDER INDEX

INDICADOR DE CONDICIONS METEREOLÒGIQUES

$X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_8 + X_9$

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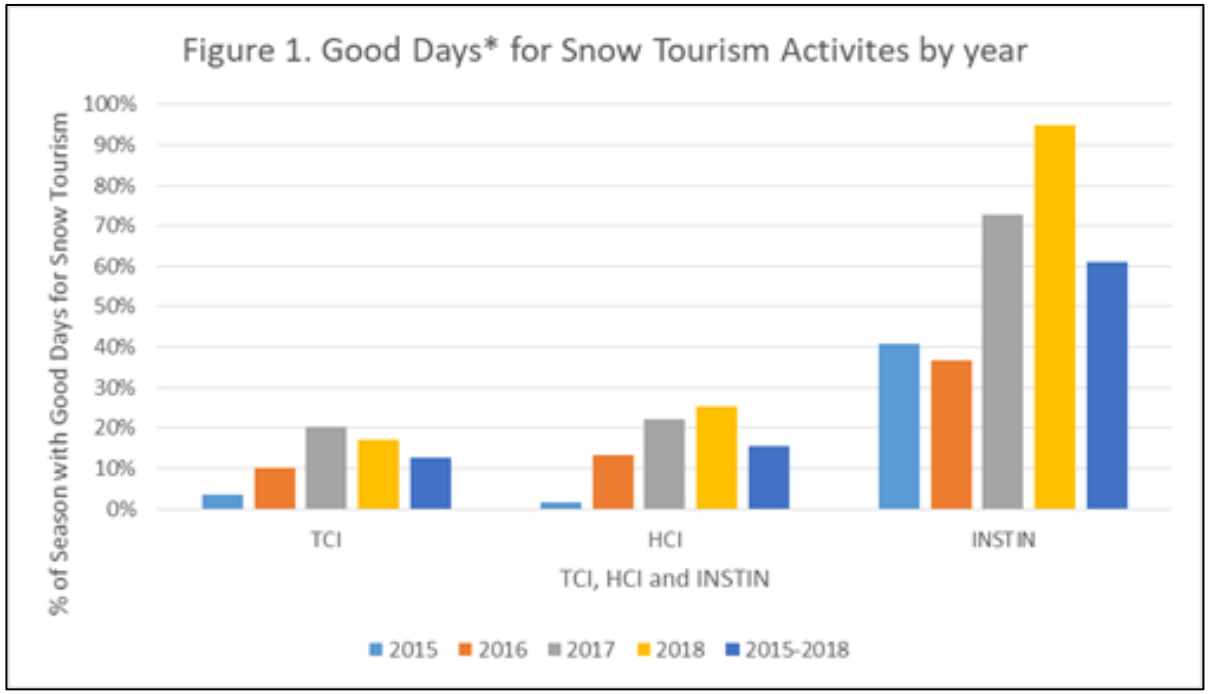


Figure 1. Good Days* for Snow Tourism Activites by year
% of Season with Good Days for Snow Tourism
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
TCI
HCI
INSTIN
TCI, HCI and INSTIN
2015
2016
2017
2018
2015-2018

