

## USE CASE 4

# RURAL DROUGHT & FLOOD (Southern Europe)

Partners: IEEC/ICGC (ES), Region of Central Macedonia (EL)

## OVERVIEW

Use Case 4 addresses rural challenges in Southern Europe, namely Catalonia, due to extreme climate variations, such as intense rainfall and prolonged droughts, which impact agriculture, forestry, biodiversity, and wildfire risks by altering biomass, fuel loads, and soil moisture. The **decline in water availability leads to conflicts over groundwater and surface water** use among agriculture, ecosystems, industries, and public consumption, while reduced soil moisture and forest degradation exacerbate wildfire spread and complicate ecosystem recovery. Unpredictable **extreme rainfall increases flood risks** in densely populated coastal areas and river basins with limited water management. To tackle these challenges, it is crucial to identify, monitor, and map soil moisture, root zone conditions, and groundwater levels to detect environmental changes, assess impacts, and evaluate soil capacity and forest stress. This real-time monitoring supports the **development of effective adaptation policies** based on weather patterns and climate variability, with regular monitoring of soil conditions and vegetation biomass being essential due to the rural water balance being driven by evapotranspiration.



## USE CASE 4 IN DETAIL

### Pain points & user needs

Stakeholders in Catalonia report a **lack of data on the actual consumption of groundwater** from urban areas and agriculture, evapotranspiration and precise knowledge about the impact of groundwater status on coastal environments.

### Available tools and data examples

- **AEMET** and **SMC** Meteo Data: includes free meteorological and atmospheric data, can be downloaded through an OpenData portal
- **European Groundwater Measurements**: European Freshwater Information System for Spain, containing data on water abstraction and freshwater resources
- **ICGC soil measurement station network (XMS-CAT)**: publicly accessible soil moisture measurement data from the XMS-CAT that belongs to the International Soil Moisture Network and includes soil moisture and temperature
- **ICGC Maps**: key geospatial information can be provided as inputs to architectures to modelling water cycle interactions such as **soil maps** and **land cover maps**
- **Menut Mission Satellite images for Catalonia**: interactive map viewer of satellite imagery
- **Meteorological forecast of Catalonia**: two daily weather maps (morning & afternoon), updated daily



### HOW PCP WISE CAN HELP

- Continuous monitoring of soil moisture (surface, subsurface, and root zone), groundwater, and evapotranspiration levels
- Integration of smart meteorological data and Earth observation datasets (spectral analysis) to develop risk indicators for drought-related crises affecting agriculture and ecosystems
- Long-term climate monitoring based on past spatio-temporal trends to forecast future climate scenarios and assess risks in different sectors (agriculture, forestry, and natural ecosystems)

