

FONDAZIONE CIMA  
CENTRO INTERNAZIONALE  
IN MONITORAGGIO AMBIENTALE



UNIVERSITÀ DEGLI  
STUDI DI GENOVA



DIPARTIMENTO DELLA  
PROTEZIONE CIVILE



REGIONE LIGURIA



PROVINCIA DI SAVONA

# RISICO

*A system for wide-nation wildfire  
risk assessment and management*

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CYber-Infrastructure for Civil  
protection Operative Procedures



GMES

# *What is RISICO?*

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- ➔ RISICO (RISchio Incendi e Coordinamento) is a wildfire risk prediction software developed by CIMA Research Foundation for Italian Civil Protection Agency
- ➔ Selected as use case in Cyclops

# ***Wildfire process***

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The main drivers of wildfire process are:

- ⇒ Vegetation;
- ⇒ Meteorological conditions;
- ⇒ Topography;

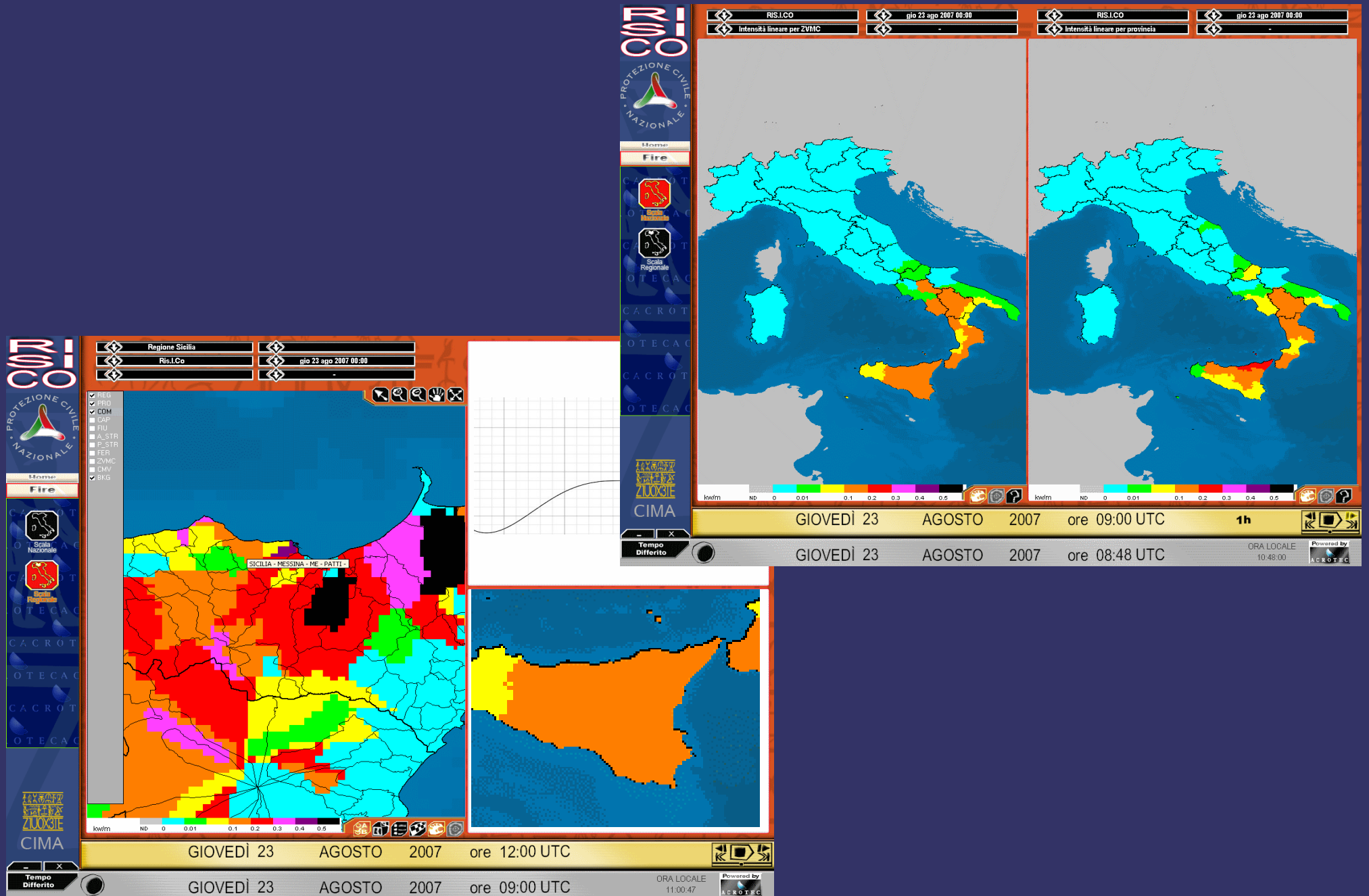
It is possible to define an estimation of the potential behaviour of a fire eventually ignited in a certain time-space window.

