



Air Quality for 2030 based on Emission Projection Scenarios: FUTURAR project

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The FUTURAR project

Air Quality in Portugal in 2030 – a policy support

<http://futurar.web.ua.pt>

FUTURAR

PROJECT NEWS TEAM PUBLICATIONS LINKS

The main goal of **FUTURAR** project is to investigate the air quality impacts, costs and benefits of emission reduction projections for 2030.



New NEC Directive targets for EU

(Source: EEA)

17.12.2016

EN

Official Journal of the European Union

L 344/1

I

(Legislative acts)

DIRECTIVES

DIRECTIVE (EU) 2016/2284 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 14 December 2016

on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

New NEC Directive targets for EU

(Source: EEA)

Pollutants covered by EU National Emission Ceilings legislation and 2030 targets





TASKS

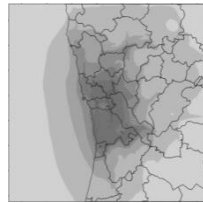
1. Present and future emissions of PM and O₃ precursors
2. Air quality in Portugal for the NEC baseline scenario
3. Air quality impacts of emission reduction scenarios
4. Environment and health impacts, costs and benefits
5. Guidelines and recommendations for policy support

METHODOLOGY



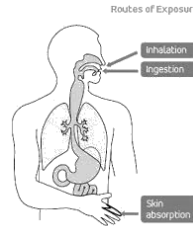
**Emission
s**

NO_x, CH₄,
NH₃, SO₂,
VOCs, PM



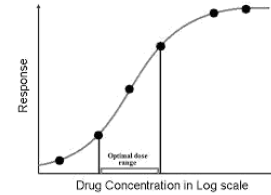
**Modelling of
dispersion & chemical
transformation**

Primary &
secondary gases
and particles



**Exposure
Analysis**

people
crops
etc



**Impact
Assessme
nt**

mortality
morbidity
crops loss



**Monetary
value**

cost-
benefits for
each NEC
scenario

EMISSIONS & SCENARIOS

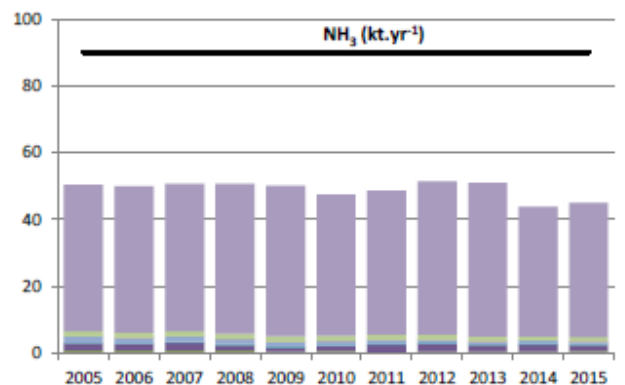
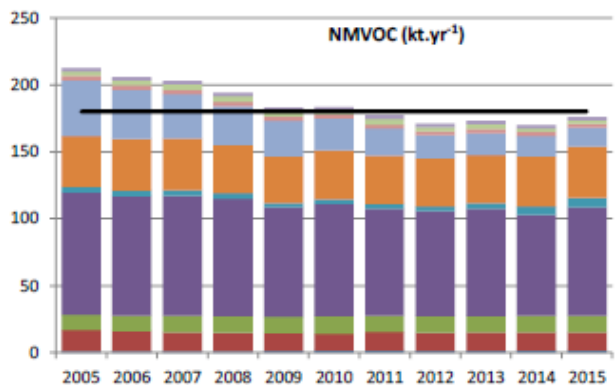
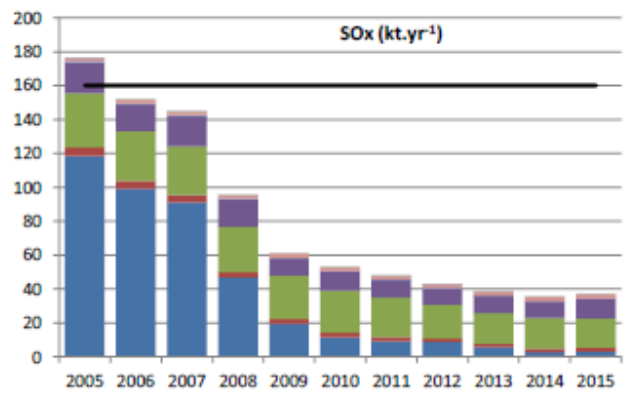
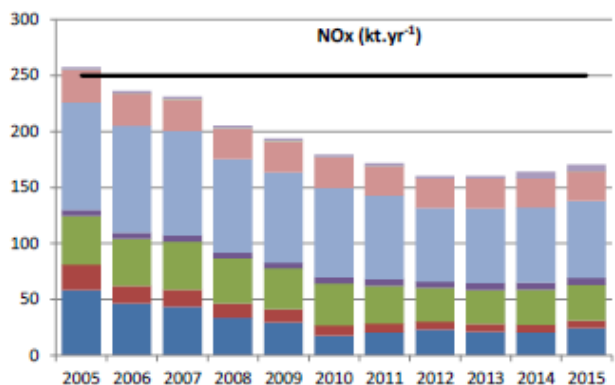
NEC 2010/2030 targets

