



1. Thematic project team workshop

Volary | 1.-2. July, 2021

FORRISK ATCZ251

**Forest fire occurrence probability modelling
by machine learning method
-preliminary results-**

Slobodan Milanović & Zoran Trailović



Chernobyl fire under control, Ukraine officials say

14 April 2020



Chernobyl disaster

stopping. Here's what you need to know



By **Jessie Yeung**, CNN

Updated 0202 GMT (1002 HKT) January 14, 2020

NOW PLAYING

Australian fires from the sky

CNN EXCLUSIVE



Siberia wildfires: Russians battle to contain the blazes

By Steve Rosenberg
 BBC News, Moscow

4 August 2019

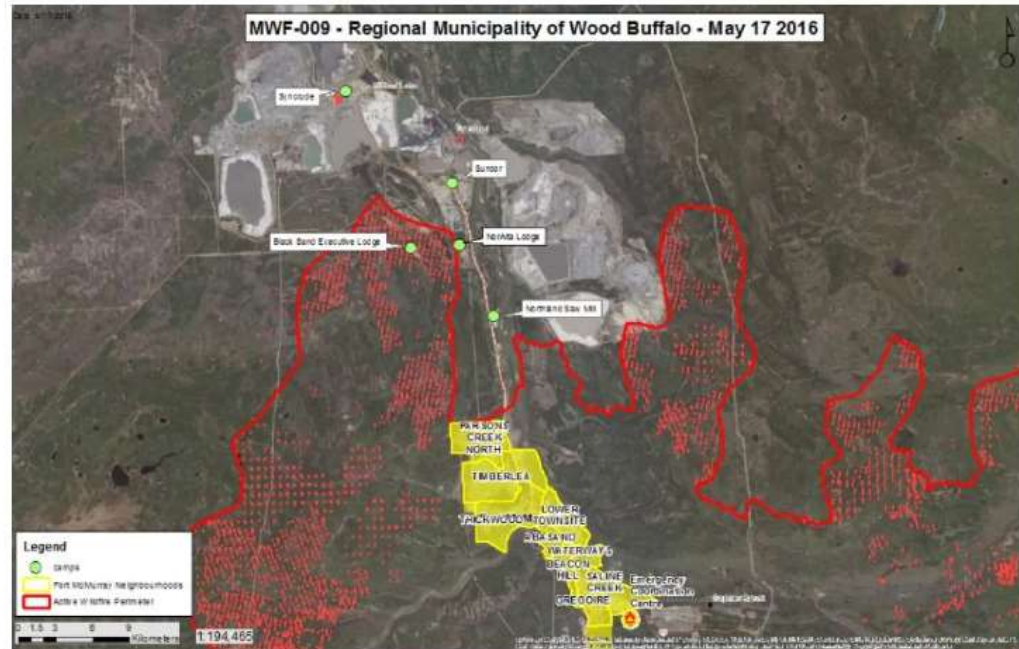


Climate change



The BBC's Steve Rosenberg travels to the forest to see how Russians are tackling the wildfires

in Brazil?



The map shows the active fire areas surrounding Fort McMurray. The green dots represent oil sands camps

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Inbox (4) - slobodan... | Примљене (5) - slob... | Mail folder list | EFFIS Fire Risk Viewer | EFFIS - Current Situati... | EFFIS Statistics

effis.jrc.ec.europa.eu/apps/effis_current_situation/index.html

European Commission > JRC EU Science Hub > DRM > Copernicus EMS > EFFIS > Applications > Current Situation Viewer [user guide]

Human Settlement Layer

Protected Areas Layer

CCI Landcover

Forecasts

FIRE DANGER FORECAST

Source: ECMWF (8 km res.)

Index: Fire Weather Index (FWI)

Date: 29 Jun 2021

Rapid Damage Assessment

Select a date-range

Last 1 Day | Last 7 Days | Last 30 Days

Fire Season

From: 28 Jun 2021 To: 29 Jun 2021

ACTIVE FIRES

MODIS VIIRS

BURNT AREAS

MODIS (supervised) VIIRS

Burnt Area Locator

FUELS

Analysis Tools

Seasonal... | EFFIS Estimates...

Active Fires MODIS

- ▼ Last 1 Day (MODIS Aqua)
- ▼ Last 7 Days (MODIS Aqua)
- ▼ Last 30 Days (MODIS Aqua)
- ▼ Fire Season (MODIS Aqua)
- ▲ Last 1 Day (MODIS Terra)
- ▲ Last 7 Days (MODIS Terra)
- ▲ Last 30 Days (MODIS Terra)
- ▲ Fire Season (MODIS Terra)

Active Fires VIIRS

- Last 1 Day (VIIRS Suomi)
- Last 7 Days (VIIRS Suomi)
- Last 30 Days (VIIRS Suomi)
- Fire Season (VIIRS Suomi)

Burnt Areas MODIS

- Last 1 Day
- Last 7 Days
- Last 30 Days
- Fire Season

Burnt Areas VIIRS

- Last 1 Day
- Last 7 Days
- Last 30 Days
- Fire Season

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Apps | Google Earth Engine | Data base: SPEI, Th... | https://cds.climate... | Attendance system... | EFFIS CIRCA | EFFIS Fire Risk Viewer | Other bookmarks | Reading list

European Commission > JRC EU Science Hub > DRM > Copernicus EMS > EFFIS > Applications > Current Situation Viewer [user guide]

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Forecasts

FIRE DANGER FORECAST

Source: ECMWF (8 km res.)

Index: Fire Weather Index (FWI)

Date: 29 Jun 2021

Rapid Damage Assessment

Select a date-range

Last 1 Day | **Last 7 Days** | Last 30 Days

Fire Season

From: 22 Jun 2021 To: 29 Jun 2021

ACTIVE FIRES

MODIS VIIRS

BURNT AREAS

MODIS (supervised) VIIRS

Burnt Area Locator

FUELS

Analysis Tools

Seasonal trend | EFFIS Estimates per Country

Active Fires MODIS

- ▼ Last 1 Day (MODIS Aqua)
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- ▼ Fire Season (MODIS Aqua)
- ▲ Last 1 Day (MODIS Terra)
- ▲ Last 7 Days (MODIS Terra)
- ▲ Last 30 Days (MODIS Terra)
- ▲ Fire Season (MODIS Terra)

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Burnt Areas MODIS

- Last 1 Day
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- Fire Season

Burnt Areas VIIRS

- Last 1 Day
- Last 7 Days
- Last 30 Days
- Fire Season

EFFIS - Copernicus [Ver. 2.7.3]

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effis.jrc.ec.europa.eu/apps/effis_current_situation/index.html

European Commission > JRC EU Science Hub > DRM > Copernicus EMS > EFFIS > Applications > Current Situation Viewer [user guide]

Human Settlement Layer

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FIRE DANGER FORECAST

Source: ECMWF (8 km res.)