# ***RISICO***

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- ⇒ How does it works?
- ⇒ By using meteorological information, vegetation and topographic maps RISICO produces an estimation of several variables:
  - Dead fuel moisture condition;
  - Potential fire spread rate;
  - Potential linear fire intensity;
- ⇒ which are useful for fire-fighting activities and wildfire prevention.

# Graphical user interface



# *Domain discretization*

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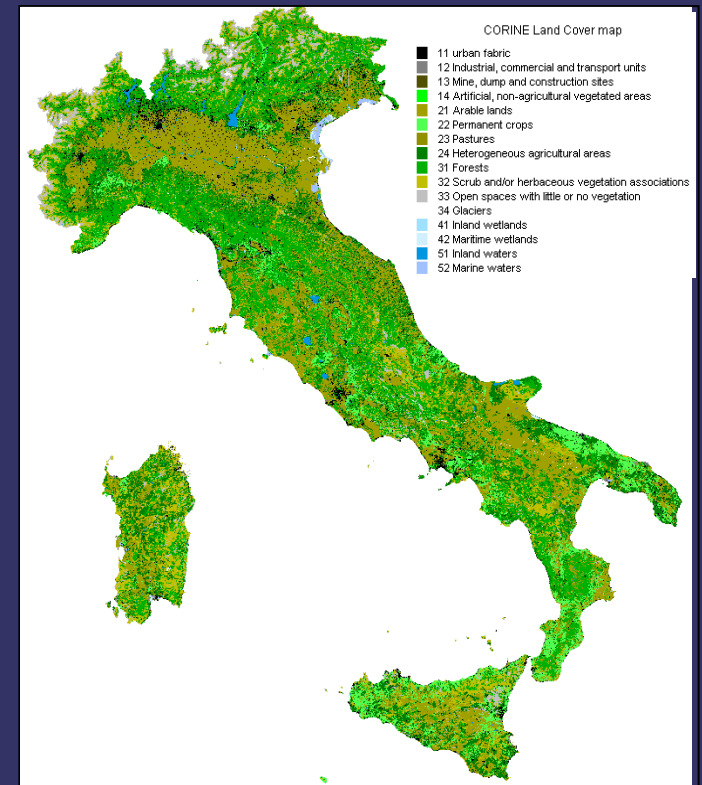
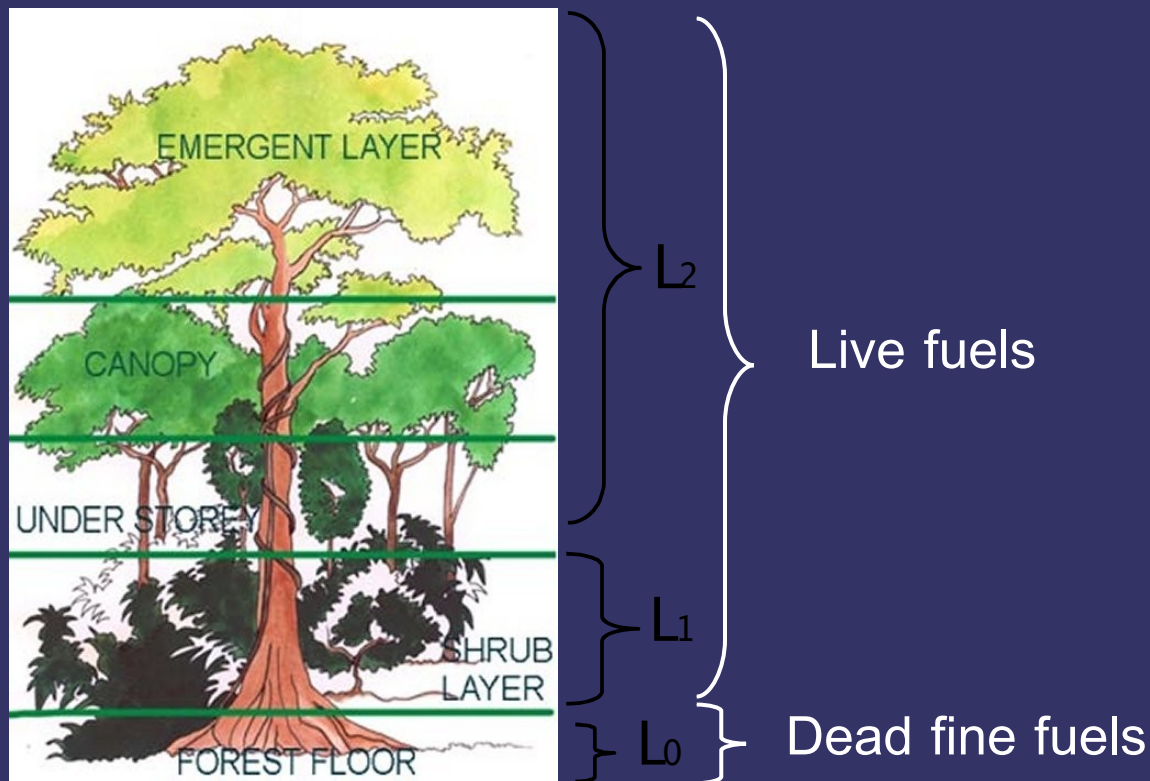
RISICO works on a regular discretized domain. It is possible to define for each grid cell:

- Vegetation type and characteristics (dead and live fuel load, live fuel moisture, Higher Heating Value);
  - Topographic characteristic (aspect and slope of the terrain)
- ⇒ Cells can be considered as completely independent from each other.

# The land use and vegetation data

Source data: CORINE LAND COVER.

16 categories of fuel have been used and parametrized.



- average seasonal fuel loads [ $\text{kg m}^{-2}$ ];
- average seasonal moisture contents [%] only for live fuels;
- average seasonal Higher Heating Value (HHV) [ $\text{kJ kg}^{-1}$ ].



# *The meteorological information*

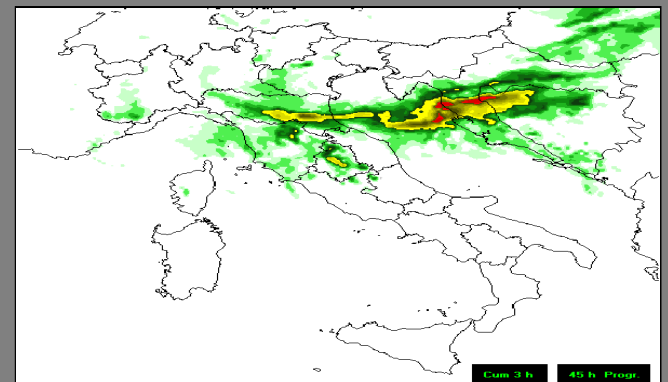
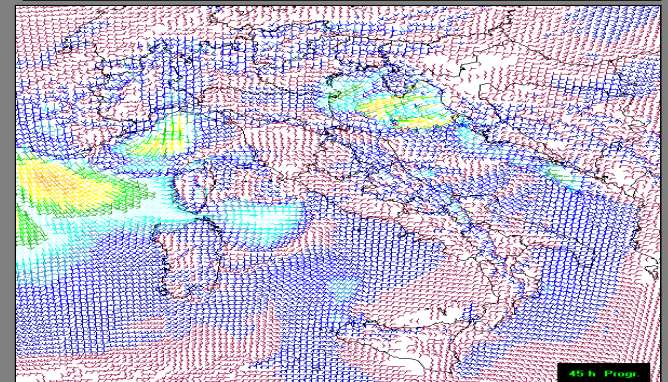
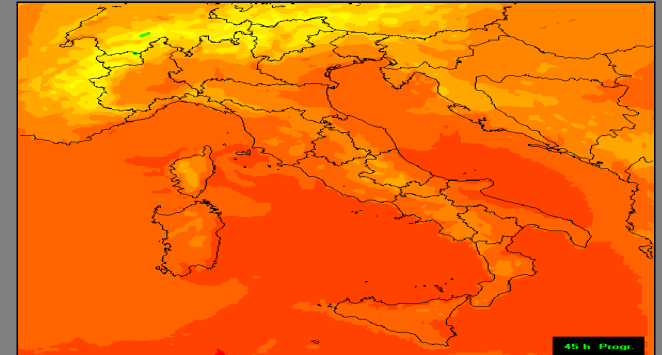
## METEOROLOGICAL DATA