Portuguese national emission ceilings for 2010 set by the DL 193/2003 and for 2030 set by the recently approved new NEC Directive 2016/2284/EU ^{1,2}.

Pollutant	NO _x	NM VOC	SO ₂	NH ₃	PM2.5
NEC for 2010 (kton)	250	180	160	90	
New NEC for 2030 (%)	63	38	83	15	53

EMISSIONS & SCENARIOS

Emission trends & NEC



- Energy sector
- Domestic
- Industrial combustion
- Industrial processes
- Fuel extraction
- Solvents
- Road transport
- Non road mobile
- Waste management
- Agriculture
- NEC 2010

EMISSIONS & SCENARIOS

NEC targets & scenarios

				2030 Projections			
(kt.yr ⁻¹)	2005 Emissions	Agreed Reduction (%)	Ceiling	APA2017	CLE	OPT	MTFR
NO_x	257.3	63	95	89	99	96	62
NM_{VOC}	212.5	38	132	148	134	124	98
SO₂	176.5	83	30	38	49	30	18
NH₃	50.3	15	43	38	51	44	35
PM_{2.5}	57.0	53	27	37	36	19	17

CLE

'current legislation'

MTFR

'maximum technically feasible emission reduction' projection

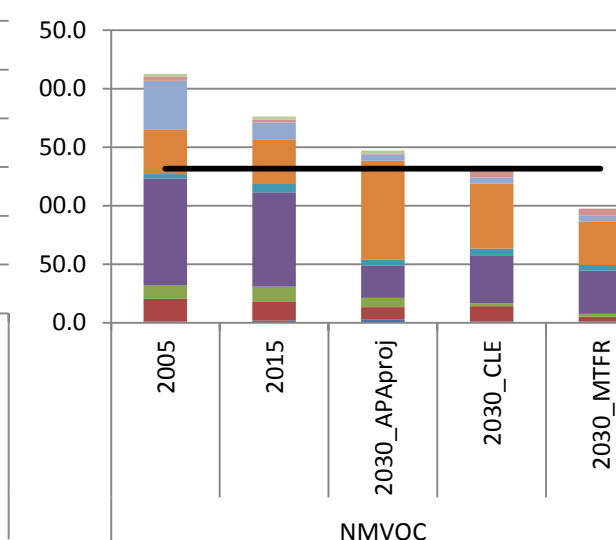
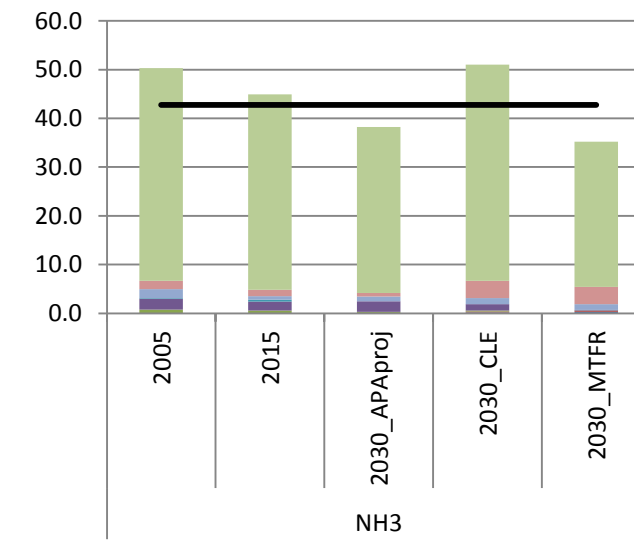
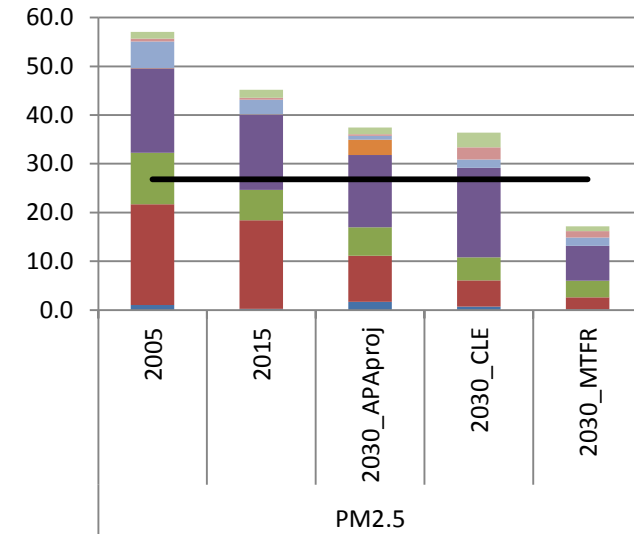
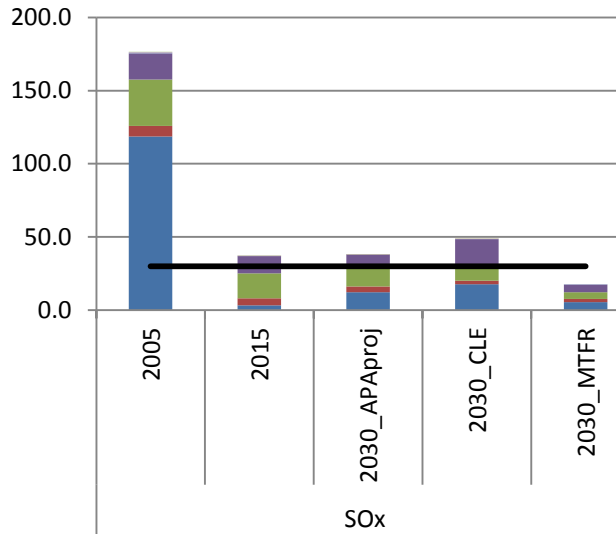
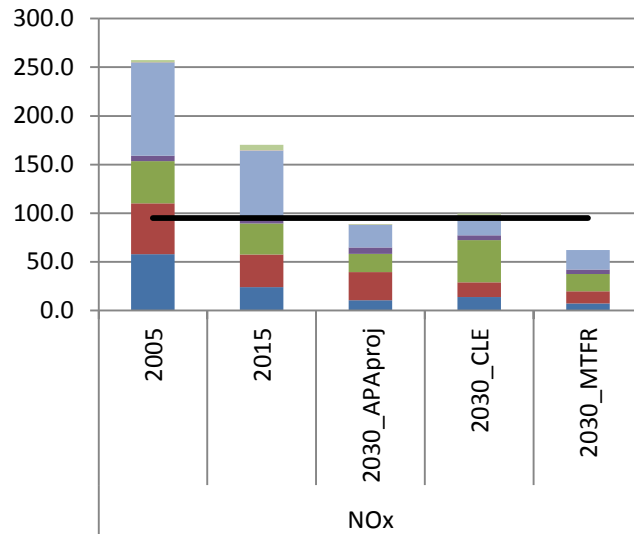
OPT

re-optimized 67% gap closure target for the EU-wide YOLL between the CLE and MTFR

APA2017

emission projections reported by Portuguese Environmental Agency in 2017

EMISSIONS & SCENARIOS



- S10 – Agriculture
- S9 – Waste
- S7 – Road Traffic
- S6 – Solvents
- S5 – Fugitive
- S4 – Industrial Processes
- S3 – Industrial combustion
- S2+S8 – Residential/Commercial Combustion
- S1 – Energy production
- 2030 NEC

