EUROPEAN UNION

GOVERNMENT OF ROMANIA

GOVERNMENT OF THE REPUBLIC OF SERBIA

Structural Funds 2007 - 2013

ENVIROBANAT

Modern tool to evaluate the Banat air quality. Emission dispersion (izo-concentration maps) studies with CERC ADMS5

Francisc Popescu

ENVIROBANAT WORKSHOP

9 – 10 June 2014, Zrenjanin, Republic of Serbia

In the frame of the project

Sustainable development of an research center in Banat region and Danube flow area through scientific research and environmental simulation tools to asses and evaluate potential threats

www.envirobanat.ro

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Common borders. Common solutions.

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CERC Cambridge Environmental Research Consultants
Environmental Software and Services

ADMS 5

World leading software for modelling industrial air pollution

ADMS 5 is a dispersion model used to model the air quality impact of existing and proposed industrial installations. Current and future air quality can be assessed with respect to the air quality standards such as the EU Air Quality Directive and WHO guidelines.

Typical applications include:

- ✓ permitting/IPPC authorizations,
- ✓ stack height determination,
- ✓ odour modelling,
- ✓ environmental impact assessments and
- ✓ safety and emergency planning.

Why choice of ADMS 5?

ADMS 5 is a new generation Gaussian plume air dispersion model, which means that the atmospheric boundary layer properties are characterized by two parameters:

- ✓ the boundary layer depth, and
- ✓ the Monin-Obukhov length

(rather than in terms of the single parameter Pasquill-Gifford class)

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Why choice of ADMS 5?

	ADMS 5	AERMOD
Meteorology		
Meteorological pre-processor	✓	✓
Dispersion		
Boundary-layer structure	h, L_{MO} scaling	h, L_{MO} scaling
Plume rise	Advanced integral model	Briggs empirical expressions
Concentration distribution	Advanced Gaussian	Advanced Gaussian
Complex effects		
Buildings	ADMS buildings module[1]	PRIME buildings module[1]
Complex terrain	Based on calculation of flow field and turbulence field by FLOWSTAR model	Interpretation between identified representation of plume flow displacement over terrain (neutral), plume inspection (stable)
Deposition (wet and dry)	✓	✓
Chemistry	Reaction of NO with O_3, photolysis of NO_2, amine chemisty[2]	Ozone limiting or plume volume molar ratio models
Other options		
Modelling the effect of wind turbines on dispersion	✓	✗
Concentration fluctuations	✓	✗
Visible plumes	Condensed plume visibility	✗
Temperature and humidity	In-plume temperature and humidity output	✗
Radioactivity	Radioactive decay / γ-ray dose; decay chain database	Simple decay
Puff model	✓	✗
Coastline module	✓	✗
Marine boundary layer	✓	✗
Input of vertical profiles of meteorological data	✓	✓