The system use the outputs of a meteorological *Limited Area Model* (LAM), namely *COSMO LAM* consisting of a set of data discretized in time steps of three hours, over a time horizon of 72 hours.

The variables used by the system are:

- air temperature
- dew point temperature
- cumulate rainfall
- wind speed
- wind direction

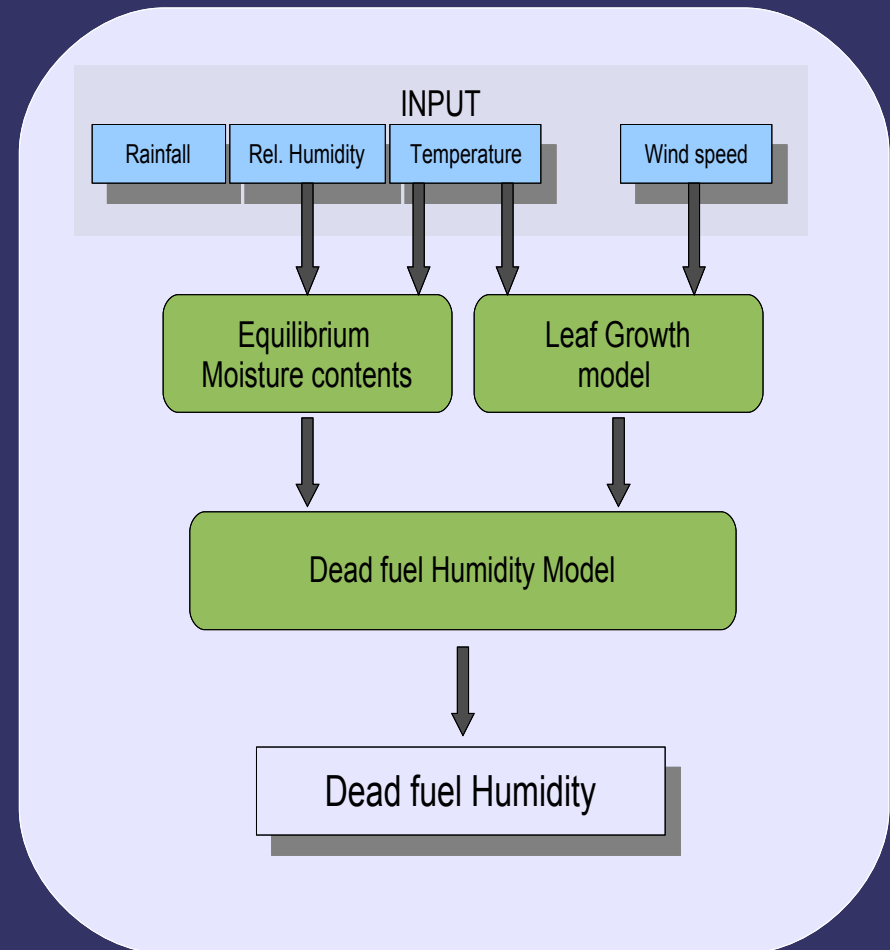
Lokal Area Modell (LAMI)  
Forecast Data





