

Development of a European Fuel Map

1 Potential applications

The participants identified the following potential applications for a European Fuel Map:

- Assessing the Wildland-Urban-Interface → prevention
- Wildfire risk assessment
- Fire Spread simulation
- Fire and smoke propagation models
- Decision Support Systems (DG ECHO)
- Track the changes caused by
 - o Climate change
 - o Population
 - o Economic activities
- Early warning system; Identification of priorities
- Harmonised fire danger modelling UBFF/Serbia
- Fire hazard/ Fire suppression index
- France: National Risk Map using dimensioned method (BYRAM)
- Operational purpose
- Fire Risk (EFFIS)
- Assessment of consequences
- FR: driver for occurrence modelling
- Fire barrier prioritisation (only for 10m resolution)

2 Challenges

The development and application of a European Fuel maps holds the following challenges:

- No coordination with national mapping but national maps already done
- Temporal resolution of the maps:
 - o Parameters of vegetation change over the year with different seasons, but seasons mean different things to different countries/regions. In principle, the fuel type should remain the same, but the fuel parameters might need to change. This opens the question of when to collect the data to calibrate/validate the fuel parameters considering the phenology of the forests.
 - o Static vs updated data: everyone stressed the need to update the maps, if possible, annually.
 - o How to incorporate rapid changes in land cover?
- Spatial resolution of the maps:

- France: resolution (governments wants a map with a house-level resolution to manage urbanism)
- Map is 2D – how about 3D? Considered with growing vegetation?
- For general policy, low resolution and low update cycle is enough (i.e. the FirEURisk 1km map). But for operations higher resolution and higher update cycles are needed (EFFIS).
- Keeping the fuel maps updated and validated are challenging and requires continuous effort and funding.
- What would be an ideal fuel map? High spatial resolution (e.g., 10 m) with yearly updates and validation.
- Need to address the difference in vegetation of the same type (e.g. broadleaved deciduous) in different regions of Europe (e.g. Portugal vs Sweden). So far, only the Eucalyptus of Portugal are being addressed in this way. Other people have done a discrimination of “flammable” vs “non flammable” forests using historical fire data.

3 Discussion

Discussion evolved around the following topics:

- Reproduction rate
 - Daily vs annually
 - Update needs to be done at least once a year at the beginning of the fire season
 - Current FirEURisk map based on 2019/2021 data
- Spatial resolution of the FirEURisk Map:
 - 100m based on Copernicus data; some data was lacking
 - This lack was closed by data available at 1km
 - The 1 km map is validated
 - 100m is possible for the entire Europe but more data/funding is needed
- National data might be available
- Usually you can only see the top of the trees but not the ground which is needed for the spread modelling → it is necessary to map the ground → more research needed
- Flammability not included in map? No, not in the fuel map but included in the modelling
- Some needle trees burn faster than others which requires more parameters
- CIMA has a classification system based on machine learning → can be compared with FirEURisk Map

In order to use a European Fuel Map for modelling purposes, the following aspects were discussed:

- Sweden develops a 10m classification → application tested based on real fires and test fires
- Resolution needs:
 - 10m needed for proper modelling but only for some regions
 - 20m at country level
 - 100m at European level
 - DSS for DG ECHO: 100m is enough

- We should keep in mind the useful resolution when reading a map
- Processing power and costs; 10m can easily be converted into 100m though
- Updates
 - At least once a year
 - Better real time
- Depends also on the purpose
- Conclusion: different products are needed (resolution & updates), depending on the purpose of use