ADMS features contrasted with US-EPA model AERMOD

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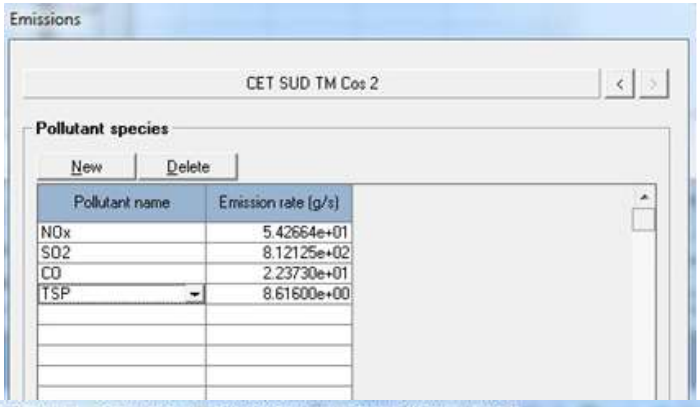
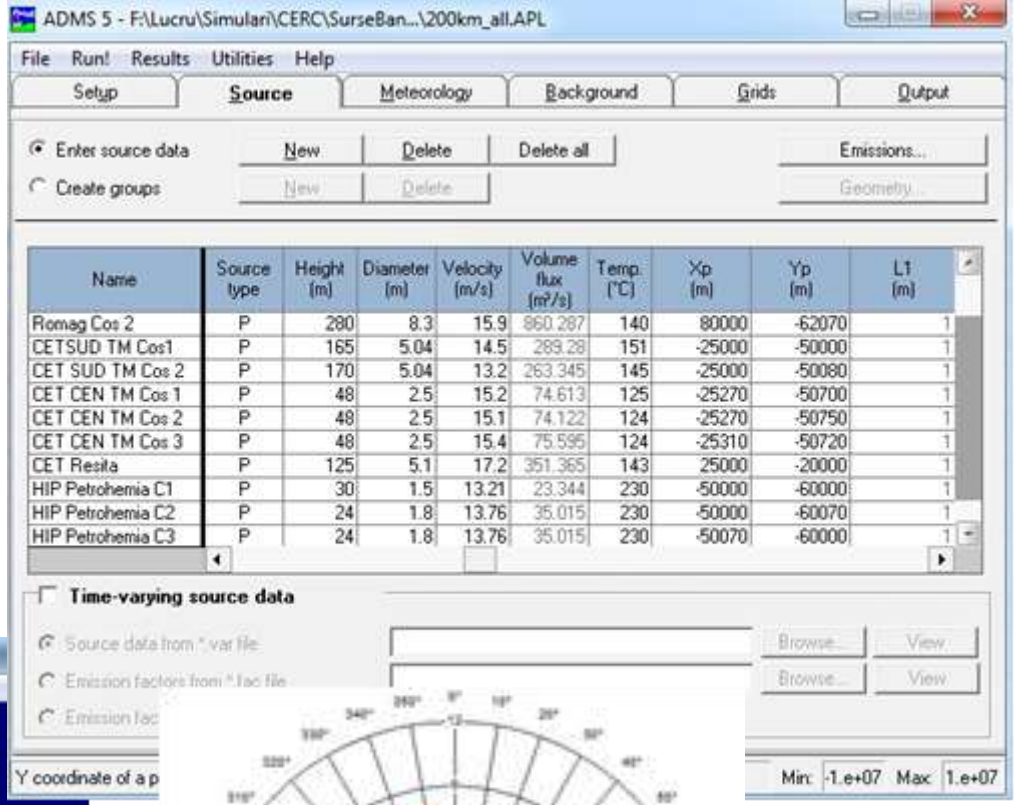
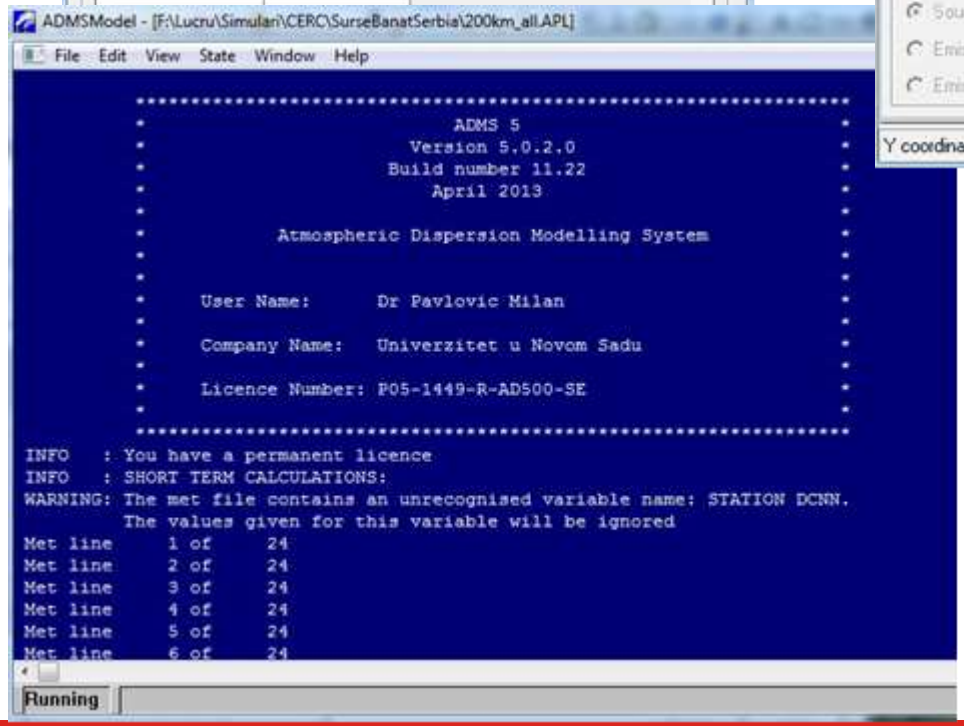
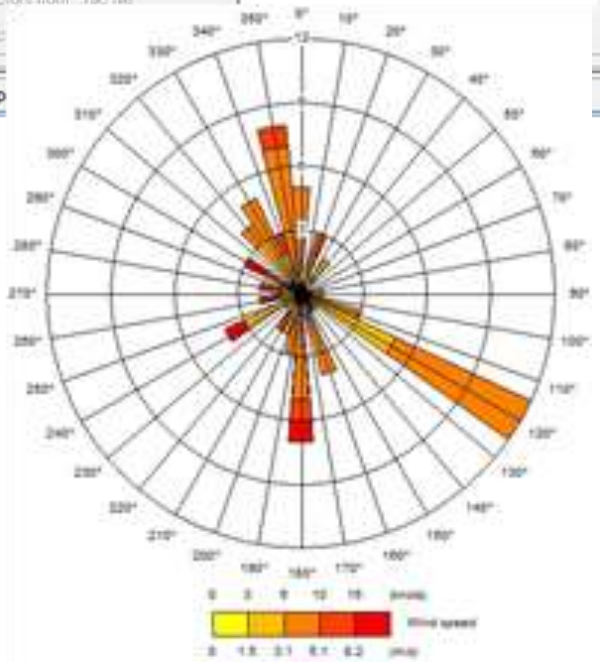
ADMS5 case study.









