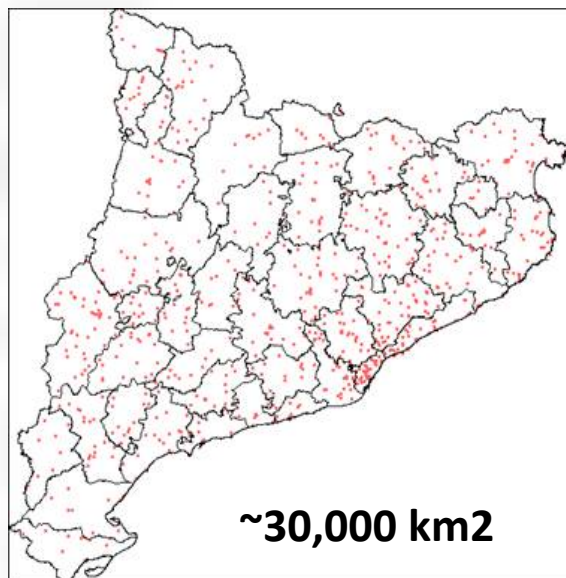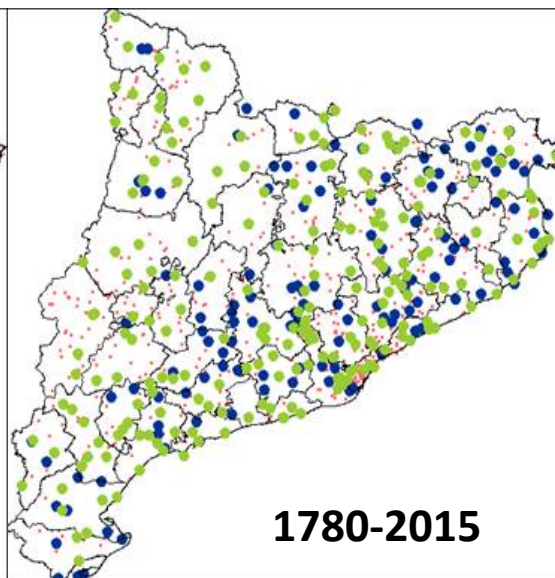# Drought Monitoring and hydric balance in Catalonia