+

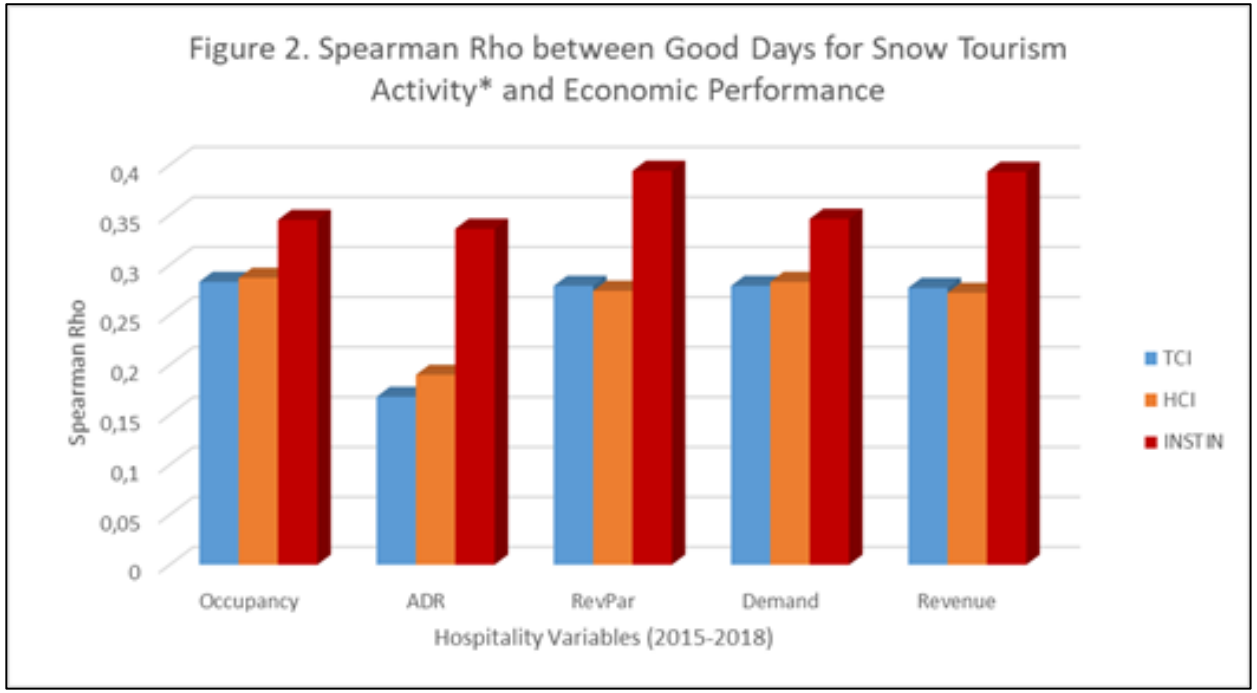