Index: Fire Weather Index (FWI)

Date: 29 Jun 2021

Rapid Damage Assessment

Select a date-range

Last 1 Day | Last 7 Days | **Last 30 Days**

Fire Season

From: 30 May 2021 To: 29 Jun 2021

ACTIVE FIRES

MODIS VIIRS

BURNT AREAS

MODIS (supervised) VIIRS

Burnt Area Locator

FUELS

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Seasonal trend | EFFIS Estimates per Country

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- Last 1 Day
- Last 7 Days
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EFFIS - Copernicus | [Ver. 2.7.3]

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Browser tabs: Inbox (4) - slobodan..., Примљене (5) - slob..., Mail folder list, EFFIS Fire Risk Viewer, EFFIS - Current Situati..., EFFIS Statistics

Address bar: effis.jrc.ec.europa.eu/apps/effis_current_situation/index.html

Breadcrumbs: European Commission > JRC EU Science Hub > DRM > Copernicus EMS > EFFIS > Applications > Current Situation Viewer

Human Settlement Layer

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Forecasts

FIRE DANGER FORECAST

Source: ECMWF (8 km res.)

Index: Fire Weather Index (FWI)

Date: 29 Jun 2021

Rapid Damage Assessment

Select a date-range

Last 1 Day | Last 7 Days | Last 30 Days

Fire Season

From: 01 Jan 2021 To: 29 Jun 2021

ACTIVE FIRES

MODIS VIIRS

BURNT AREAS

MODIS (supervised) VIIRS

Burnt Area Locator

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Seasonal trend | EFFIS Estimates per Country

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- ▼ Fire Season (MODIS Aqua)
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- ▲ Fire Season (MODIS Terra)

Active Fires VIIRS

- Last 1 Day (VIIRS Suomi)
- Last 7 Days (VIIRS Suomi)
- Last 30 Days (VIIRS Suomi)
- Fire Season (VIIRS Suomi)

Burnt Areas MODIS

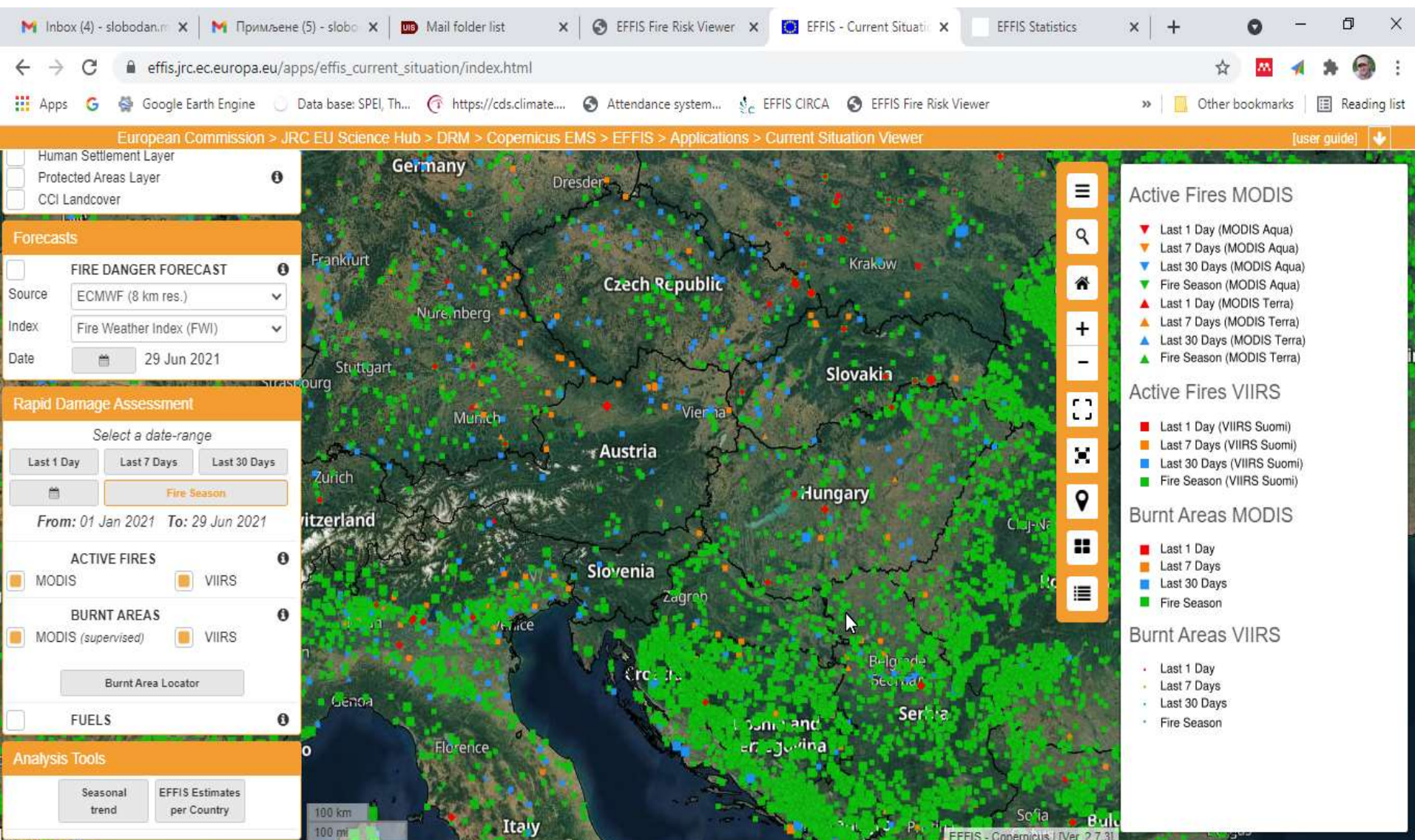
- Last 1 Day
- Last 7 Days
- Last 30 Days
- Fire Season