1. Initial datasets

2. Current State of Indeces and cartography

3. Ongoing developments

4. Future guidelines

Generalitat de Catalunya

Servei Meteorològic de Catalunya
meteo.cat

Initial PPT and TMP datasets

Generalitat de Catalunya

Servei Meteorològic de Catalunya — meteo.cat

~30,000 km2

1780-2015

1996-2015

XEMA Alta Muntanya
XEMA

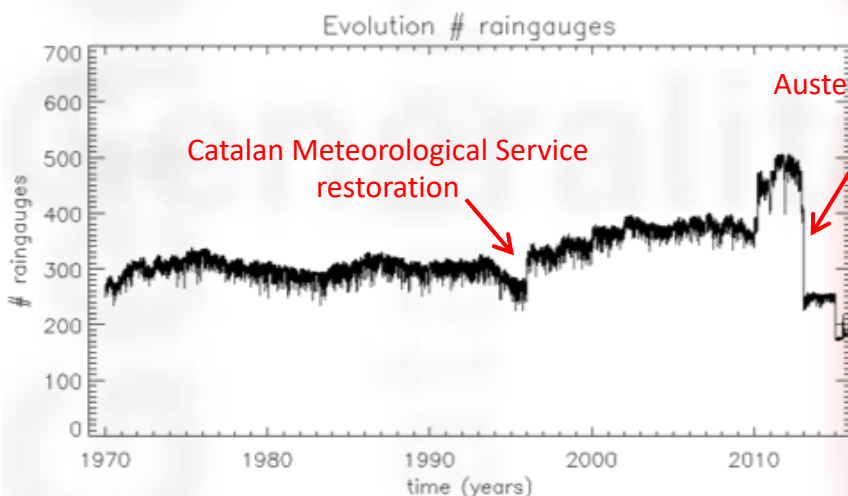**Initial distribution
(National historical database)**
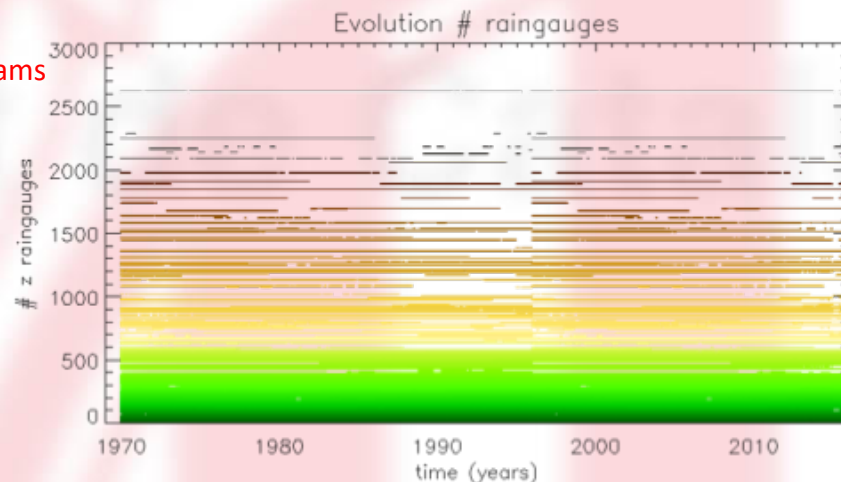
**New spots detected
Time coverage improvement**
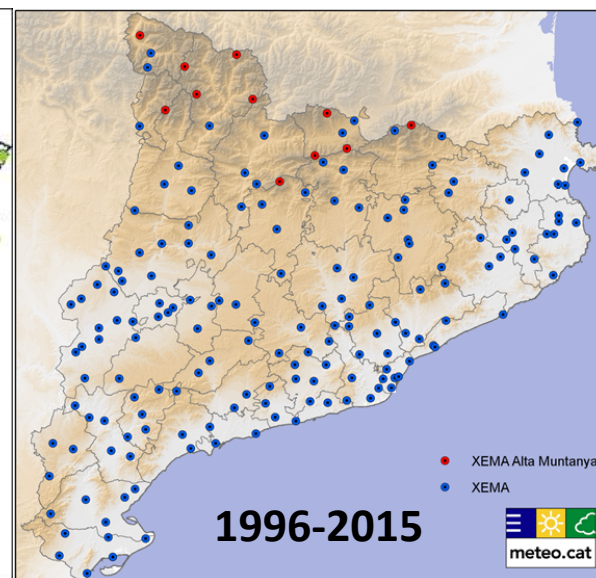
**Automatic weather station network (SMC)
High mountain network**

More than 1250 raingauges and 660 temperature stations

Evolution # raingauges

Austerity programs

Catalan Meteorological Service restoration

Daily Evolution of stations number (1970-2017)

Evolution # raingauges

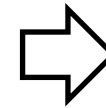**Number of raingauges according to their altitude (1970-2017)**

Current Indeces and characteristics

Current End-User:

Standardised Precipitation Index (SPI) (McKee et al, 1993)
Data needs: daily accumulated precipitation
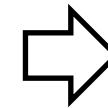Updated monthly(at site locations) and daily(1x1km grid)

⇨ **CATALAN WATER AGENCY**

Reference Evapotranspiration (ETo) (FAO, 1998)
Data needs: temperature, relative humidity, radiation, wind,
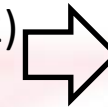Updated hourly(at site locations)