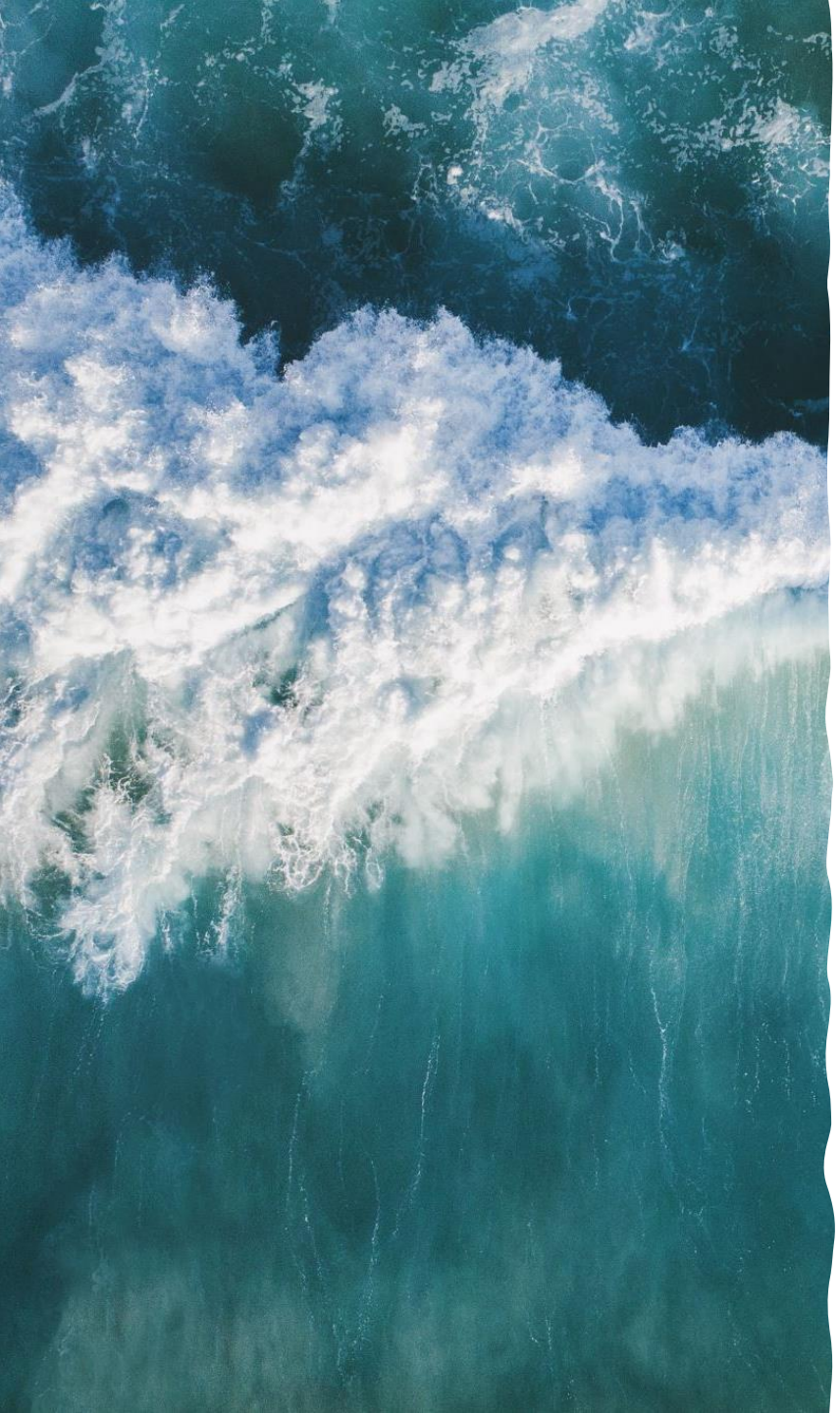
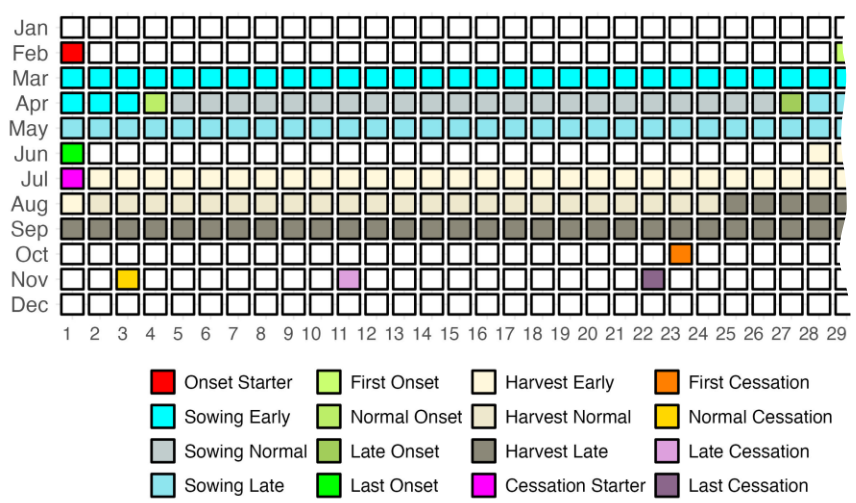