Burnt Areas VIIRS

- Last 1 Day
- Last 7 Days
- Last 30 Days
- Fire Season

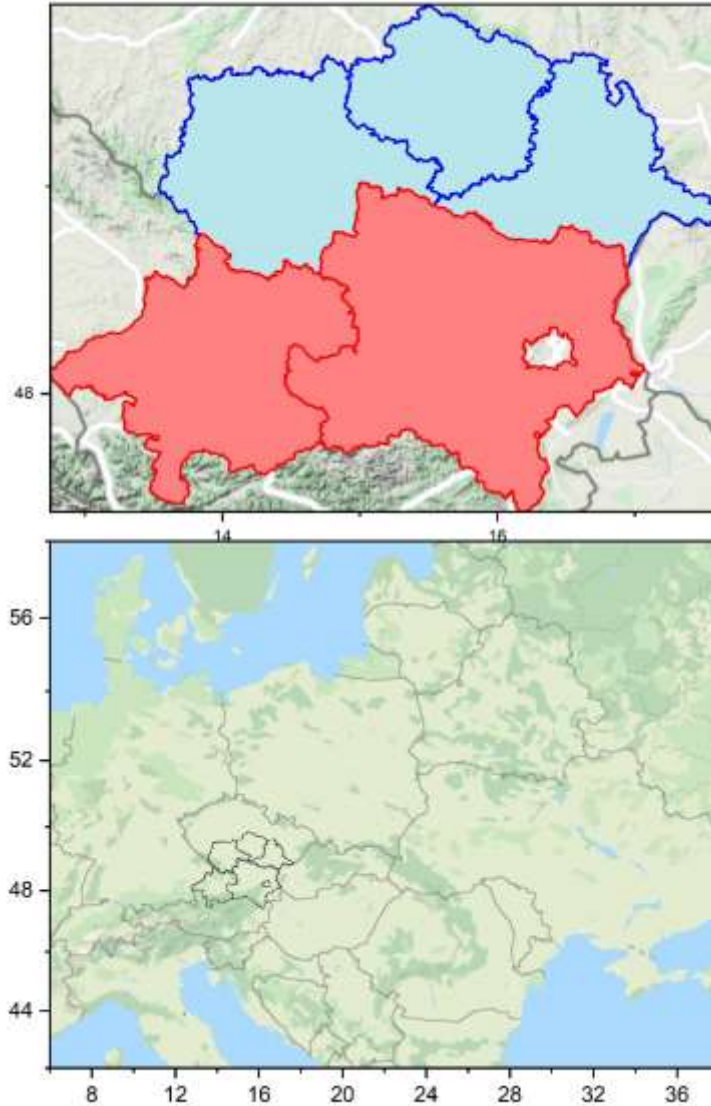
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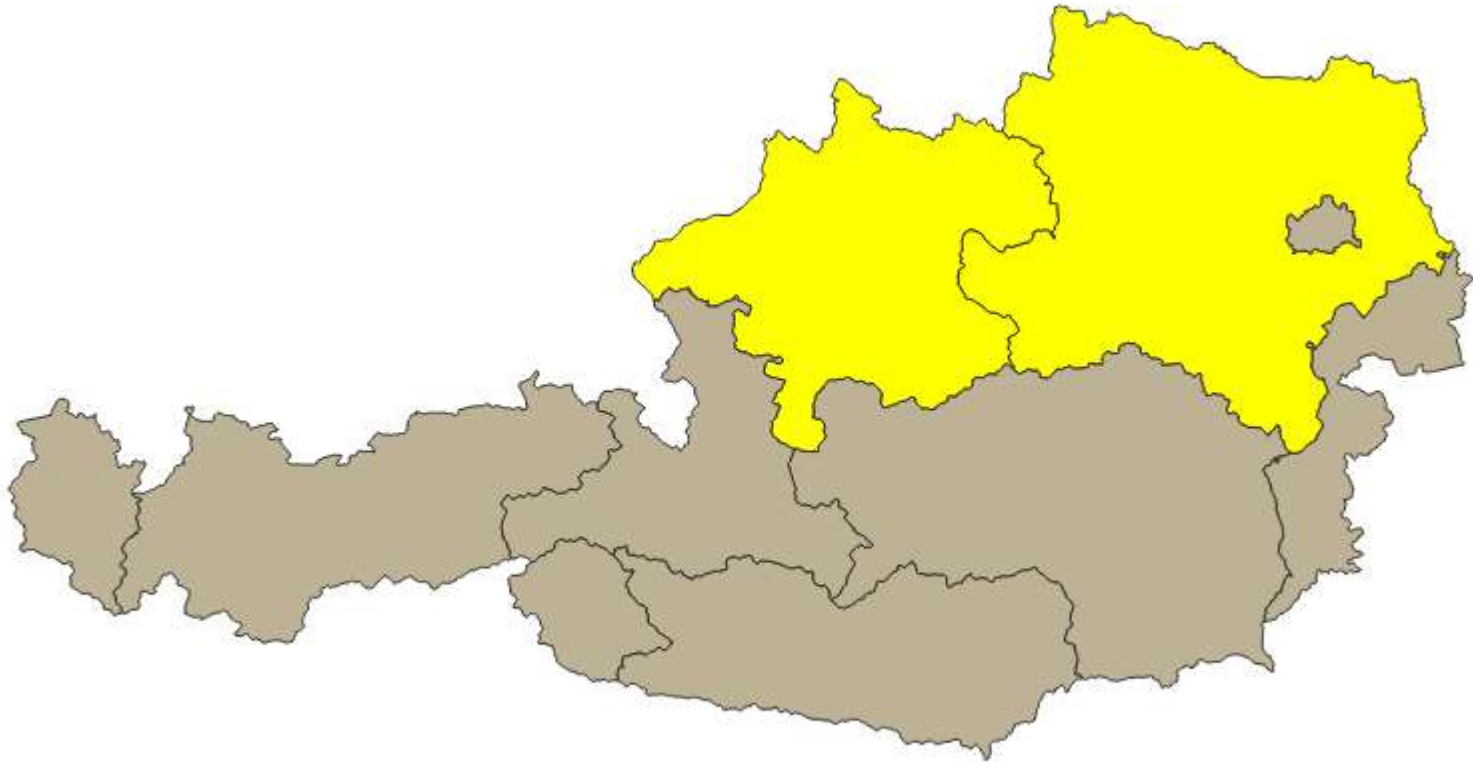
