FAIRMODE CT9

Air Quality Projections

Intercomparison Exercise (Benchmarking platform)

FAIRMODE Technical Meeting

October 2022

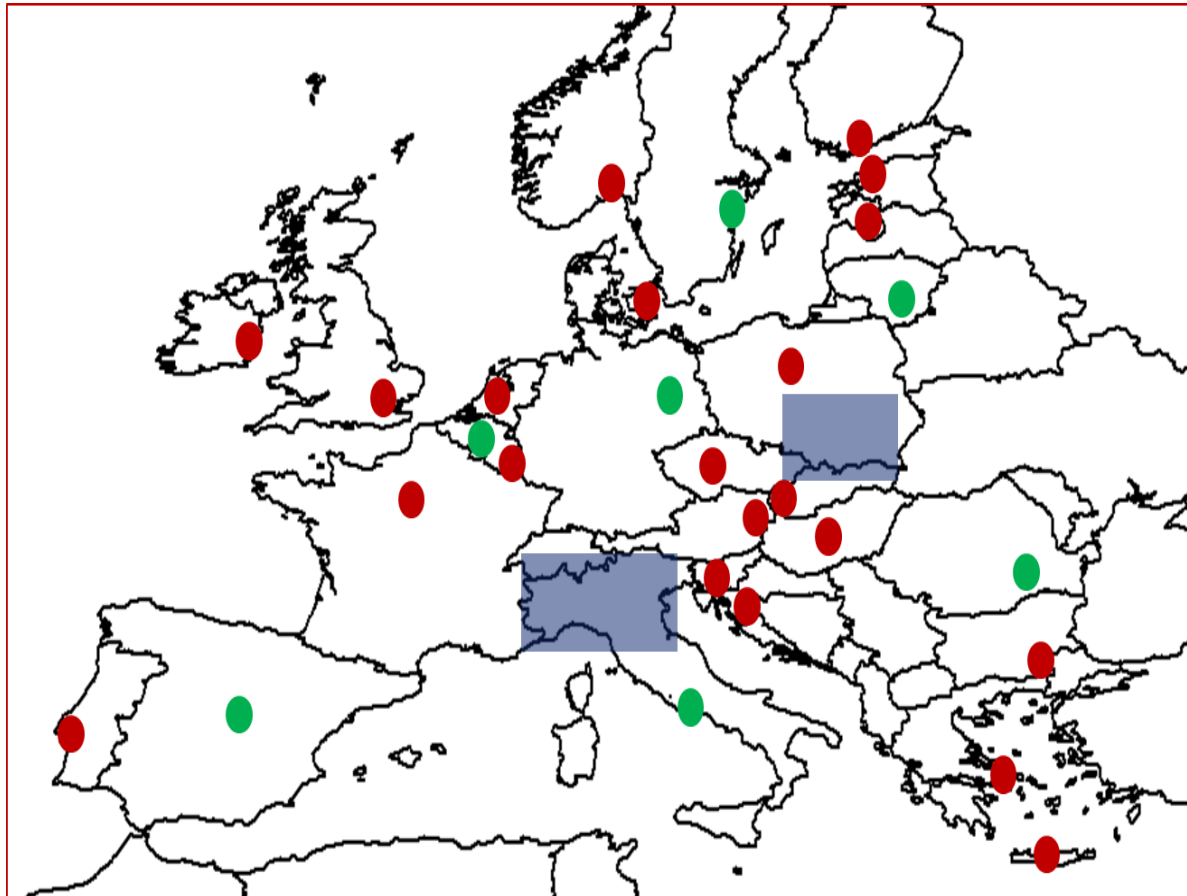# Remembering the CT9 Platform | objective

QUESTION:

How to deal with the variability of model responses to emission changes?

PROPOSAL:

An inter-comparison platform: to address the issue of the sensitivity of model responses to emission changes, in particular to assess, discuss, explain and minimize model discrepancies.

CT9 Platform proposal

Platform intended to benchmark and understand differences among modelling system responses to emission changes

- Wide **set of cities in Europe** (mostly EU capitals) plus a **few regions defined**

- Main pollutants: **PM10, NO2 and O3**

- Addressing both **episodes and yearly averages**

- Theoretical scenarios (**25%, 50%**)

- Both to **local & European scale** modelling systems

- **Platform rather** than an exercise

intention is not to compare city responses among themselves but to compare model results over a given city