Figure 2. Spearman Rho between Good Days for Snow Tourism Activity* and Economic Performance
Spearman Rho
0,4
0,35
0,3
0,25
0,2
0,15
0,1
0,05
0
Occupancy
ADR
RevPar
Demand
Revenue
Hospitality Variables (2015-2018)
TCI
HCI
INSTIN



🏄 Case 2 – Surf Optim Days: Climate-informed coastal tourism

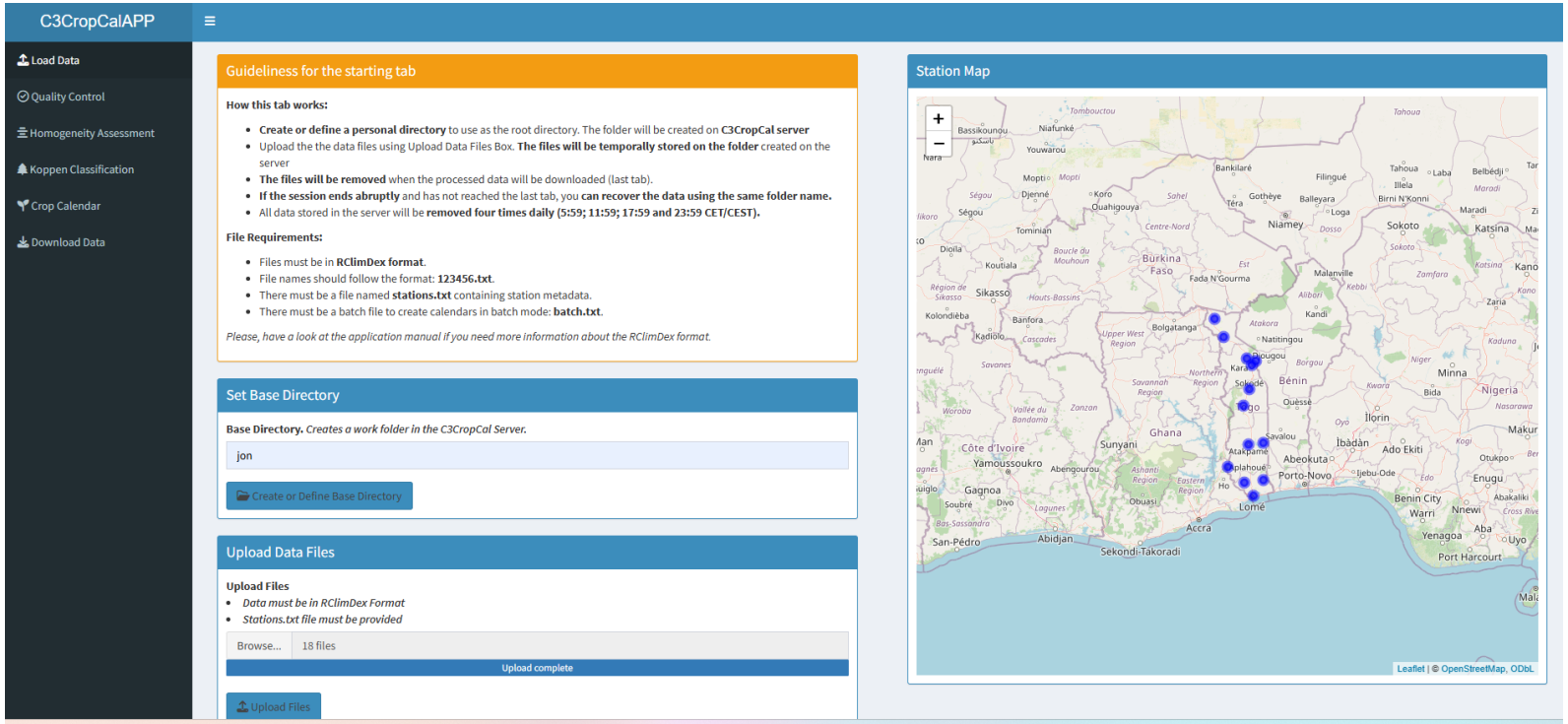
- Surf Optim Days identifies the most favorable days for surfing by analyzing marine and atmospheric conditions.
- 🎯 **Relevance**
  - Supports **surf schools** and **coastal tourism operators** in planning and marketing.
  - Helps **surfers** — locals and tourists — to make better decisions about where and when to surf.
  - Contributes to **safety** and **satisfaction** in water-based recreational activities.
- 🌊 **Climate information needed:**
  - **Wind direction and speed** (key for wave formation and safety)
  - **Wave height and frequency** (linked to storm systems and swell potential)
  - **Sea surface temperature** (important for comfort and wetsuit needs)
  - **Air temperature** and **humidity** (affect perceived conditions)
  - **Atmospheric pressure** (can help forecast storm-driven swell)