⇨ **WATERING OFFICE & AGRICULTURE DEPT.**

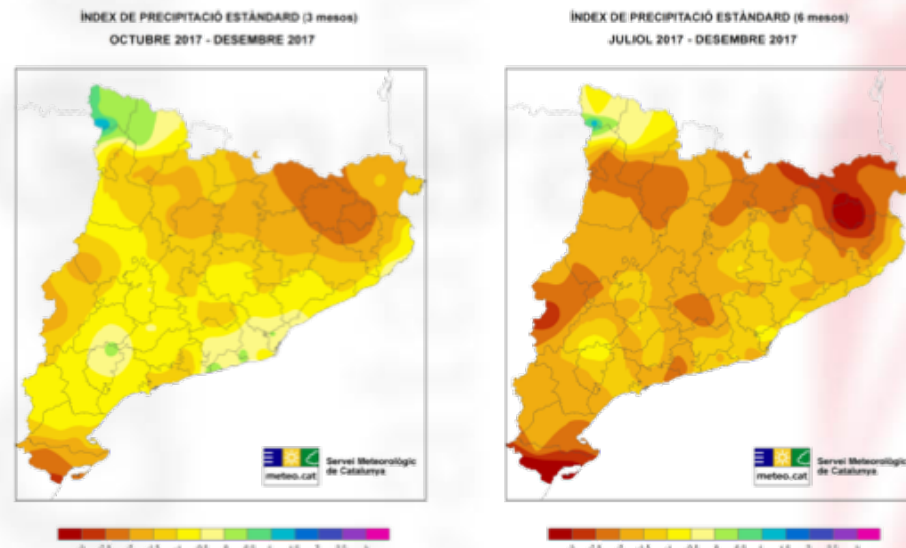**Drought Code (DC) from the Canadian Forest Fire Index** (Turner, 1972)
Data needs: daily accumulated precipitation and 12UTC temperature
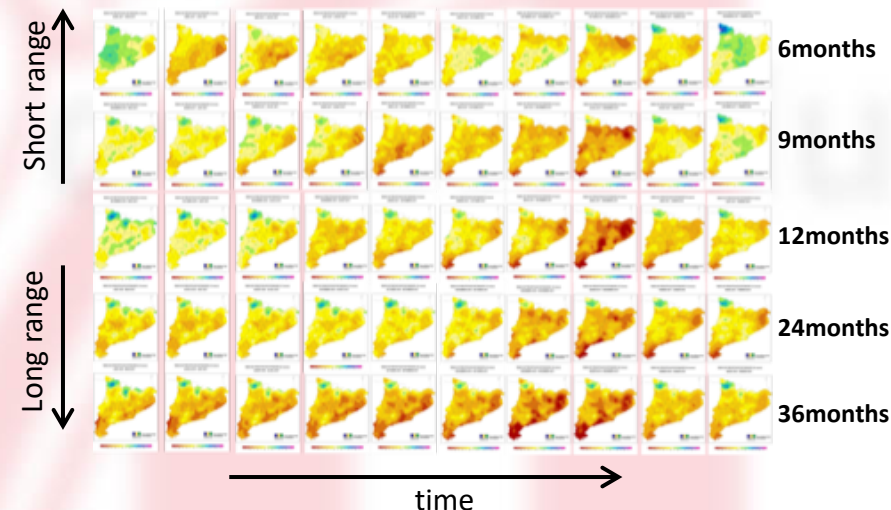Updated daily (1x1km grid)

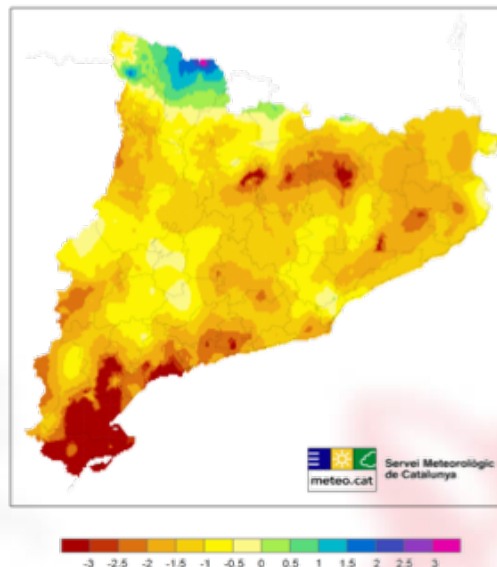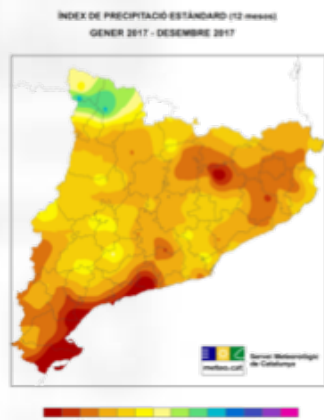⇨ **CATALAN FOREST FIRE PREVENTION SERVICE**