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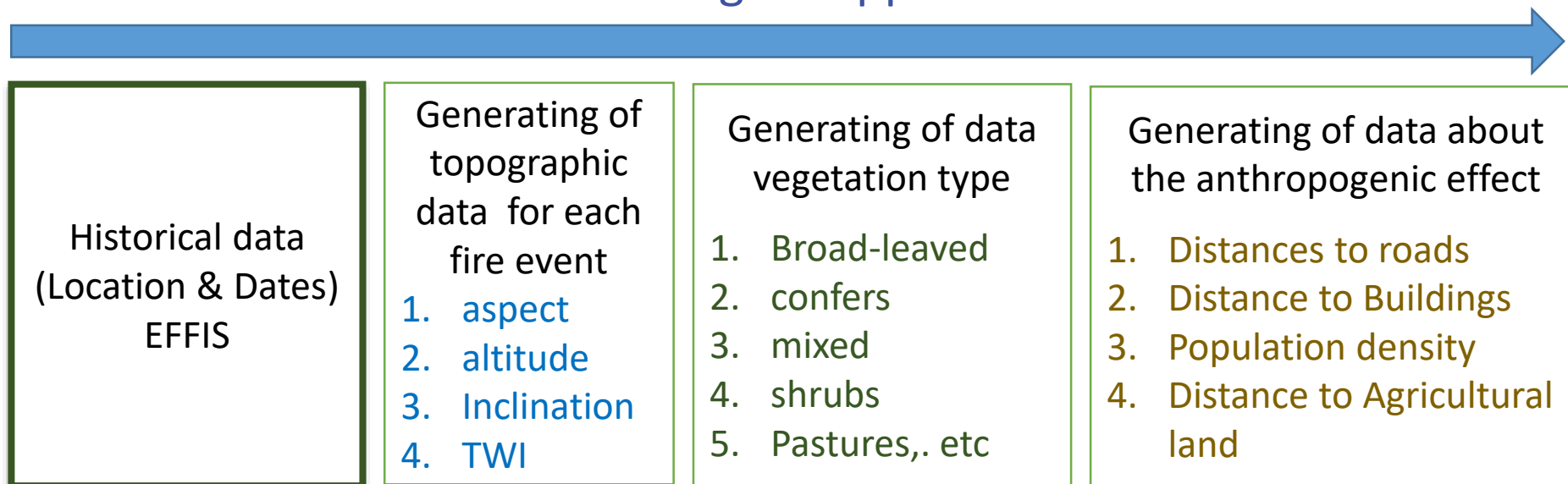
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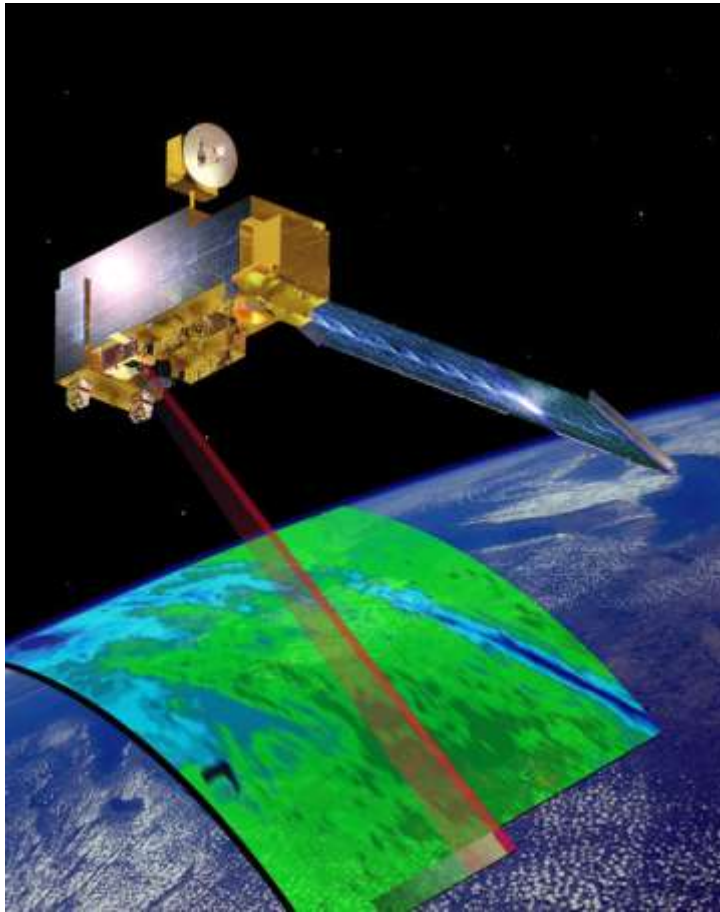
“Forest fire occurrence probability modeling” -Methodological approach-