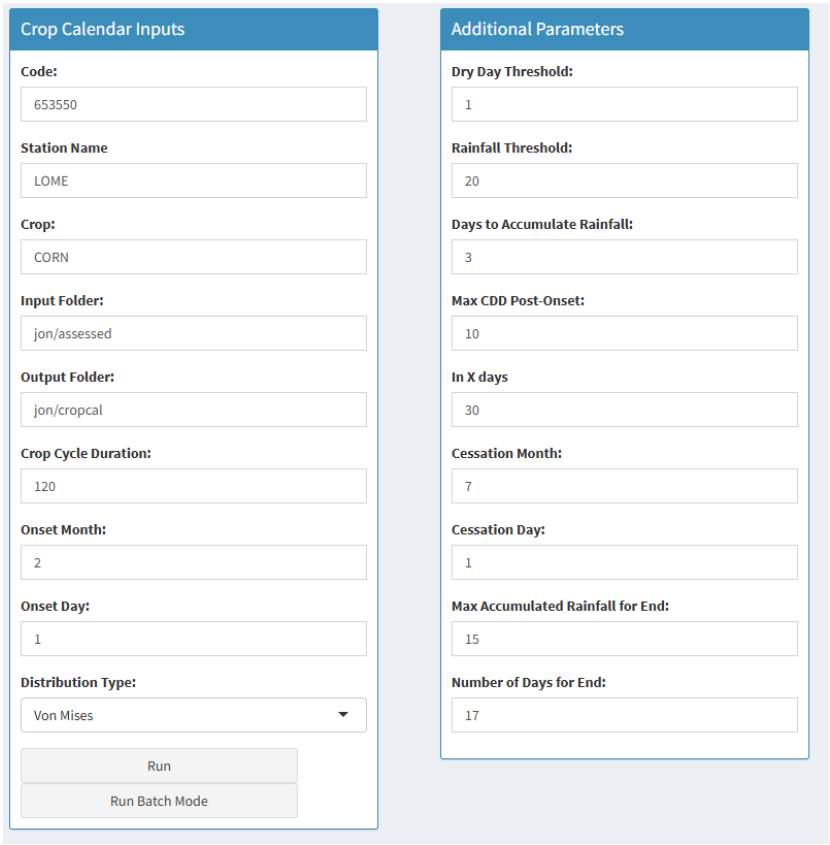


🌾 Case 3 – Climatological Crop Calendars: Climate-smart agricultural planning

- Crop calendars help farmers decide when to plant and harvest based on local climate patterns. They align crop cycles with rainfall, temperature, and growing season conditions.
- 🎯 **Relevance**
  - Supports **smallholder farmers** and **agricultural advisors** in optimizing crop yield.
  - Useful for **extension services** and **food security planning**.
  - Crucial for **adapting to climate variability and change** in agriculture.
- 🌦️ **Climate information needed (for tropical regions)**
  - **Precipitation patterns** (onset and cessation of rainy season)
  - **Minimum and maximum temperature** (crop germination, flowering, and maturity)