CARTOGRAPHY AT THE SMC WEBSITE:

ÍNDEX DE PRECIPITACIÓ ESTÀNDARD (3 mesos)
OCTUBRE 2017 - DESEMBRE 2017

ÍNDEX DE PRECIPITACIÓ ESTÀNDARD (6 mesos)
JULIOL 2017 - DESEMBRE 2017

DROUGHT EVOLUTION

Short range

Long range

6months
9months
12months
24months
36months

time

Ongoing developments
SPI(Standardised Precipitation Index)

Generalitat de Catalunya

meteo.cat — Servei Meteorològic de Catalunya

1. RESOLUTION IMPROVEMENT

ÍNDEX DE PRECIPITACIÓ ESTÀNDARD IPE12
01/01/2018

ÍNDEX DE PRECIPITACIÓ ESTÀNDARD (12 mesos)
GENER 2017 - DESEMBRE 2017

Old resolution (station kriging)
NO GRID!!

New grid resolution (1x1 km)

2. NEW AGGREGATION INTERVALS
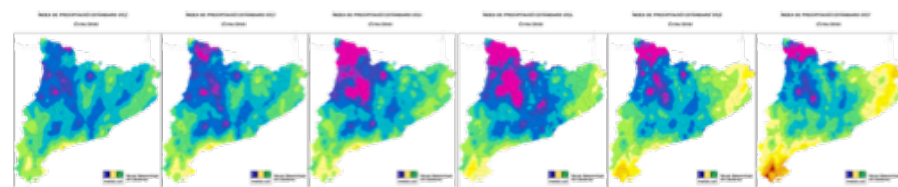
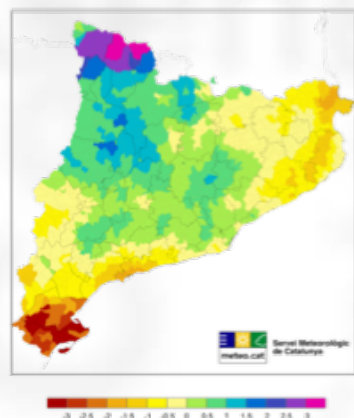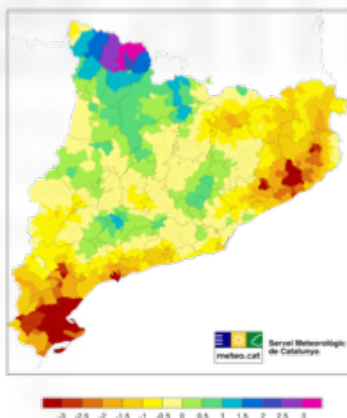**2 months** ← **Short range drought**
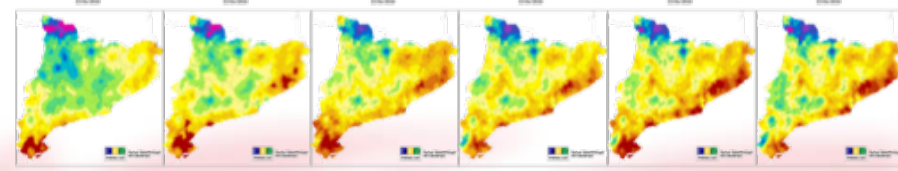
Long range drought → **72 months**