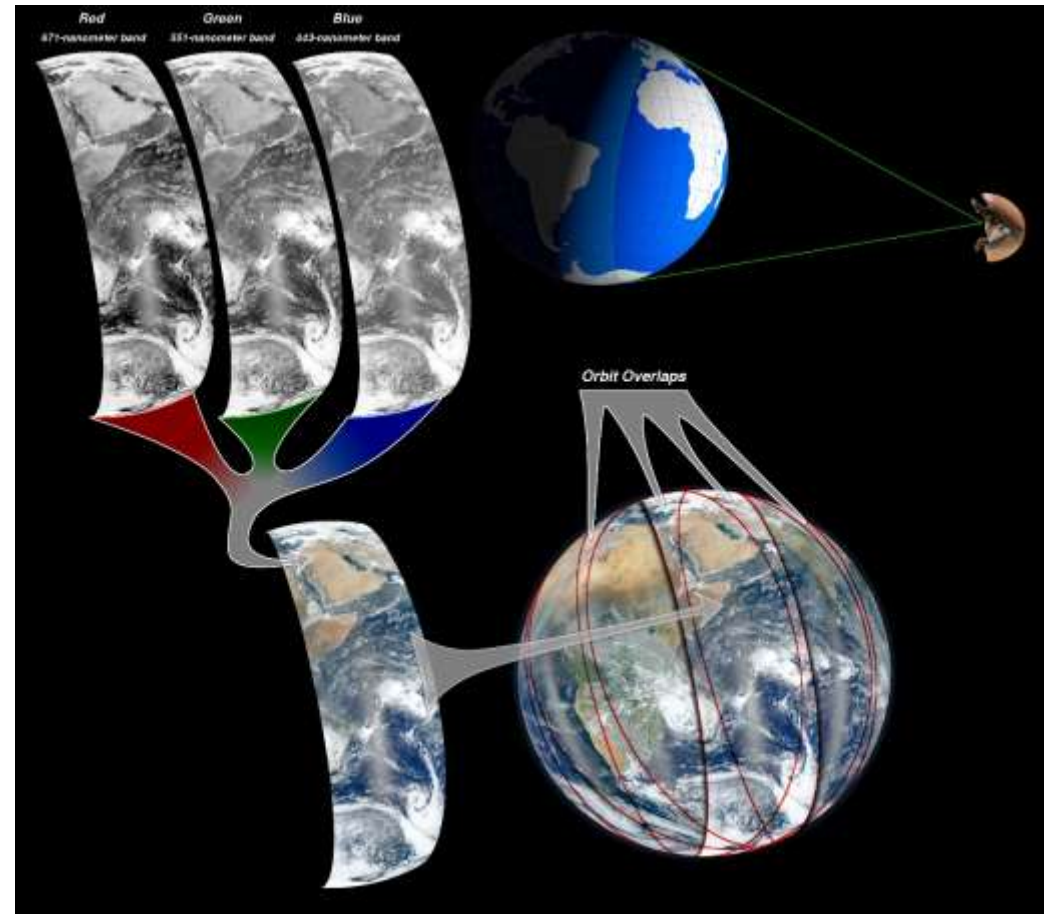
Database about the forest fire



MODIS
(Moderate Resolution Imaging
Spectroradiometer)
EFFIS

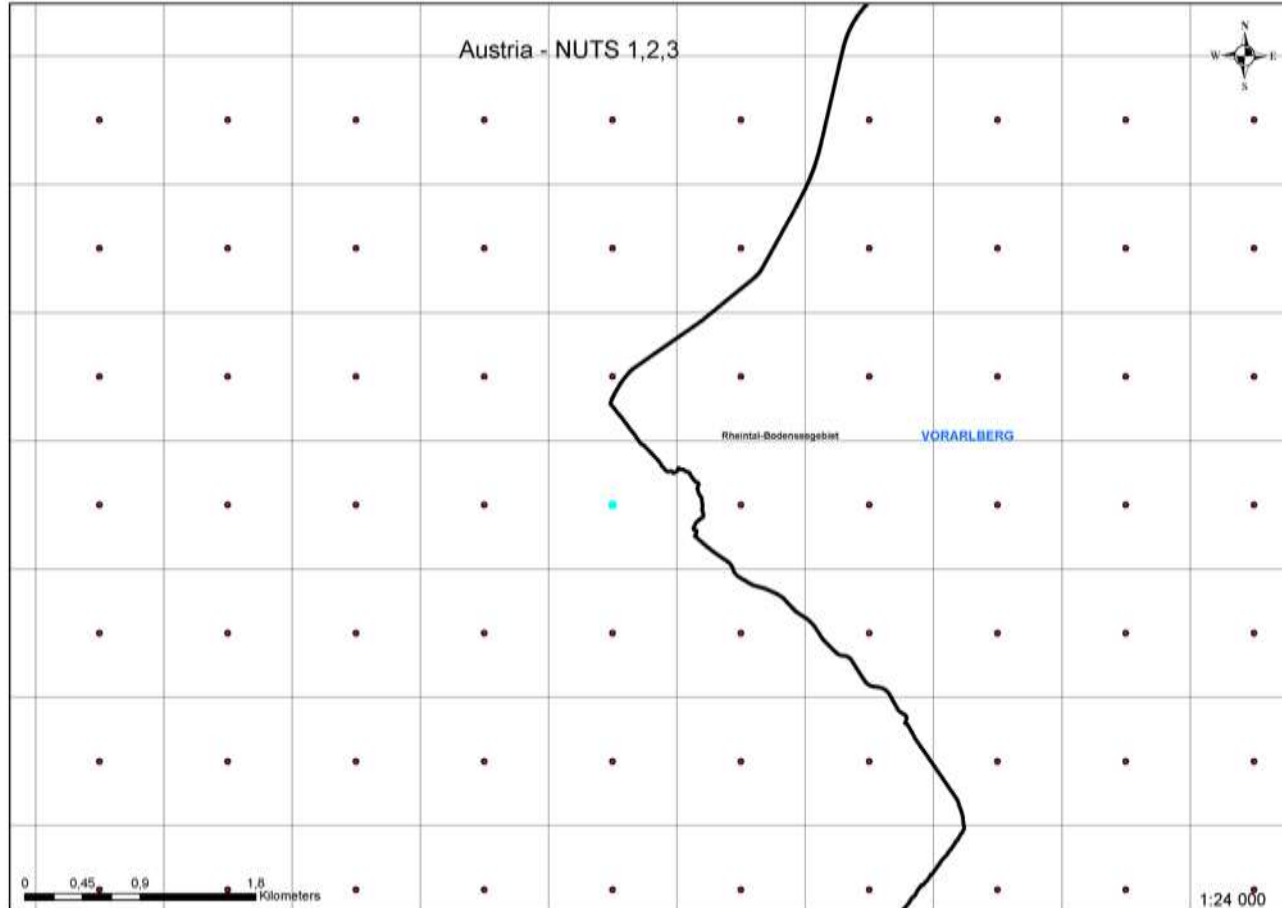


VIIRS