AIR QUALITY

WRF-CAMx simulations



- 2005 emissions and 2005 meteo
- 2005 emissions and 2030 meteo

- CLE 2030 emissions + 2005 meteo
- MTRF 2030 emissions + 2005 meteo

- CLE 2030 emissions + 2030 meteo
- MTRF 2030 emissions + 2030 meteo

baseline

meteo influence

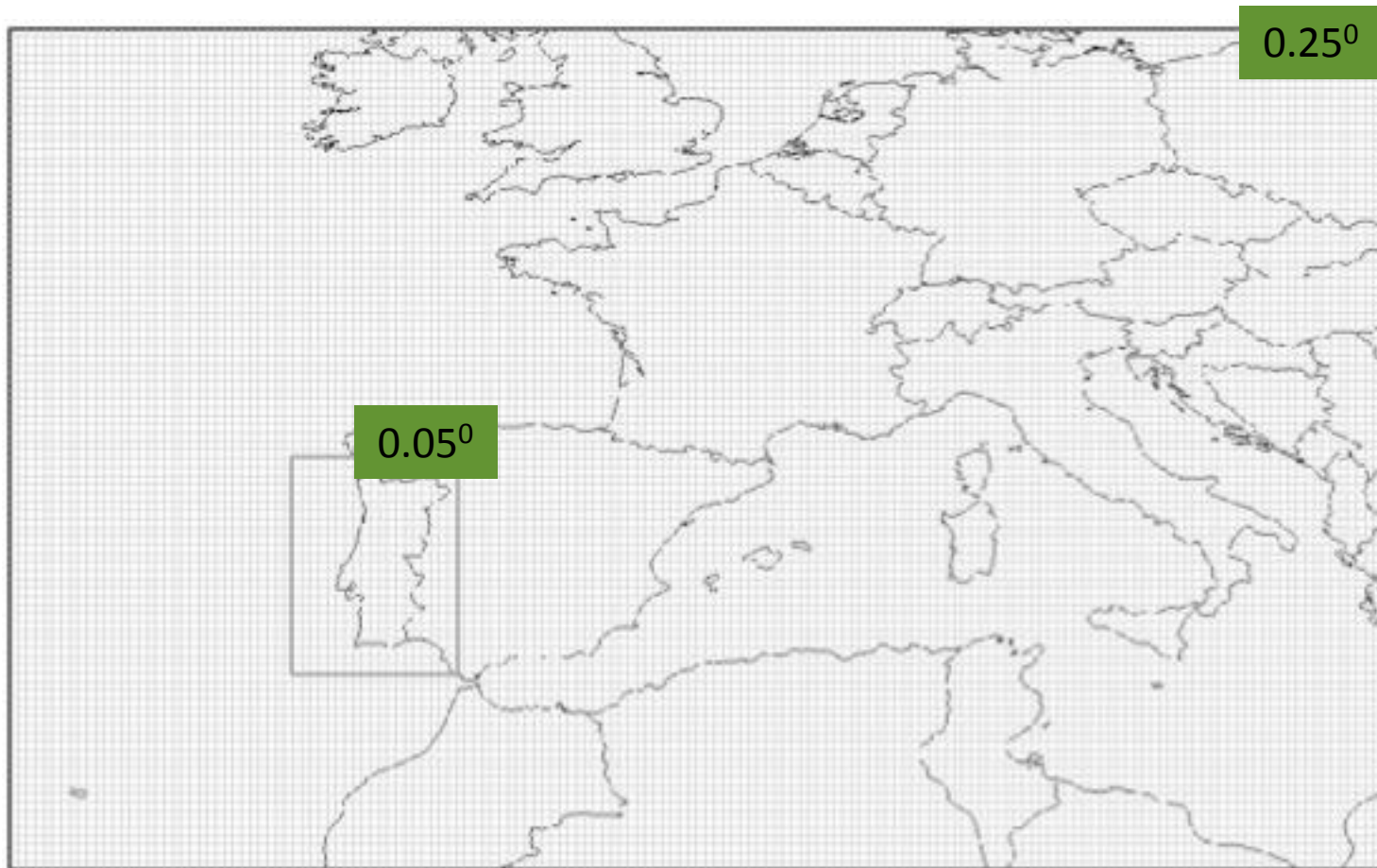
emissions influence

**emissions +
meteo influence**

... **preliminary results** for 2 months – **May & October**

METHODOLOGY

Modelling setup



PRELIMINARY

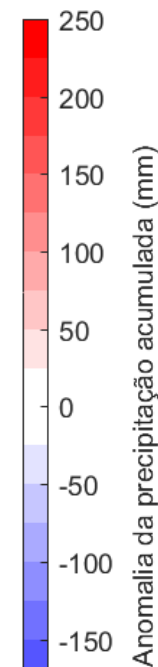
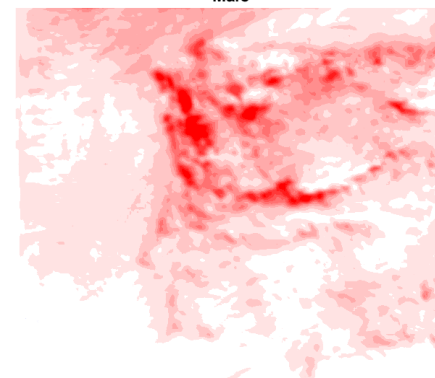
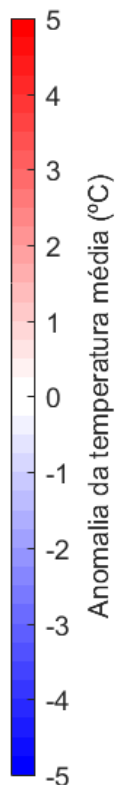
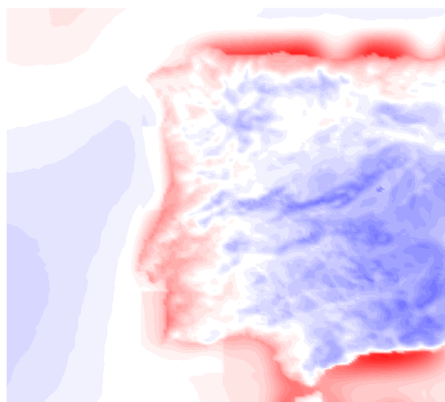
Meteorology RESULTS