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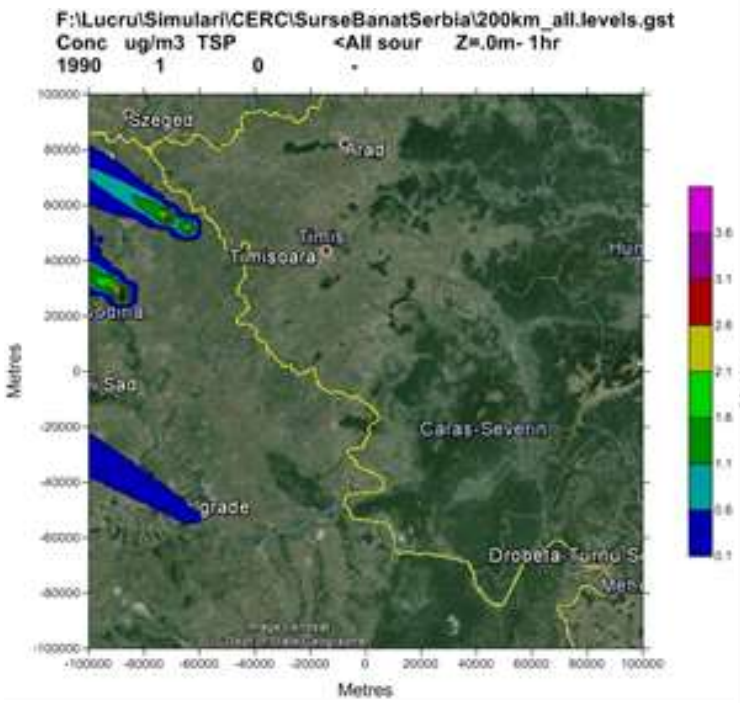
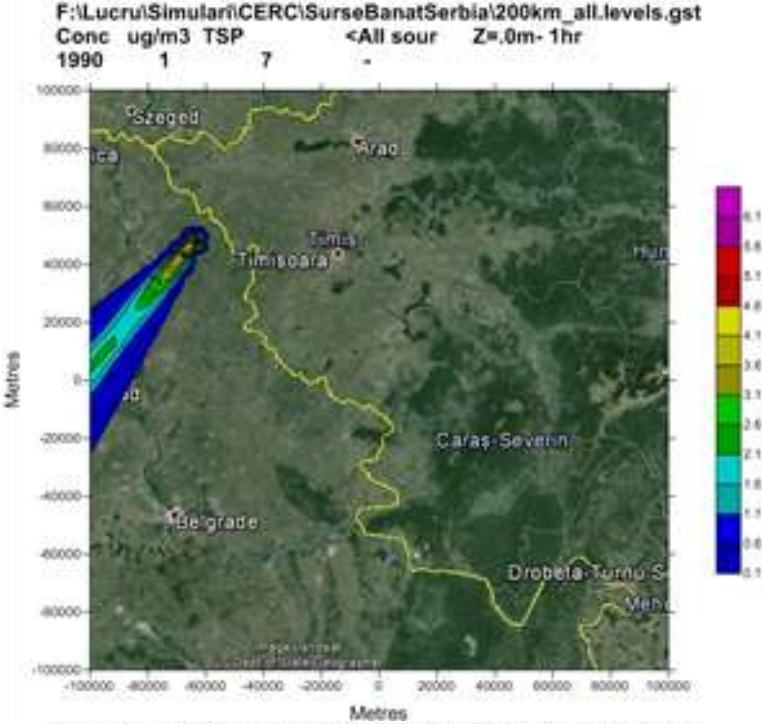
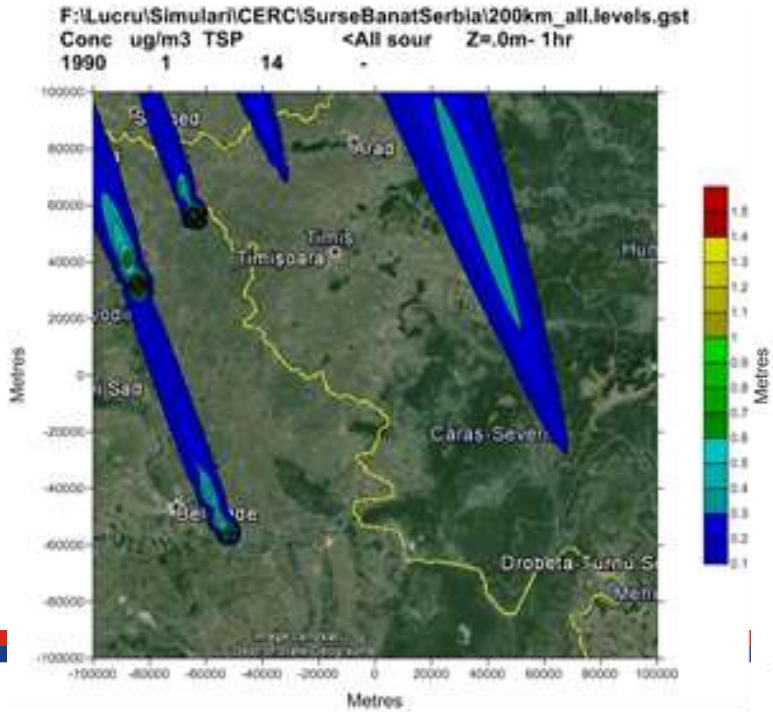
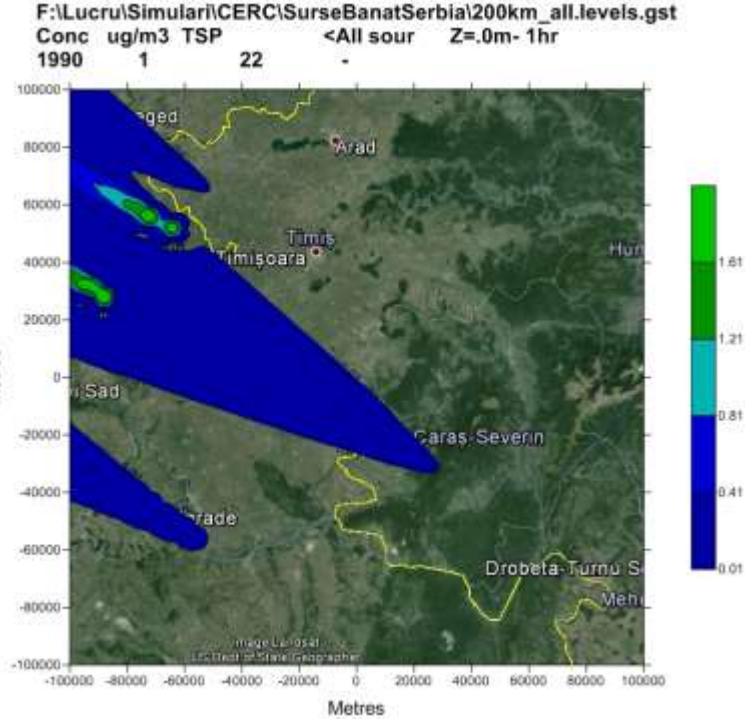
Particles (TSP) dispersion in Banat region for several main industrial facilities