(Visible Infrared Imaging
Radiometer Suite)
EFFIS



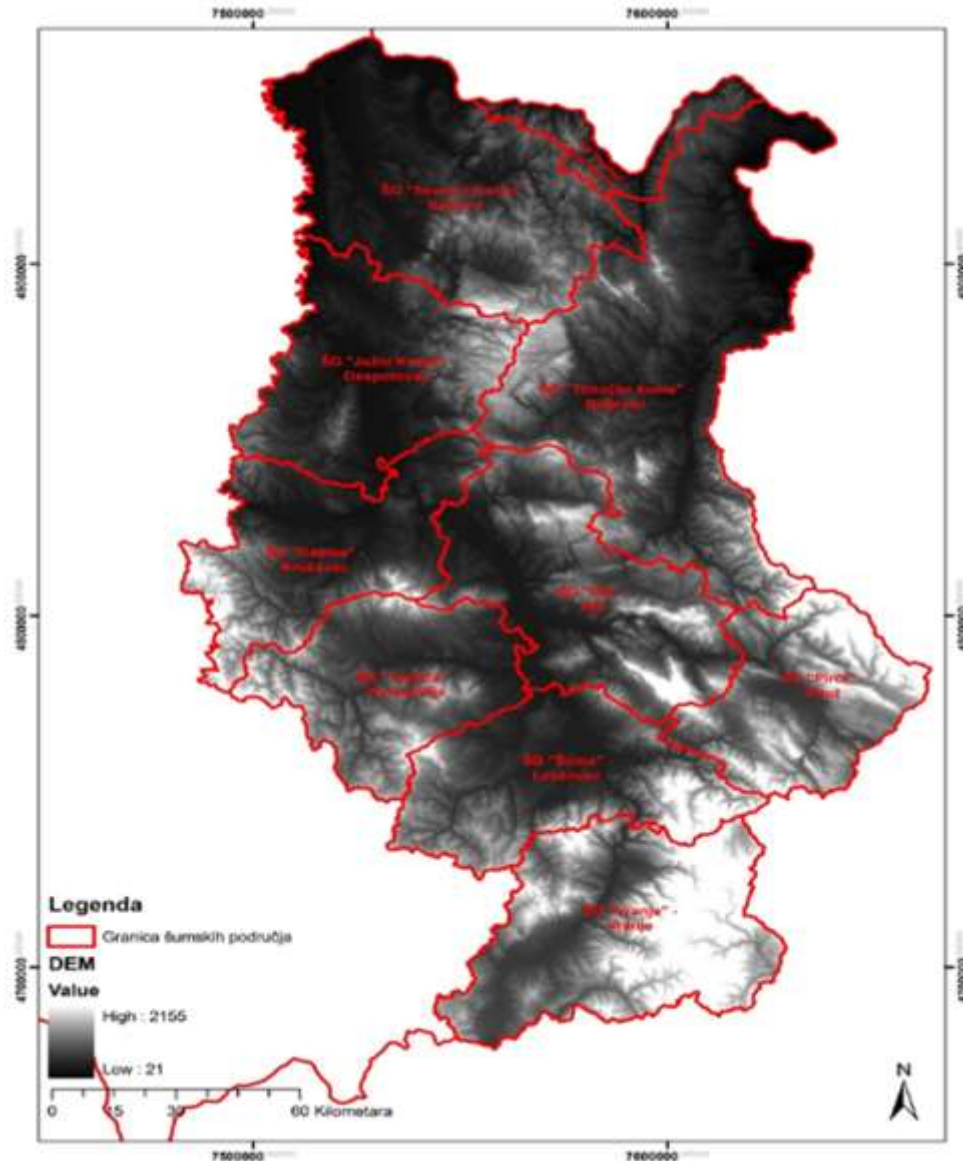
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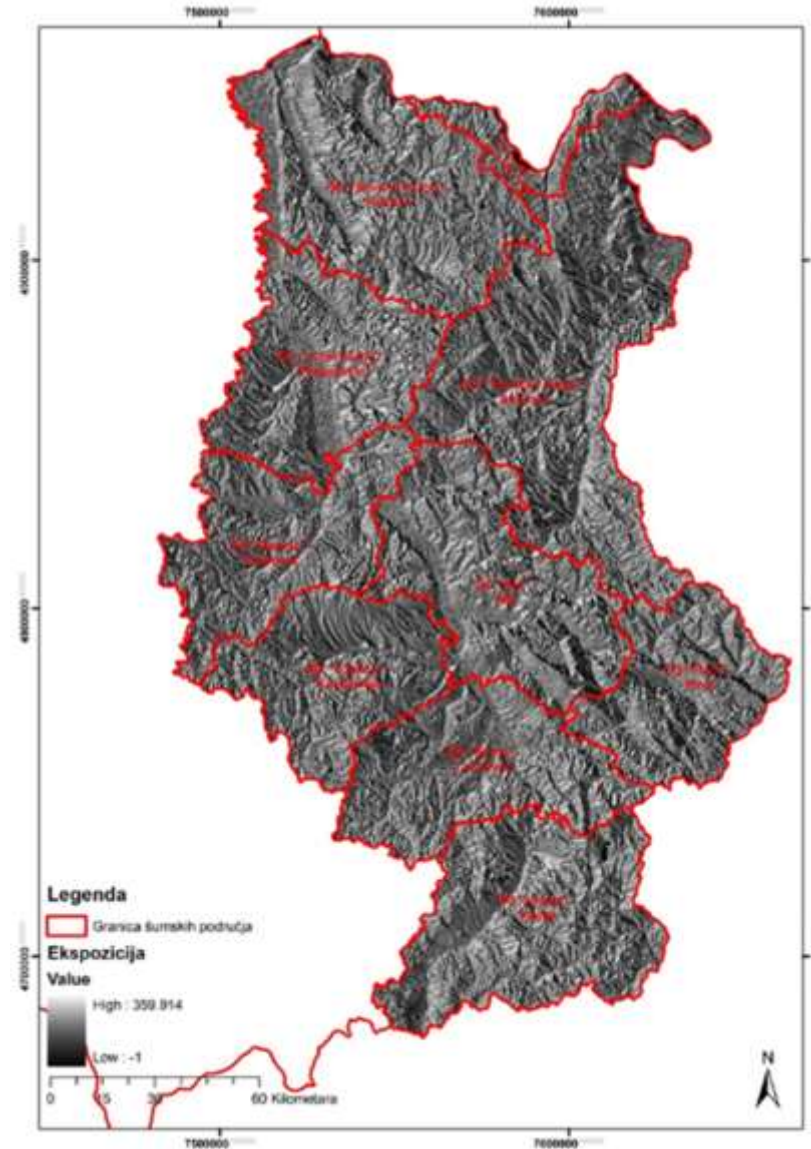