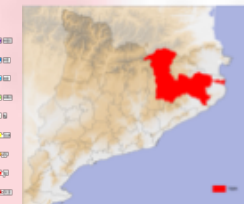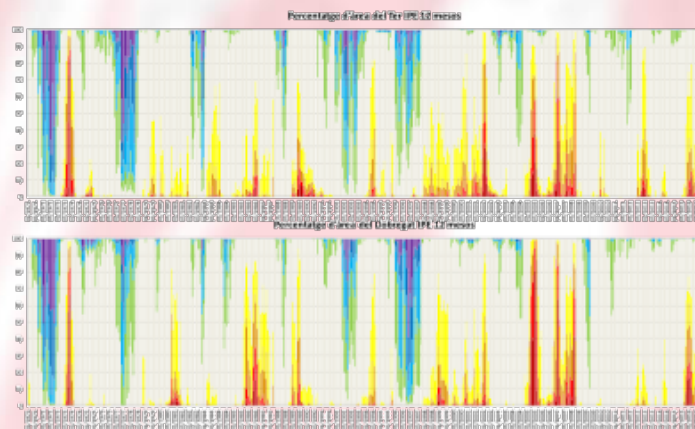## 3. HYDRIC REGIME AT CATALAN MUNICIPALITIES

ÍNDEX DE PRECIPITACIÓ ESTÀNDARD IPE12
10/06/2018

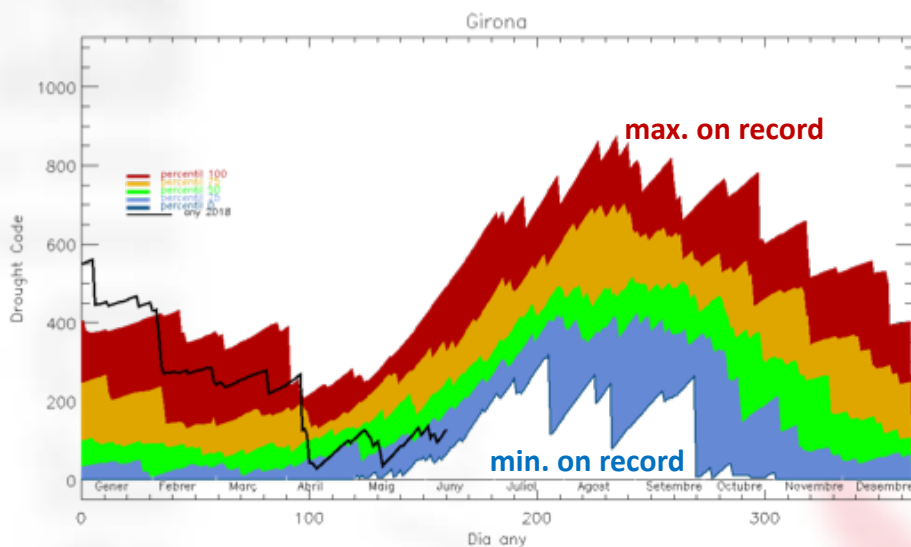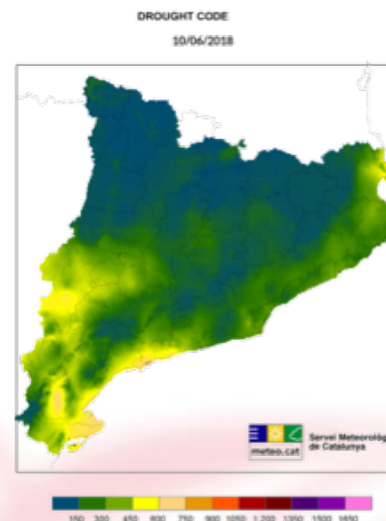ÍNDEX DE PRECIPITACIÓ ESTÀNDARD IPE24
10/06/2018

4. % DROUGHT AFFECTATION ON RIVER BASINS (time series 1970-now)