Case 3 – Climatological Crop Calendars: Climate-smart agricultural planning

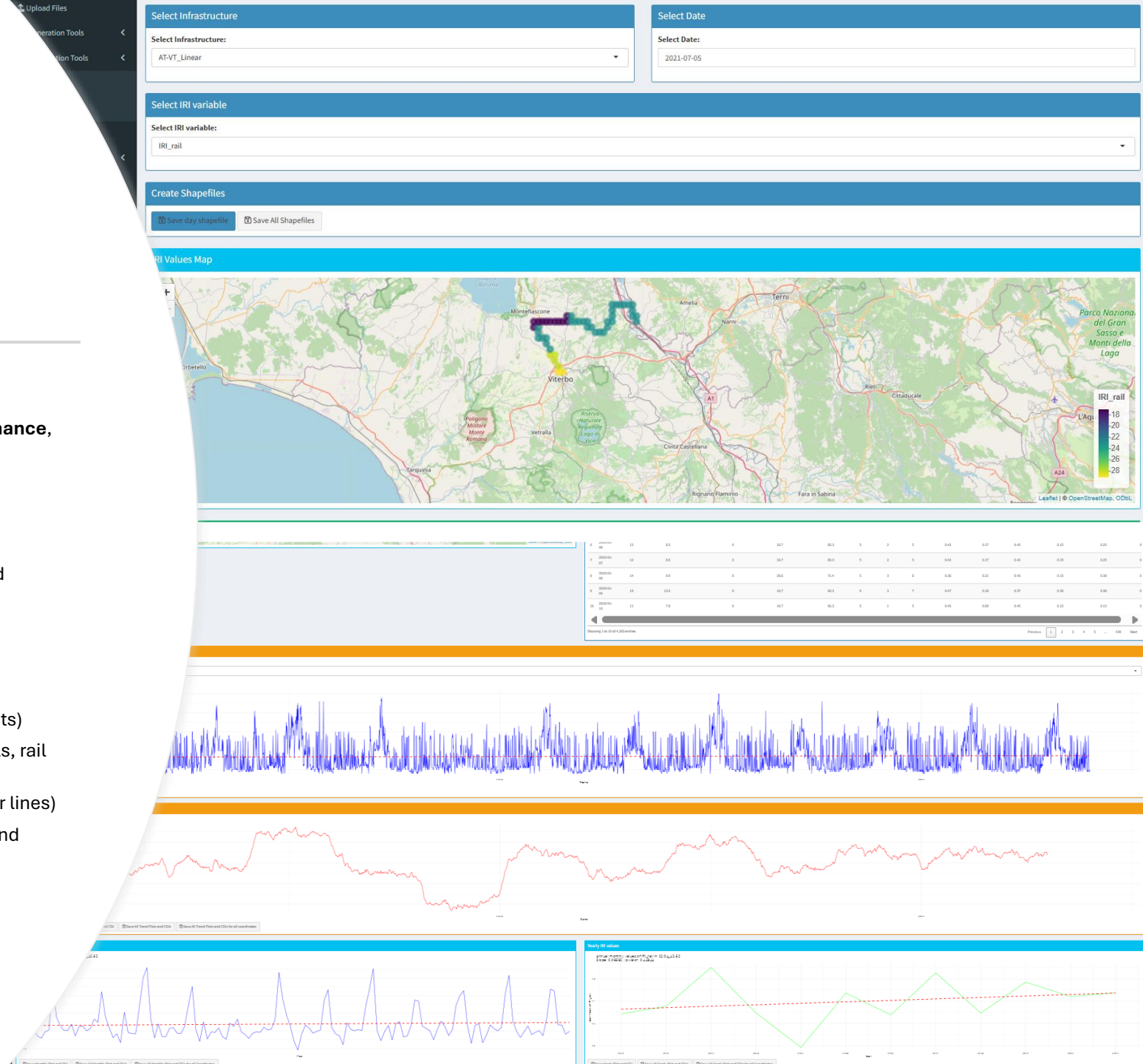


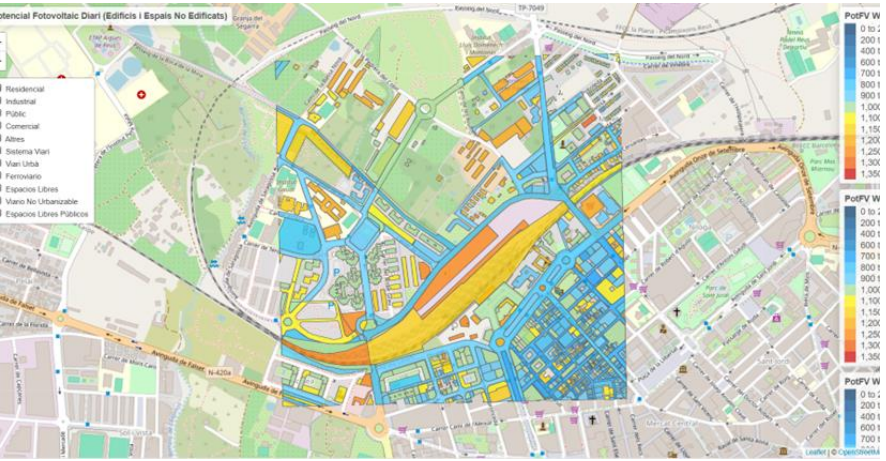


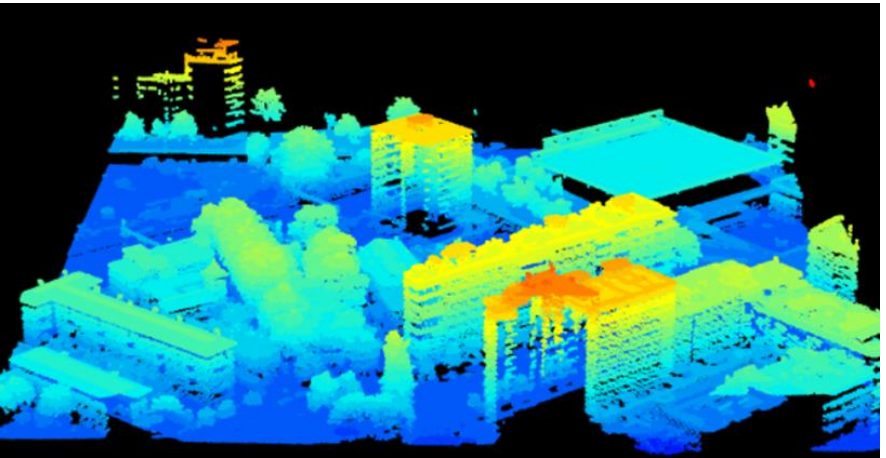
http://195.20.235.67:3838/C3cropcal/App/