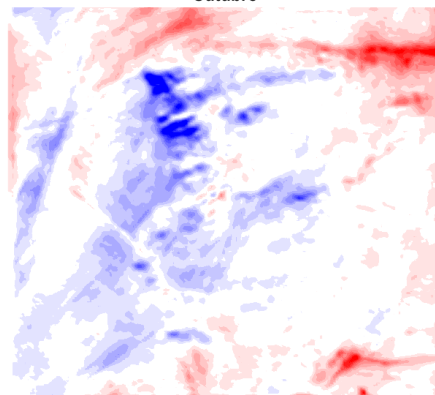
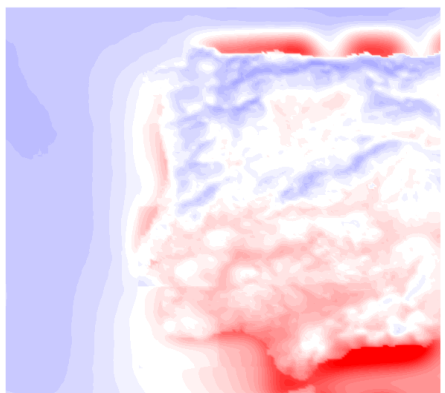
Temperature

Accumulated precipitation

MAY



OCTOBER



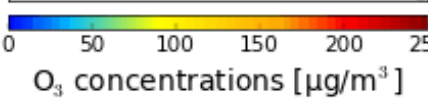
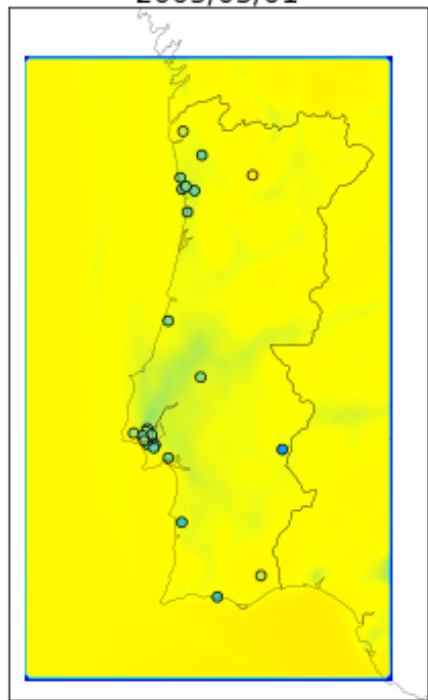
PRELIMINARY

Validation of baseline scenario

RESULTS

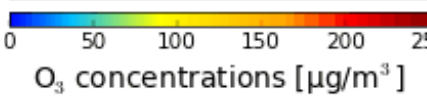
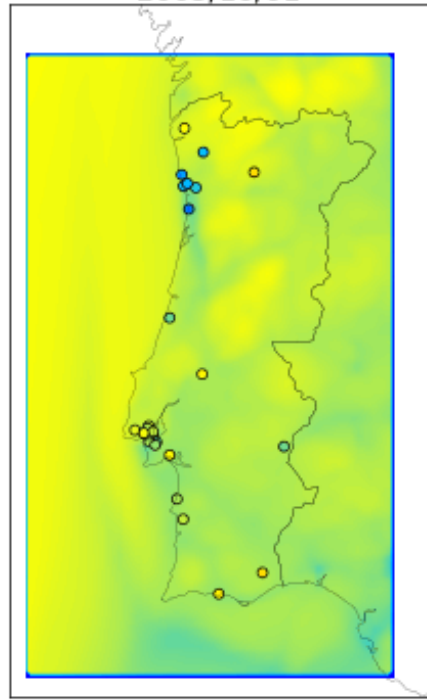
O₃

2005/05/01



O₃ concentrations [µg/m³]