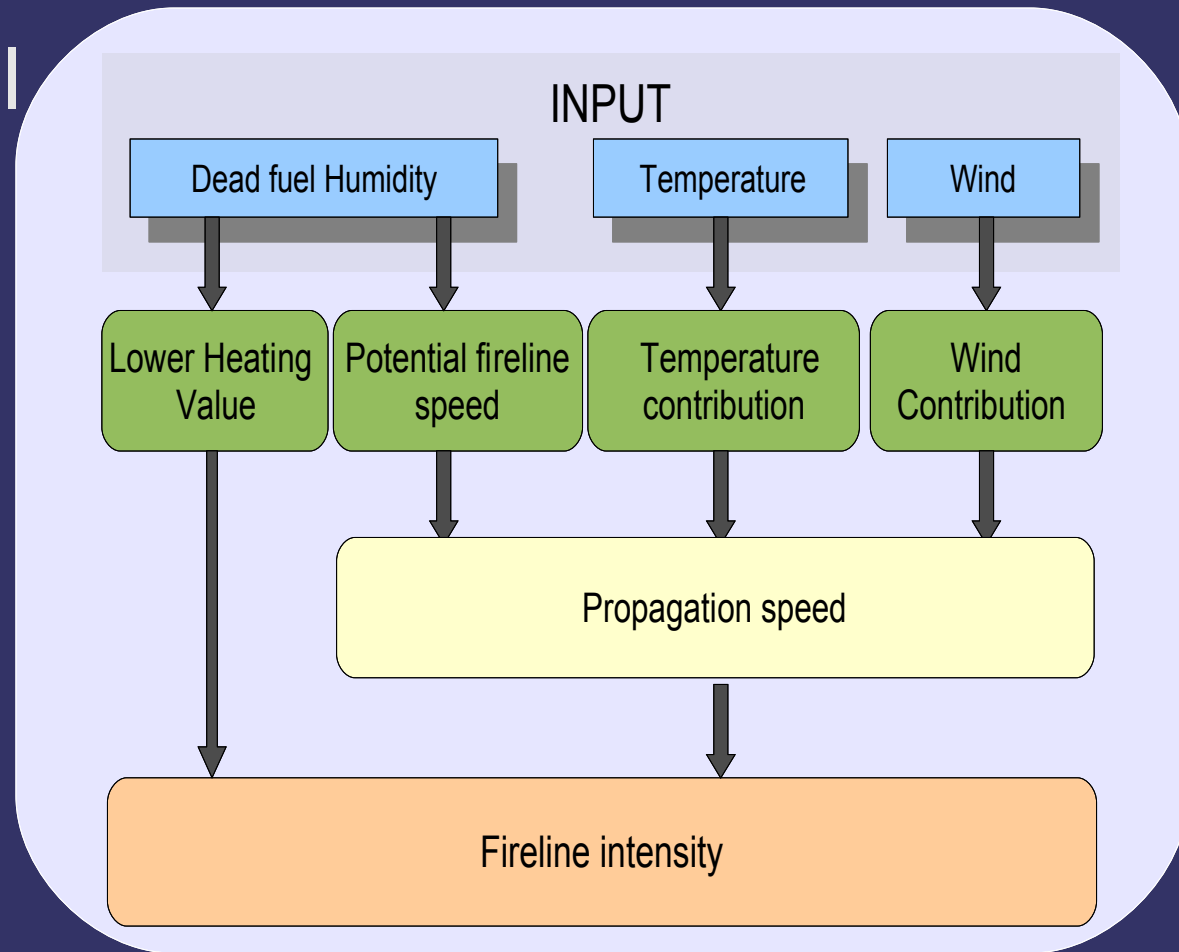
# *Fuel Moisture model*

- ➔ Fire ignition depends on dead and live fuel moisture.
- ➔ The live fuel moisture can be considered constant on seasonal basis.
- ➔ The dead fuel moisture, is highly dependent on meteorological basis.



# Fire Spread Model

- ➔ Fire Spread Model describes the potential risk of a ignited fire.