dispersion study covered area - 40000 km²









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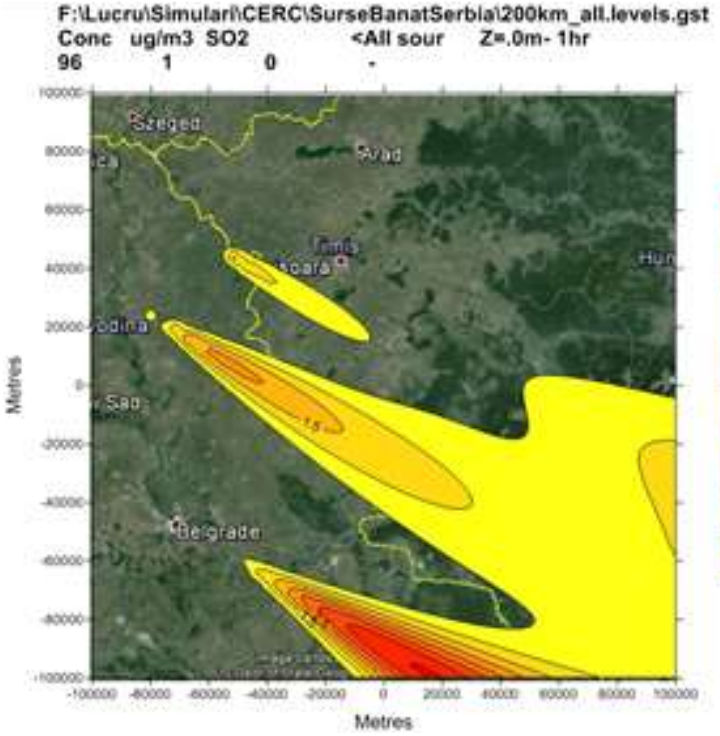
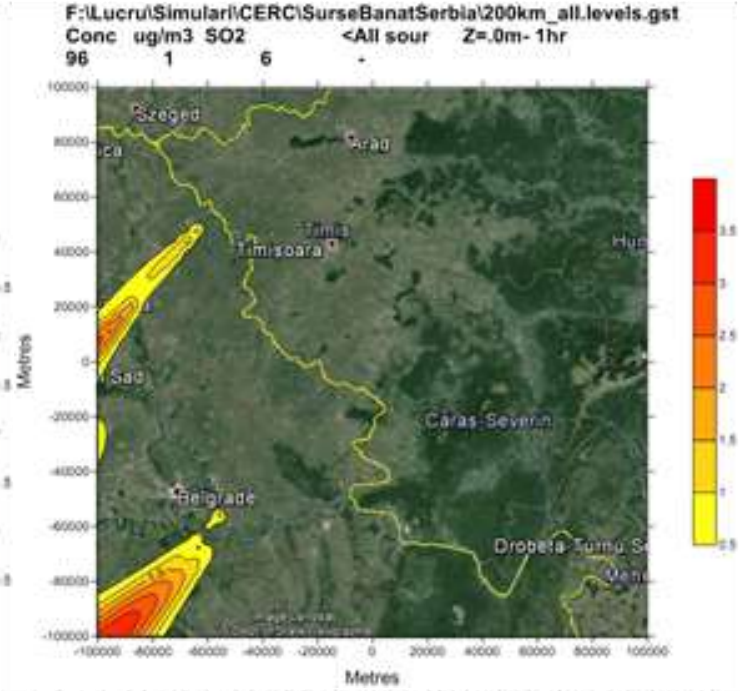
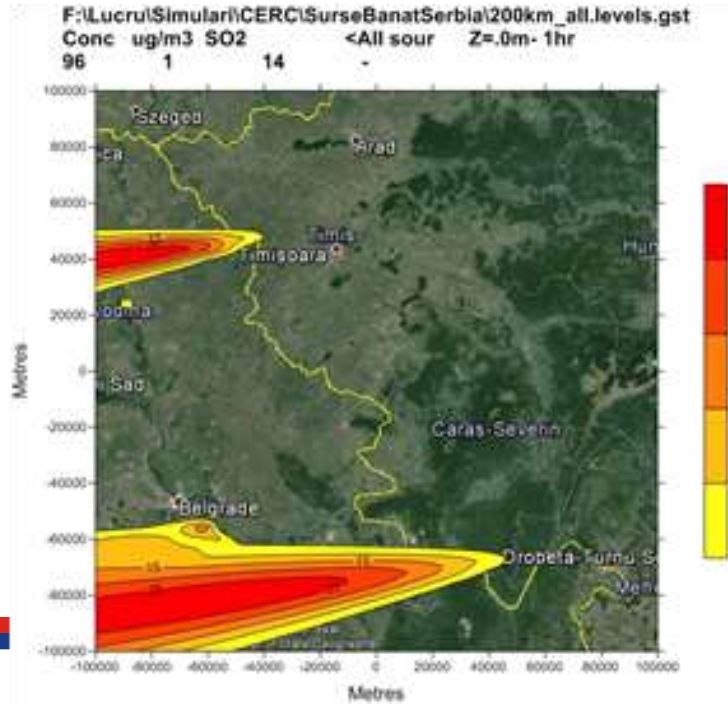
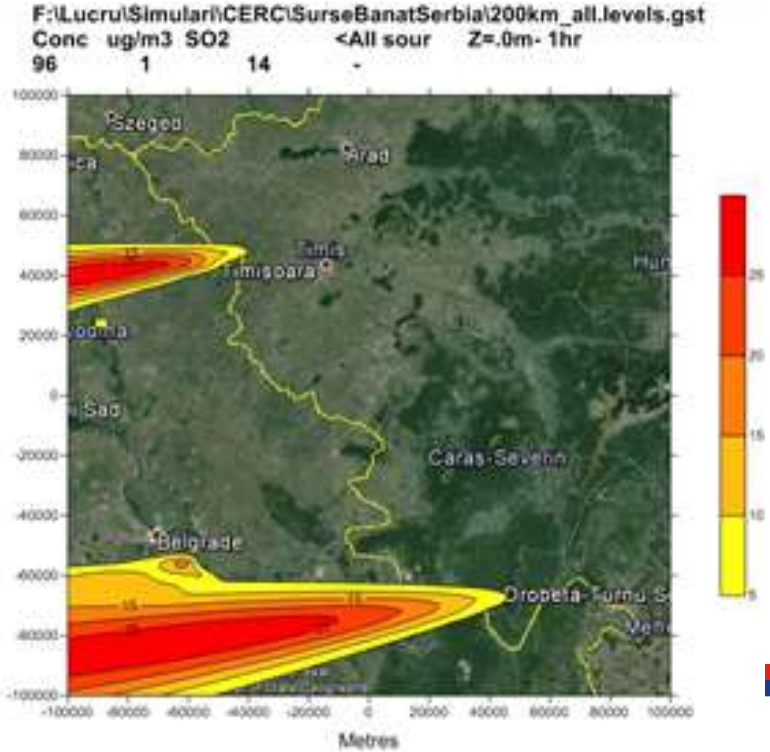
SO_2 dispersion in Banat region for several main industrial facilities