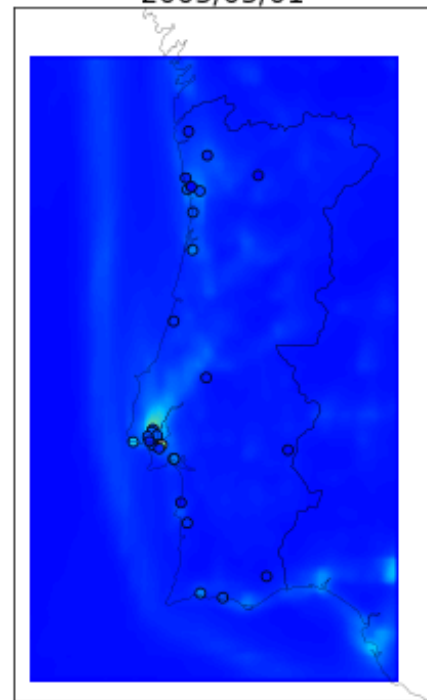
2005/10/01



O₃ concentrations [µg/m³]

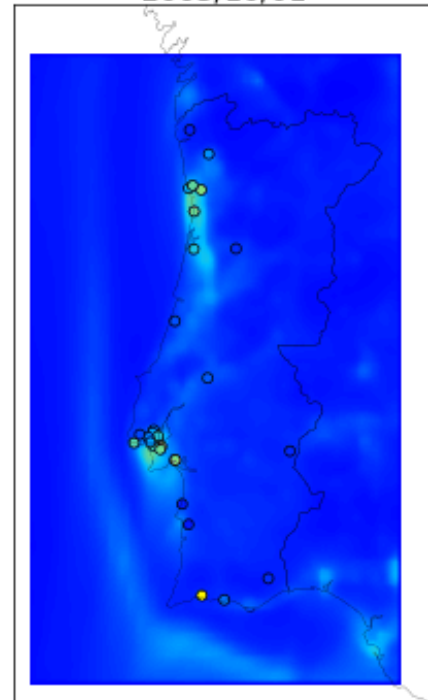
NO₂

2005/05/01



NO₂ concentrations [µg/m³]

2005/10/01



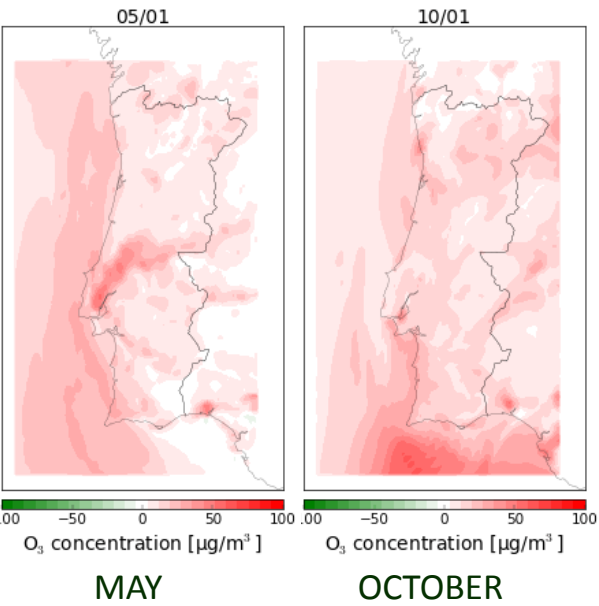
NO₂ concentrations [µg/m³]