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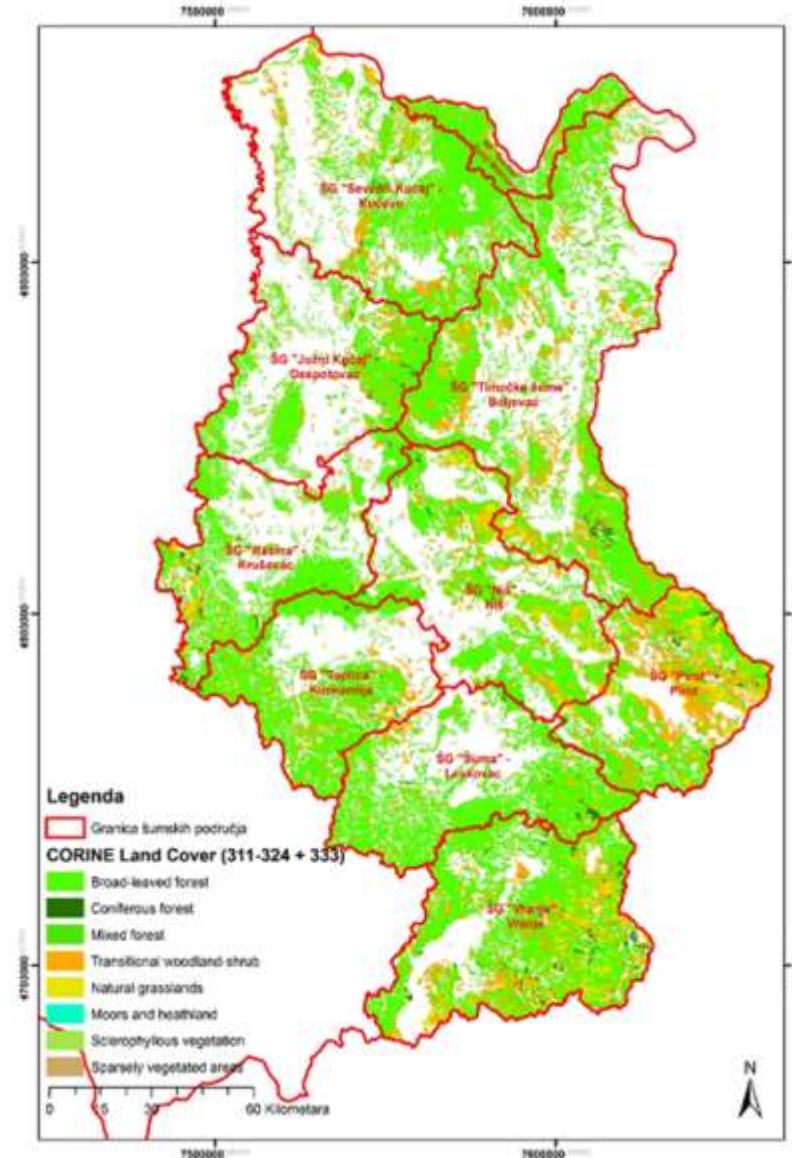
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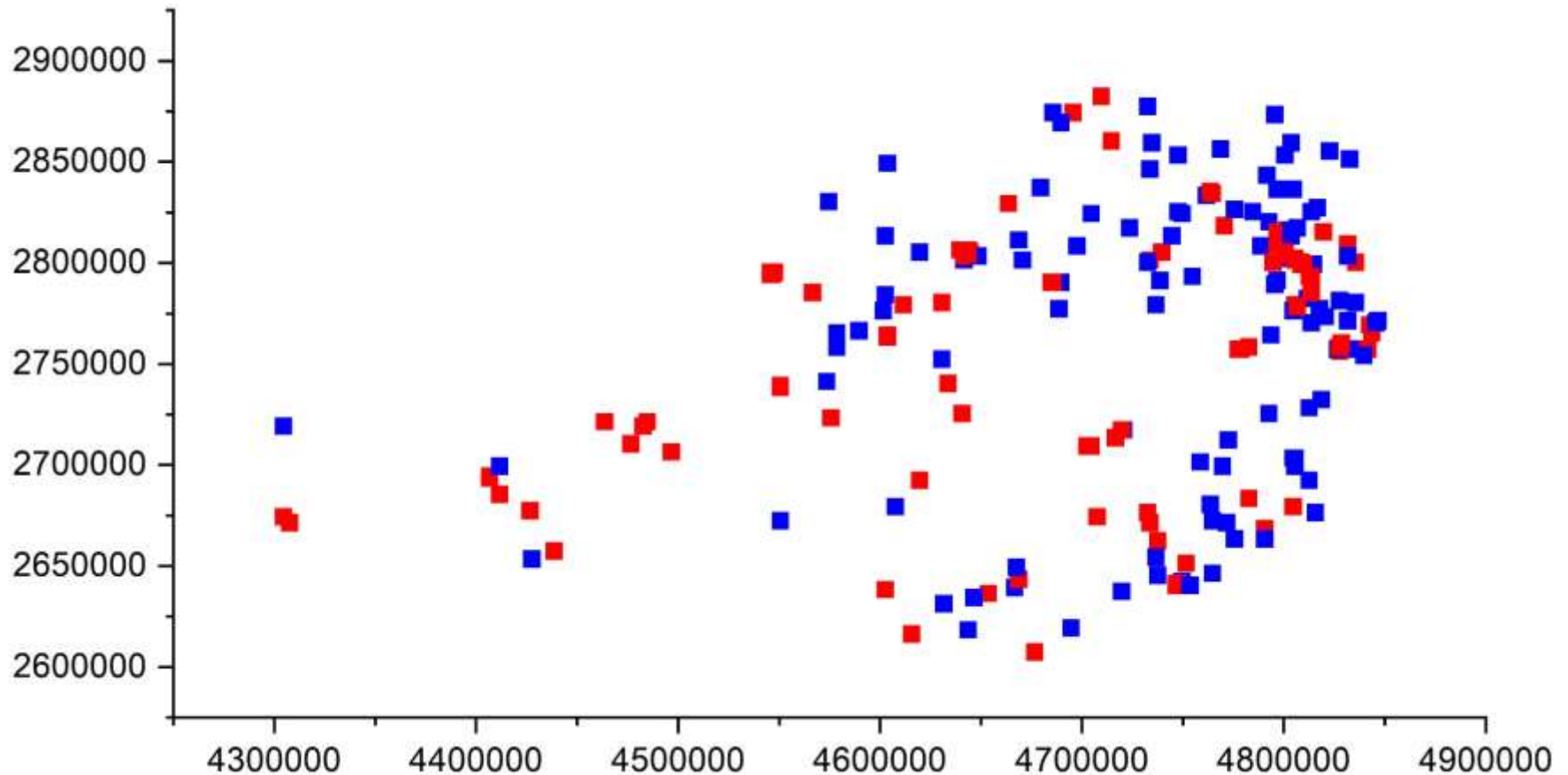