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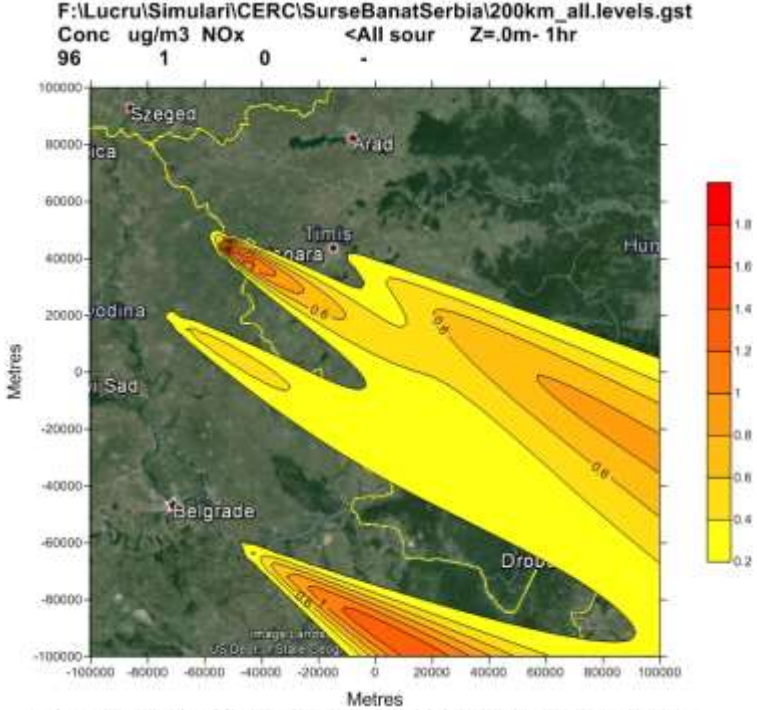
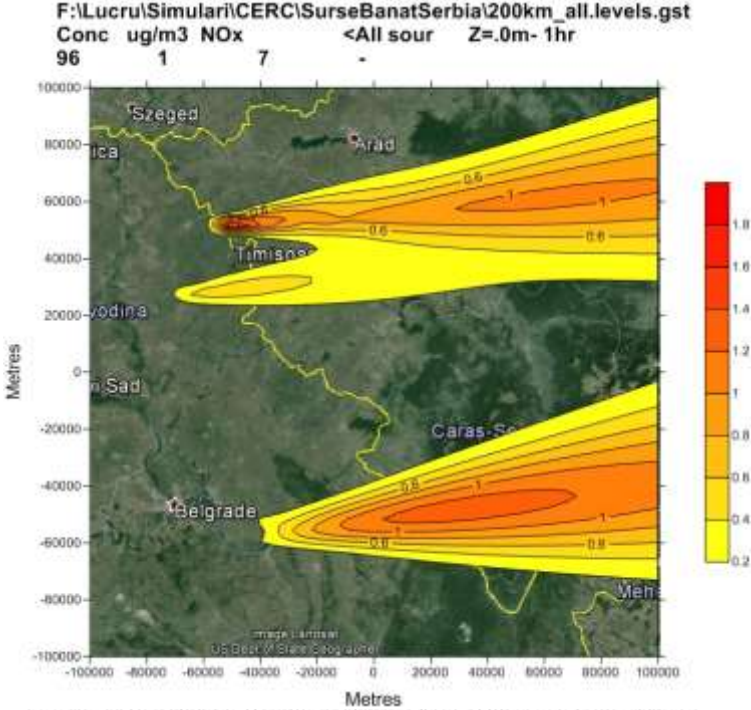