PRELIMINARY

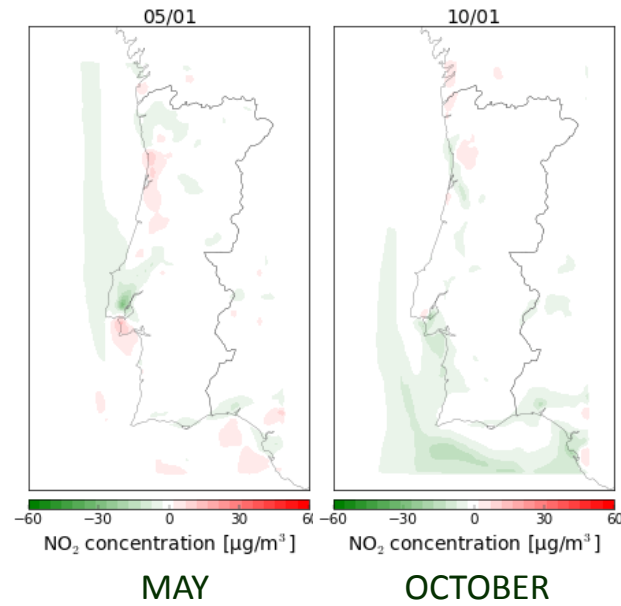
Meteorology influence RESULTS



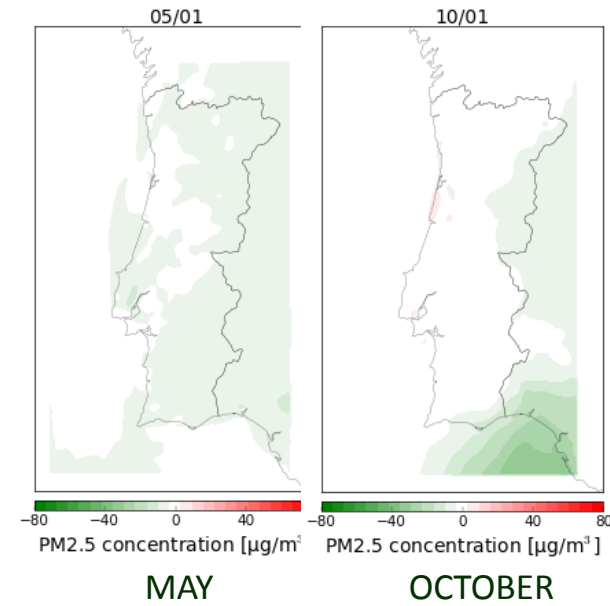
O₃



NO₂



PM2.5



PRELIMINARY

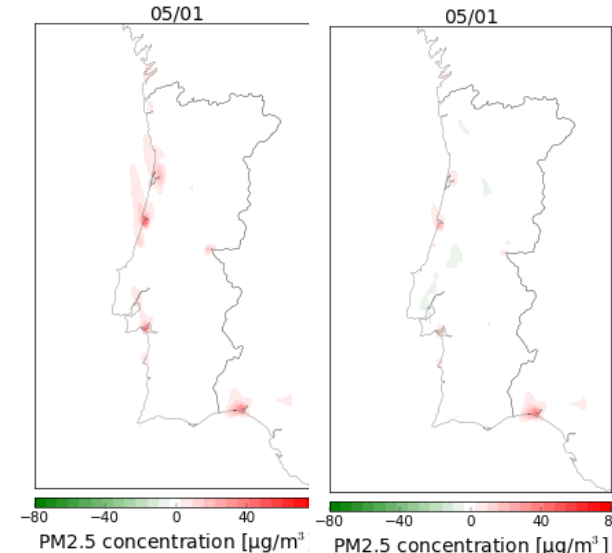
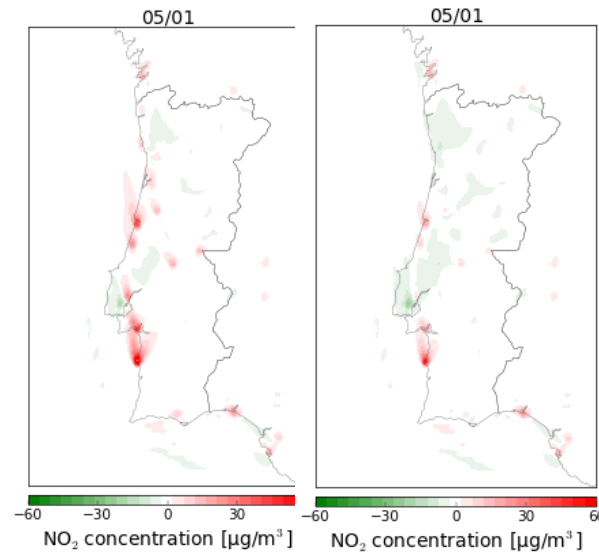
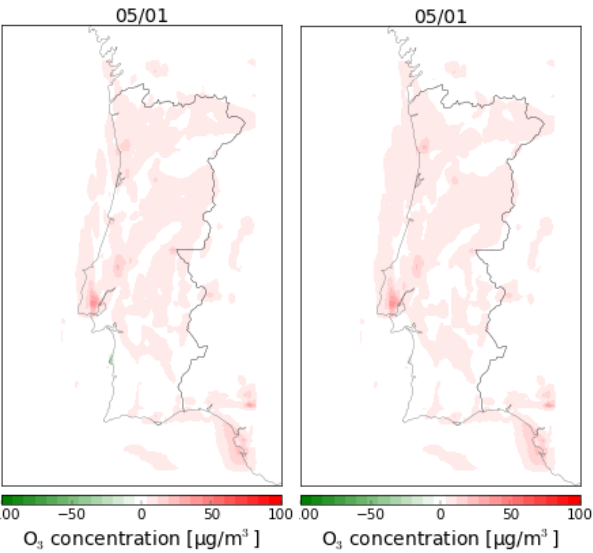
Emissions influence RESULTS



