



**Doctoral Thesis Title:** A methodology to calculate Live Fuel Moisture Content and the Flammability Index for the generation of fire prevention cartography in the Valencian community (Spain).

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**Abstract:**

The prevention of forest fires is a complex task that requires fast, effective and reliable information to characterize the vegetation of the territory, as well as other factors that influence the ignition and expansion of the fire. In this sense, the Live Fuel Moisture Content (LFMC) becomes important as a parameter that measures the amount of water present in the vegetation and is inversely proportional to the intensity of a fire, the greater the LFMC, the less likely a fire will start or spread.

The objective of this research will be to estimate and represent in raster format the LFMC in the Comunitat Valenciana, through semi-automatic methods that use remote sensors (Sentinel-2 and MODIS), this in order to develop a flammability index that allows to interpret the ease that a landscape has for fire to start or spread from one point to another. This index will be calculated through the application of binary logistic regression models that relate the occurrence of fires (presence or absence) with variables such as LFMC, meteorological, topographic or even anthropogenic factors. The training samples will be constructed from the analysis of satellite images before and after a fire, in places where the LFMC of burned and unburned pixels that are close and can represent the same type of vegetation can be determined.

Based on the LFMC and the flammability index, the aim is to develop thematic cartography that can be integrated into a geoportal with the collaboration of Sistema Integrado de Gestión de Incendios Forestales (SIGIF) of the Generalitat Valenciana. It will be assessed if it is feasible to predict LFMC values in the near future through meteorological forecast data.

**Available Means:**

- Images Sentinel-2 y MODIS
- Download satellite data using Google Earth Engine free of charge on the online platform.
- Use R-Studio + R free software.
- Use the software Qgis associated to Python.
- Data of LFMC obtained in the field by the public company VAERSA provided to the thesis director through the Direcció General de Prevenció d'Incendis Forestals de la Generalitat Valenciana.
- Meteorological data of Comunitat Valenciana recollected by Agencia Estatal de Meteorología (AEMET) and provided to the thesis director through Generalitat Valenciana.
- Operating sistem Linux (free software)
- Free software to create geoportals:
  - o PostgreSQL 11 + Postgis 2,5 + Pgrouting + adminpack and PgAdmin 4
  - o Tomcat 9
  - o GeoServer 2.16



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