Percentatge d'àrea del Ter IPE 12 mesos

Percentatge d'àrea del Llobregat IPE 12 mesos

Ongoing developments
Drought Code(DC) and ETo

Generalitat de Catalunya

Servei Meteorològic de Catalunya · meteo.cat

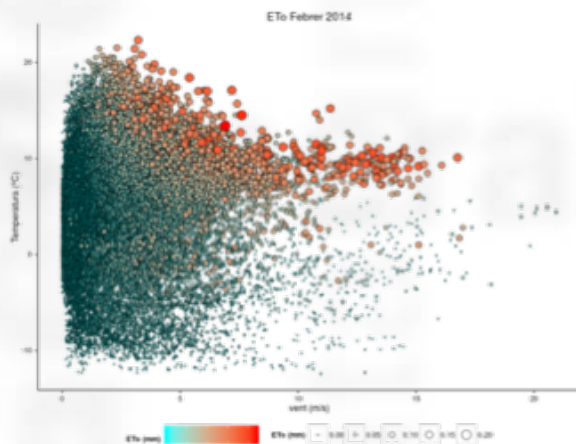**1. DC SITE BY SITE HISTORICAL OVERVIEW (1996-2016)**
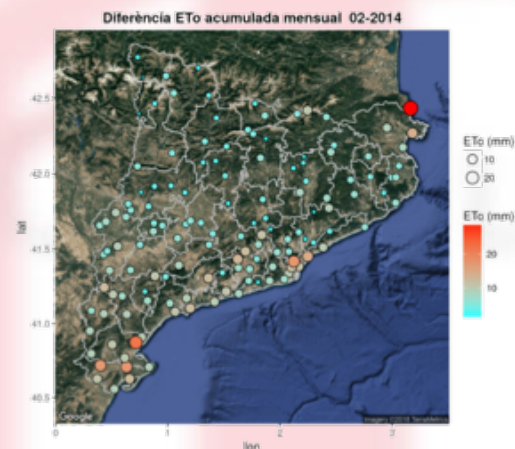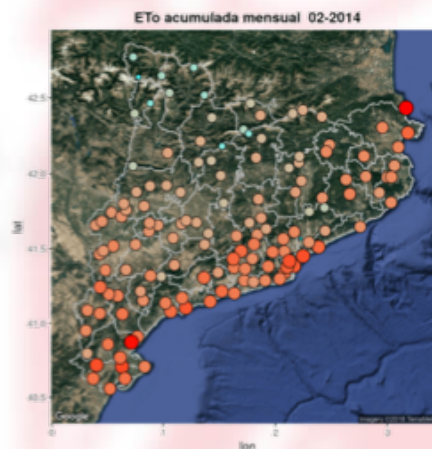

2. DC 1X1 KM GRID RESOLUTION

End-user:
CATALAN FOREST FIRE PREVENTION SERVICE

3. ETo RECALCULATION AT HOURLY TIME SCALE

4. ACCUMULATED ETo AND DIFERENCES WITH OLD VERSION DATASET

1. Adaptation of the Standardised Precipitation Index (SPI) to hydrological drought and Application to seasonal prediction purposes