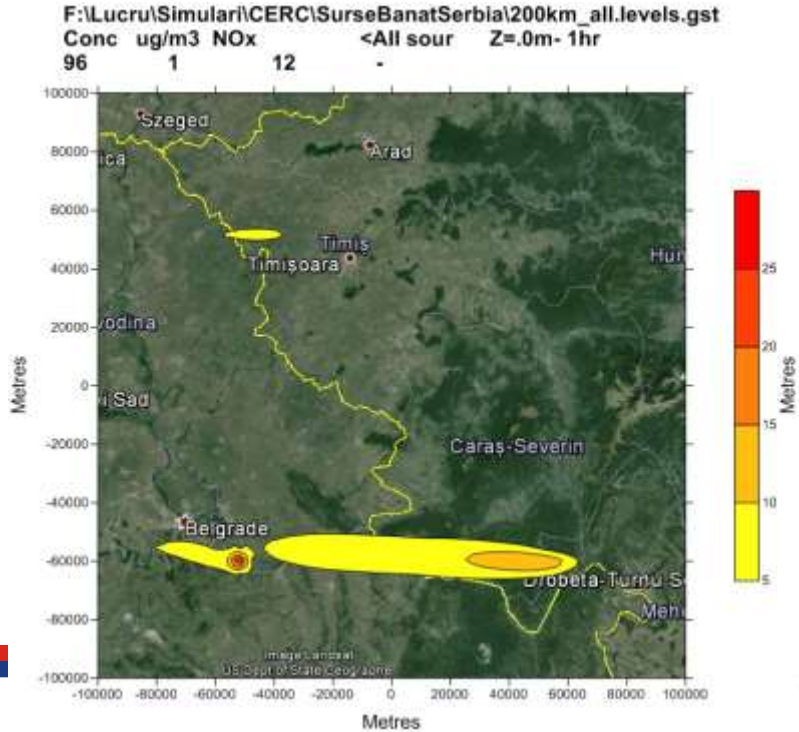
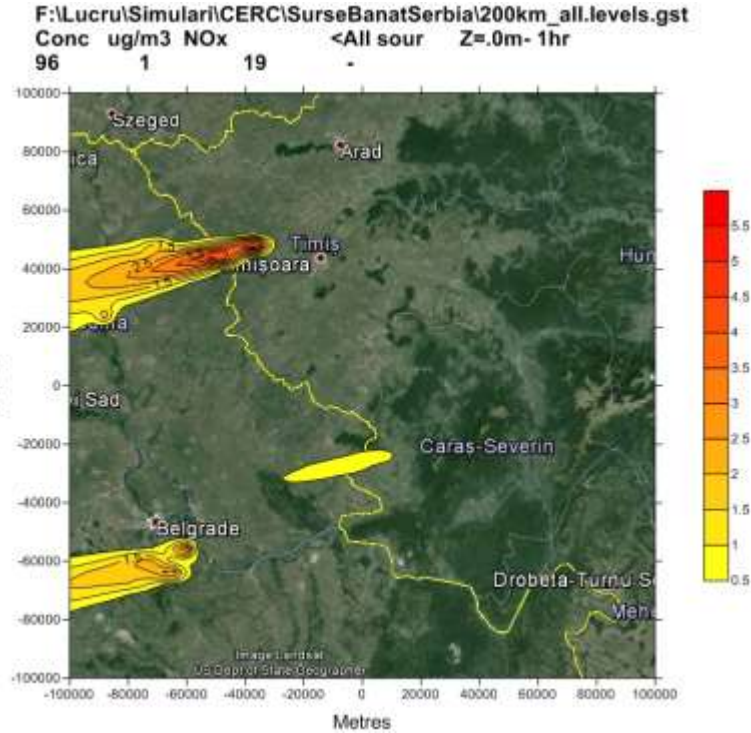
NOx dispersion in Banat region for several main industrial facilities