O₃

NO₂

PM2.5



CLE

MTRF

CLE

MTRF

CLE

MTRF

PRELIMINARY

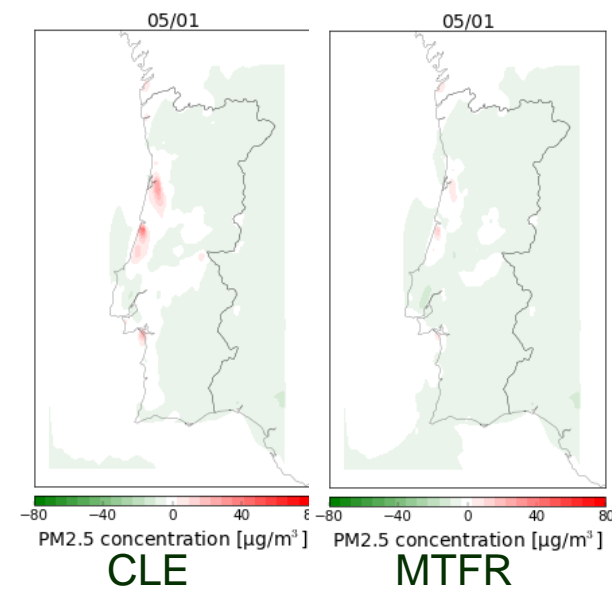
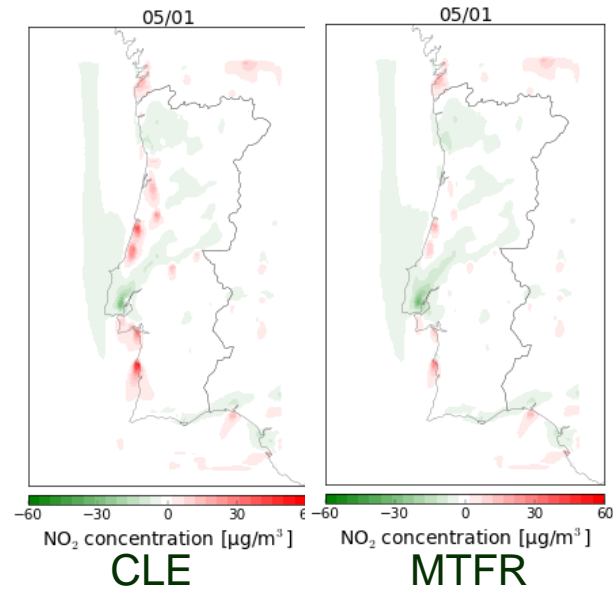
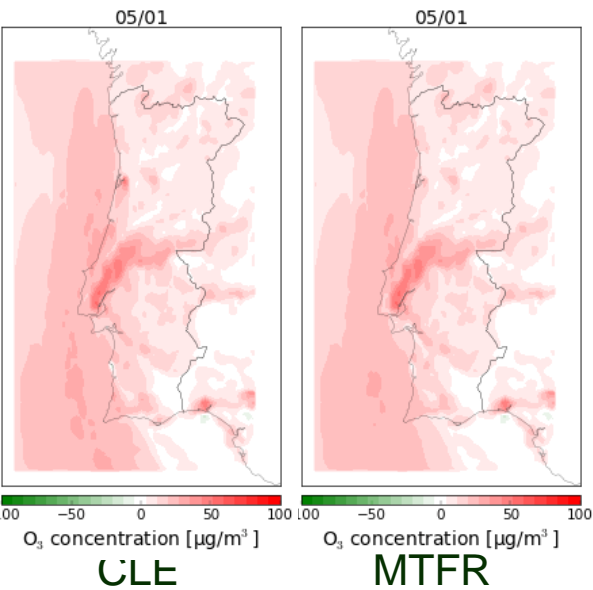
Meteo + emissions RESULTS



O₃

NO₂

PM_{2.5}



ON-GOING WORK



Other scenarios are being prepared by the Portuguese Agency of Environment and will be simulated

Next steps:

Estimation of environment and health impacts

Cost-benefit analysis for each scenario to identify the optimal scenario for Portugal to fulfill NEC and air quality objectives at least cost and maximum benefit

Recommendations and guidelines

Promoting the discussion...

1. Which MS are already working on long-term strategies?
2. What are the main driver to do that? (EU recommendation or country aim?)
3. Which are the main methodologies used?
4. Which are the main problems/difficulties found?