Demandand: CATALAN WATER AGENCY

2. Short and medium range (7 days) probabilistic ETo prediction (FAO, 1998)

Demandand: WATERING OFFICE, IRTA and AGRICULTURE DEPT

3. Hydric Balance (PPT-ETo) and derived indexes

Demandand: WATERING OFFICE, IRTA, AGRICULTURE DEPT, CATALAN CLIMATE CHANGE OFFICE

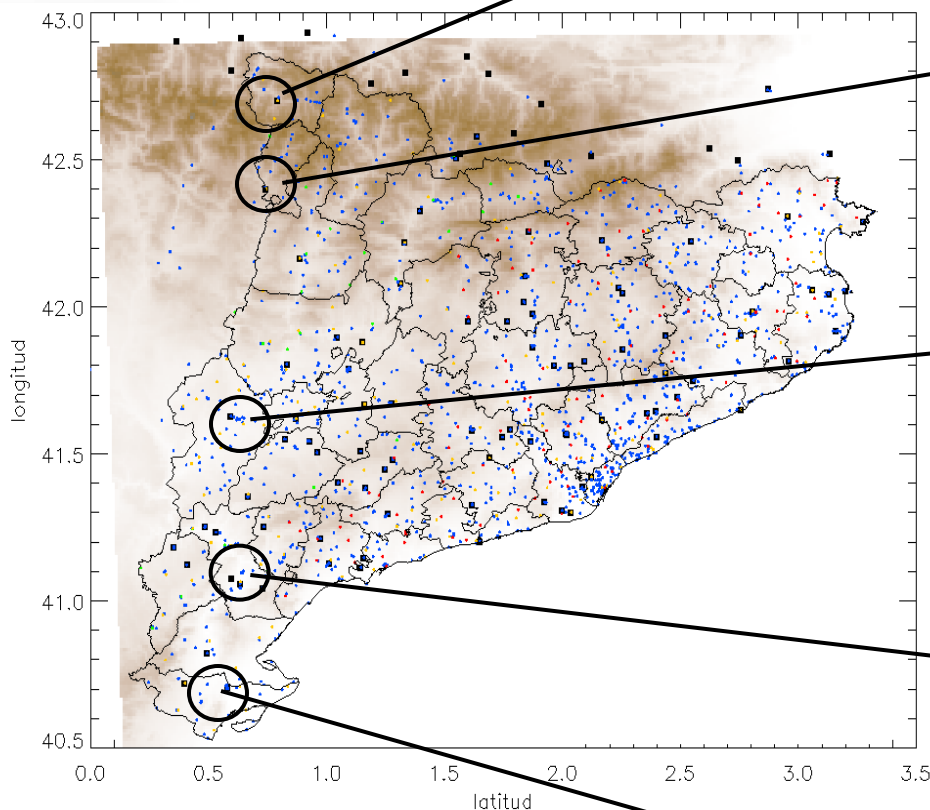**4. Canadian Forest Fire Index components at high resolution (FWI, ISI, DMC, DC)**

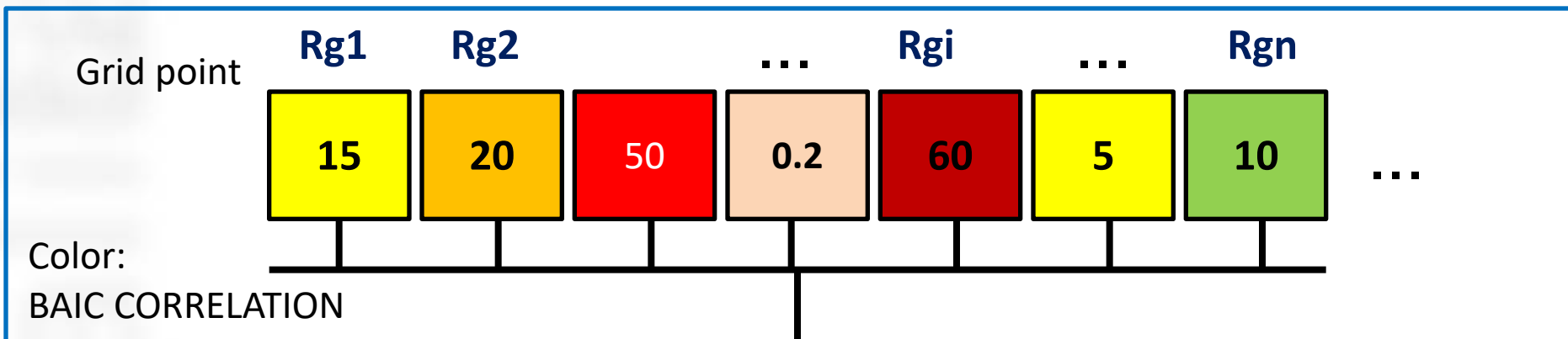Demandand: FOREST FIRE PREVENTION SERVICE

ADDITIONAL INFORMATION

LINEAR MULTIREGRESSION ANALYSES

GRID CONSTRUCTION:CLUSTERS

Area of Influence

BAIC vs ALL NETWORK

PREDICTOR VARIABLES: z, C, geograf. Coord.

LINEAR MULTIREGRESSION ANALYSES