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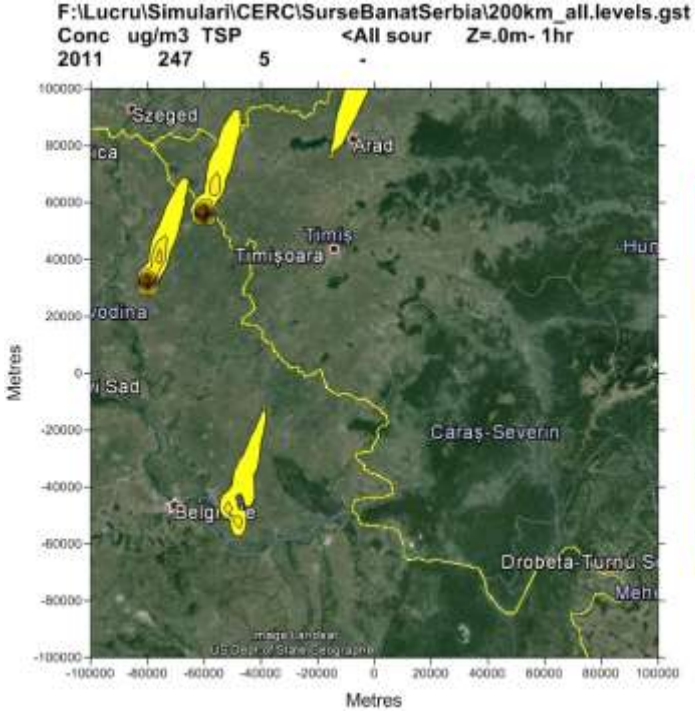
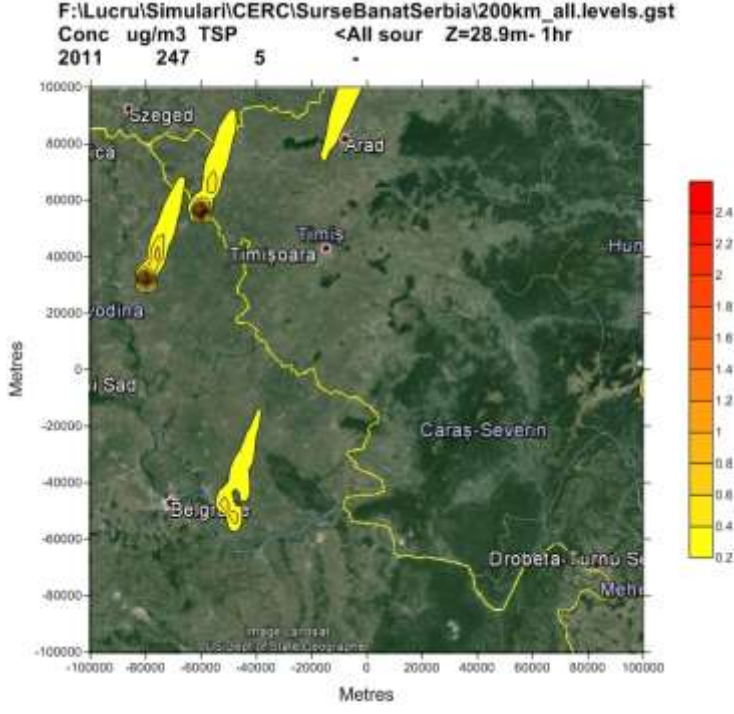
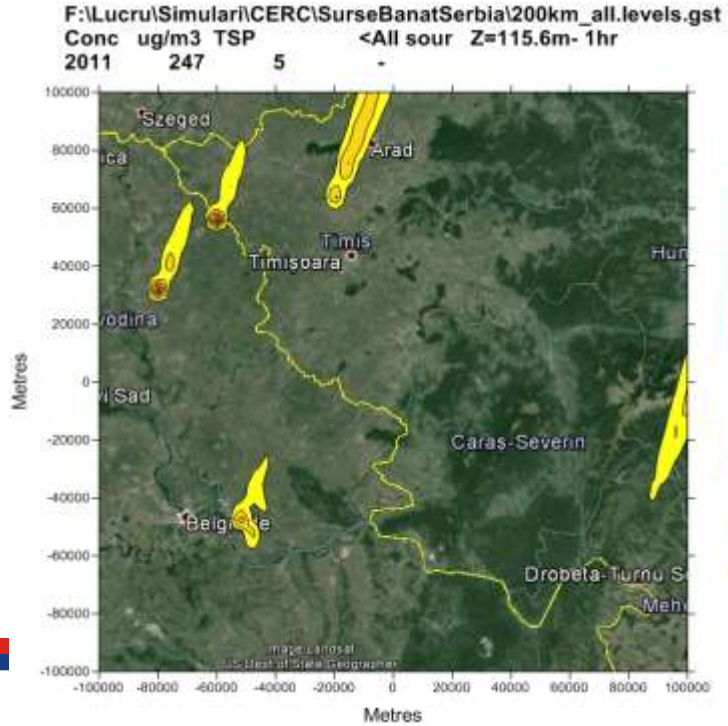
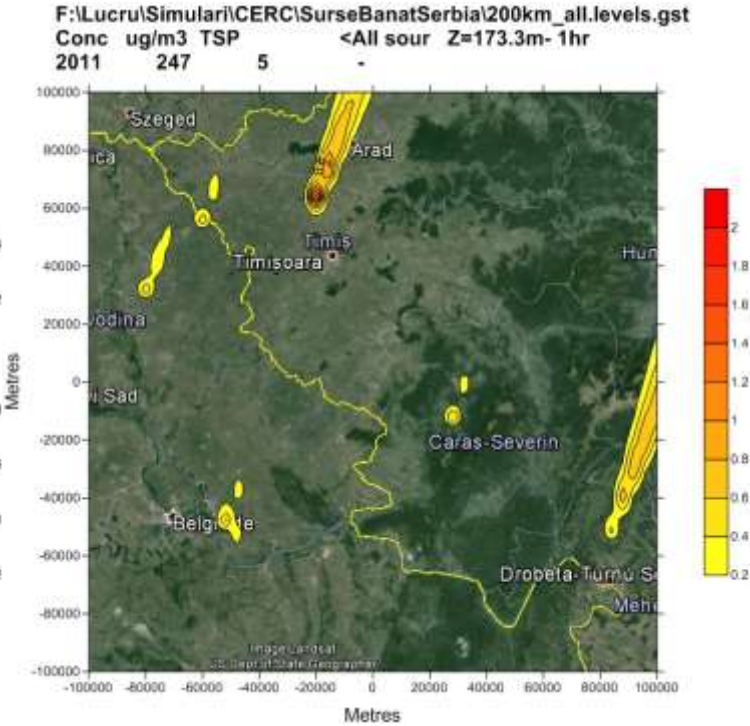
NOx dispersion in Banat region for several main industrial facilities.

(height varying scenario)









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More data are available to download from envirobanat.ro/Database.php

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