Project FORRISK - Cross-border forest risk management





Project FORRISK - Cross-border forest risk management





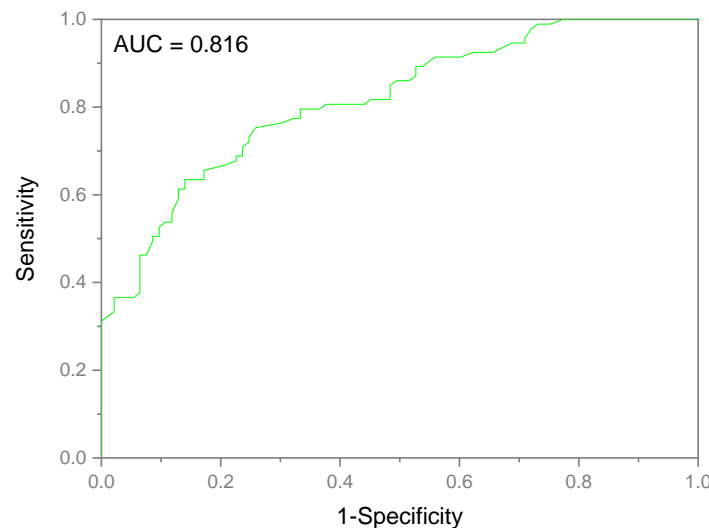
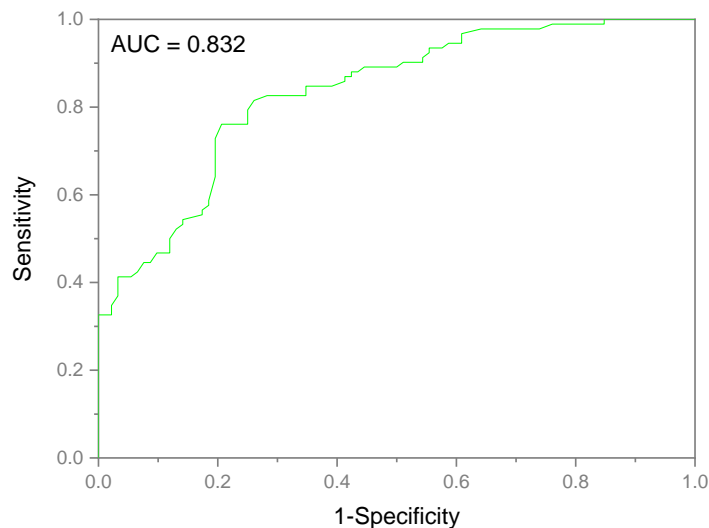
Explanatory variable importance evaluation Gini impurity for random forest (RF) model

VARIABLE	AVERAGE GINI Impurity	GINI Impurity MODEL
DIST_RAILWAYS	0.956	1.000
DIST_BUILDINGS	0.827	0.966
TWI_MEAN	0.782	0.852
DIST_ROAD_C	0.730	0.815
DIST_WATER	0.614	0.760
Population_Density_2011	0.589	0.595
DIST_ROAD_B	0.553	
Corine_311_ha	0.448	
DIST_AGRICULT	0.441	
Corine_313_ha	0.418	
Corine_312_ha	0.314	
EXP_CODE	0.222	
Corine_321_ha	0.125	
Corine_324_ha	0.062	
Corine_333_ha	0.000	



Classification tables for the training and validation sets of data based on RF model, with applied cut off values, according to the sensitivity equals specificity method.

Model	Cutoff		Predicted							
			Training			Validation				
			0	1	% Correct	0	1	% Correct		
RF	0.580	Observed	0	41	12	77.0	0	36	186	67.0
			1	10	43	81.0	1	12	42	78.0
		Overall %				79.0				72.0



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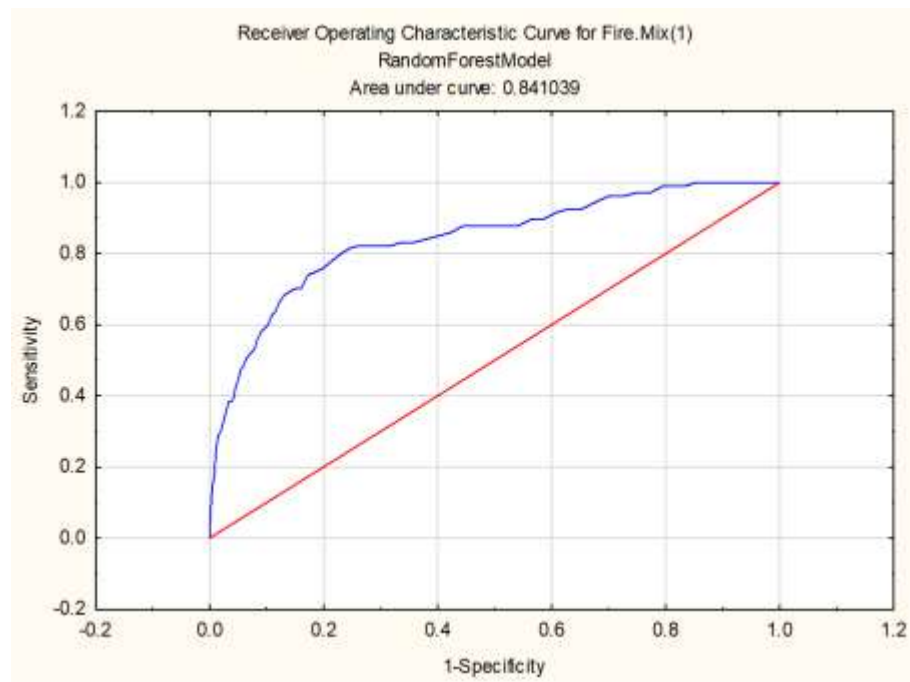


Color maps of predicted category frequencies relative to the total observed class frequency for Fire.Mix

File Name: RF 6 80 trees 0.580 cutoff.xml

Color band of percentages : 0% >0 and <10 % 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

(Actual)	1 0 (Predicted) RandomForestModel	2 1 (Predicted) RandomForestModel
	0	77.33%
1	20.56%	79.44%
Overall Accuracy = 77.33%		





Thanks for attention!

Source: EFFIS