# ***GRID architecture***

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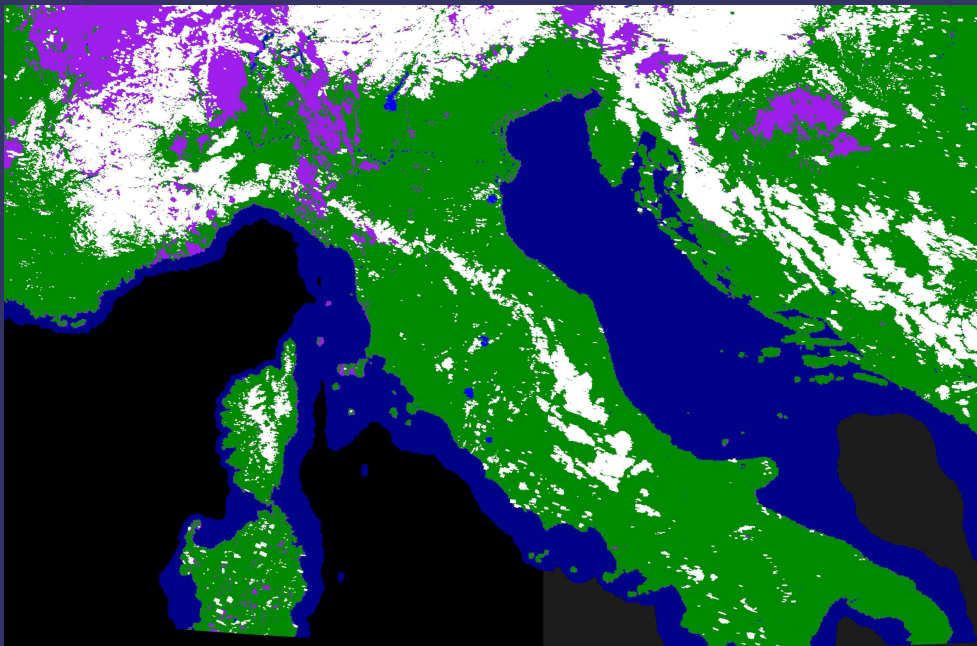
- ⇒ High resolution grid allows to represent the vegetation and topographical heterogeneity;
- ⇒ The use of a national-wide, low resolution system like RISICO cannot provide all the information required by the Civil protection agency during emergencies.
- ⇒ It' useful to have a system which can provide high resolution output in small times for a particular time-space window.

***Thanks for your attention***

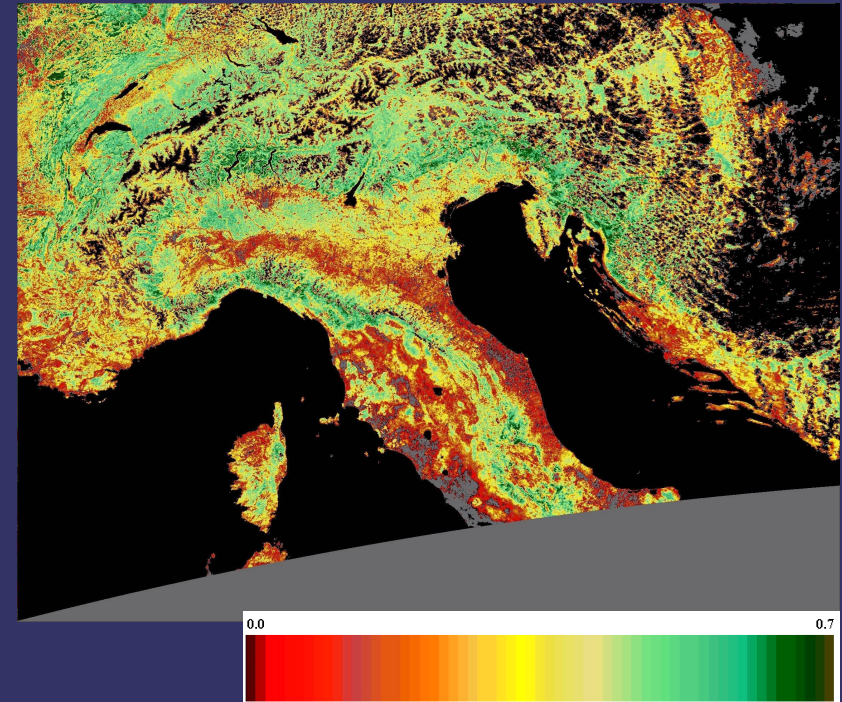
# EO products

Remote Sensing data provide valuable information for the characterization of the state of vegetation, mapping of fuel types and vegetation properties at different temporal and spatial scales including the global, regional and landscape levels.