🏗 Case 4 – Infrastructure Risk Index: Climate resilience for critical systems

- The Infrastructure Risk Index assesses the vulnerability of transportation systems to climate-related hazards. It helps prioritize **adaptation**, **maintenance**, and **investment** decisions.
- 🎯 **Relevance**
  - Essential for **urban planners**, **civil engineers**, and **public authorities**.
  - Used to design **resilient infrastructure** that can withstand extreme events.
  - Supports **long-term planning** under changing climate conditions.
- 🌪 **Climate information needed:**
  - **Extreme precipitation** (flash floods, road and rail washouts)
  - **Heatwaves and extrem temperature** (impact on materials, rail buckling, power systems)
  - **Strong winds** (damages to aboveground structures, power lines)
  - **Seasonal and long-term variability** (trends in exposure and risk)
  - **Compound events** (e.g., heat + drought + fire risk)





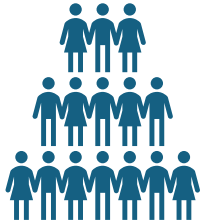


☼ Case 5 – Solar Potential in Reus: Climate data for energy transition

- This case estimates the **solar energy potential** for rooftops in Reus, helping citizens, companies, and municipalities assess the viability of installing **solar panels** for self-consumption
- 🎯 **Relevance**
  - Useful for **homeowners**, **urban planners**, and **local energy communities**.
  - Supports **decarbonization strategies** and local **energy resilience**.
  - Encourages **investment** in renewable energy with location-specific data.
- ☼ **Climate information needed:**
  - **Hourly solar radiation** (direct and global)
  - **Cloud cover** (to estimate shading and variability)
  - **Air temperature** (affects panel efficiency)
  - **Roof orientation and tilt** (geospatial layer, combined with climate data)
  - **Seasonal and diurnal variability** (to optimize energy production)

Case 6 – ClicAPP: Climate thresholds for safe Castells practice

ClicAPP is a tool designed to help human tower groups (colles castelleres) assess whether weather conditions are safe and comfortable for rehearsals or performances.



Relevance

Developed for **Castells teams**, cultural organizers, and local councils.

Helps minimize **health risks** related to heat, humidity, and slippery ground.

Supports decisions about **cancelling, relocating, or adjusting** events.

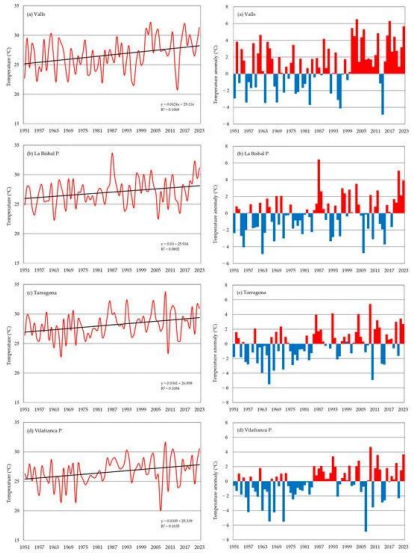
Climate information needed

Air temperature and relative humidity

Heat index thresholds (e.g., moderate, high, extreme)

Wind speed (affecting stability)

Rainfall or wet surfaces (affecting safety of the base and balance)



Climate Change and Castells (human towers)

- Impact of climate change in human tower summer events
- Unesco Intagible Heritage
- Co-creation of adaptation actions

Conclusion

- All these examples start from a **well-defined climate information need.**
- It’s not only about having data — it’s about **translating climate data into usable, valuable information.**
- **Take-home message: Co-creation** and user engagement are key to building meaningful climate services.