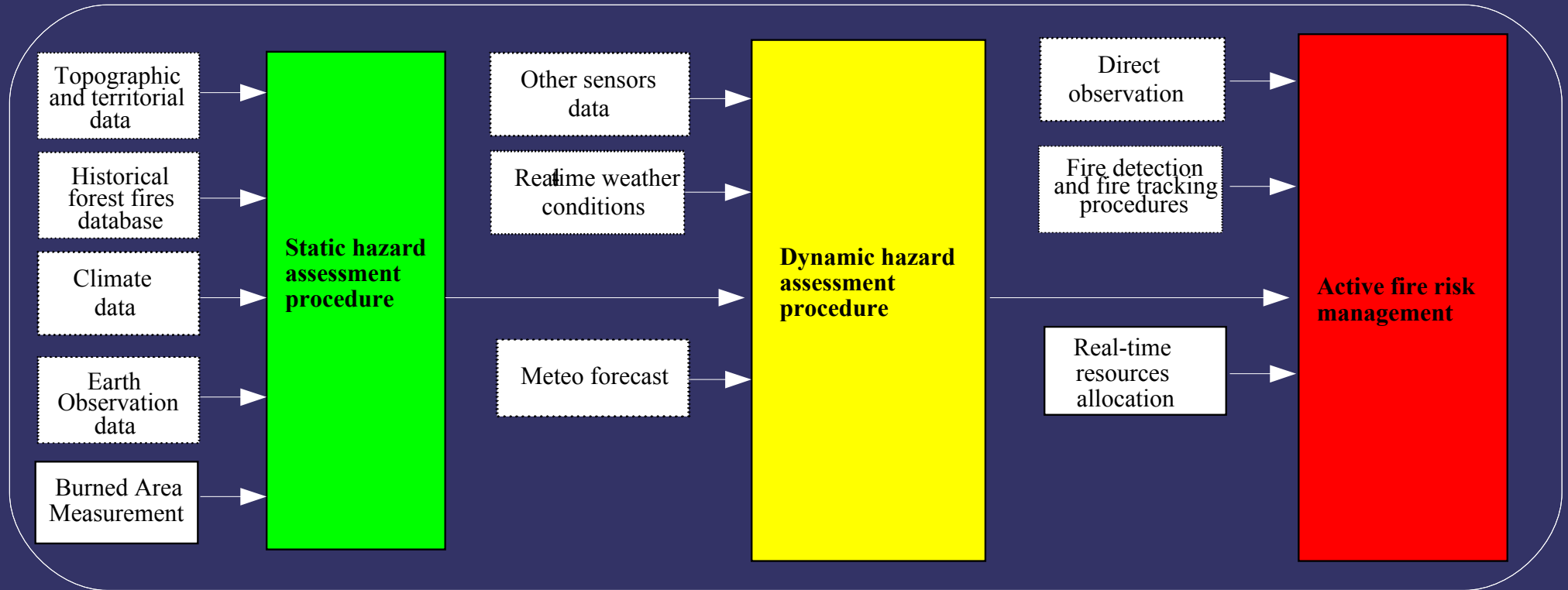
*SNOW COVER map - MODIS acq. in 2001-01-01*



*NDVI map – MODIS acquired in 2003-07-18*



# *A general architecture for wildfire risk management*



- ➔ The RISICO system is used as a part of the dynamic hazard assessment procedure



# *The RISICO product family*

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- ⇒ - RISICO: automatic batch run, fixed data-set, low resolution (~1Km), fixed domain.
  - It's used by the Civil department protection for risk forecast
- ⇒ - OPEN-RISICO: on-demand run, user selectable domain and dataset.
  - Can be used for support during emergencies.