CT9 Platform| structure
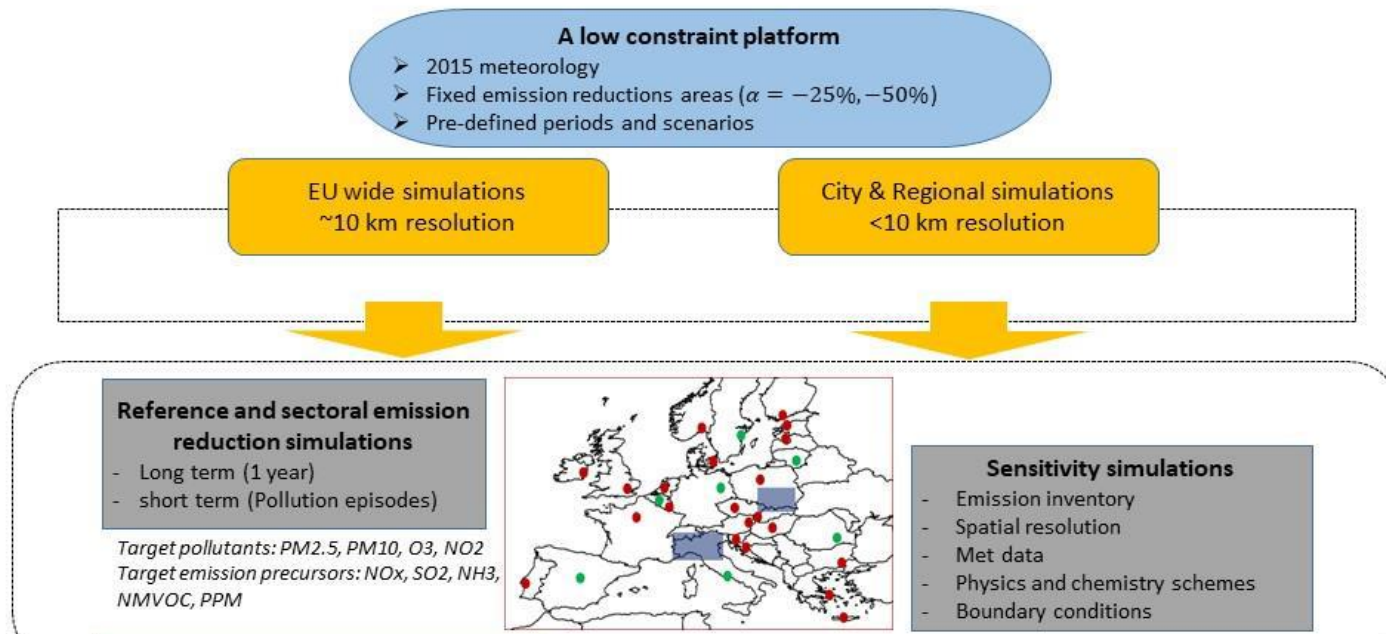
This inter-comparison platform would allow:

- **understanding the variability** of models responses to emissions changes

- **guide member states/cities** in the application of emission reduction measures:

  - Model system vs model system (same/different scale)

  - Model vs model (with similar input data)

  - Model version vs. model version

The pre-selected episodes

PM10

Locations			PM episodes in 2015 Emissions reduced by 25% and 50% individually and all together (SOx, VOC, PPM, NOx, NH₃)				
			Month				
Country	City	Episode code	JAN	FEB	MAR	APR	JUL
Austria	Vienna	VIE019		10 - 16			
Belgium	Brussels	BRU025				23 - 24	
Czech Republic	Prague	PRA007	1 - 9				
Denmark	Copenhagen	COP028					24 - 26
Finland	Helsinki	HEL029					24 - 26
France	Paris	PAR014		10 - 16			
Germany	Berlin	BER023			15 - 25		
Hungary	Budapest	BUD024			15 - 25		
Ireland	Dublin	DUB026				8 - 10	
Netherlands	Amsterdam	AMS012	1 - 9				
Norway	Oslo	OSL030					24 - 26
Poland	Warsaw	WAR013	1 - 9				
Portugal	Lisbon	LIS010	1 - 9				
Romania	Bucharest	BUC022		2 - 3			
Slovakia	Bratislava	BRA027				22 - 23	
Spain	Madrid	MAD021	22 - 23				
Sweden	Stockholm	STO032					13 - 15
United Kingdom	London	LON020			12 - 21		

O3

Locations			Ozone episodes in 2015 Emissions reduced by 25% and 50% individually and all together (VOC, NOx)			
			Month			
Country	City/Region	Episode code	JUN	JUL	AUG	SEP
Austria	Vienna	VIE018			11 - 16	
Belgium	Brussels	BRU034		10 - 17		
Czech Republic	Prague	PRA035		1 - 5		
Denmark	Copenhagen	COP036		24 - 26		
France	Paris	PAR015	5 - 6			
Germany	Berlin	BER037	5 - 6			
Greece	Athens	ATH016	-		6 - 14	
Hungary	Budapest	BUD038			7 - 9	
Ireland	Dublin	DUB039	5 - 6			
Poland	Warsaw	WAR040			7 - 9	
Portugal	Lisbon	LIS041	5 - 6			
Slovakia	Bratislava	BRA042	5 - 6			

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CT9 Participants

ZMAG, Austria

ENEA, Italy

CYPRUS INSTITUTE, Cyprus

IRCELINE, Belgic
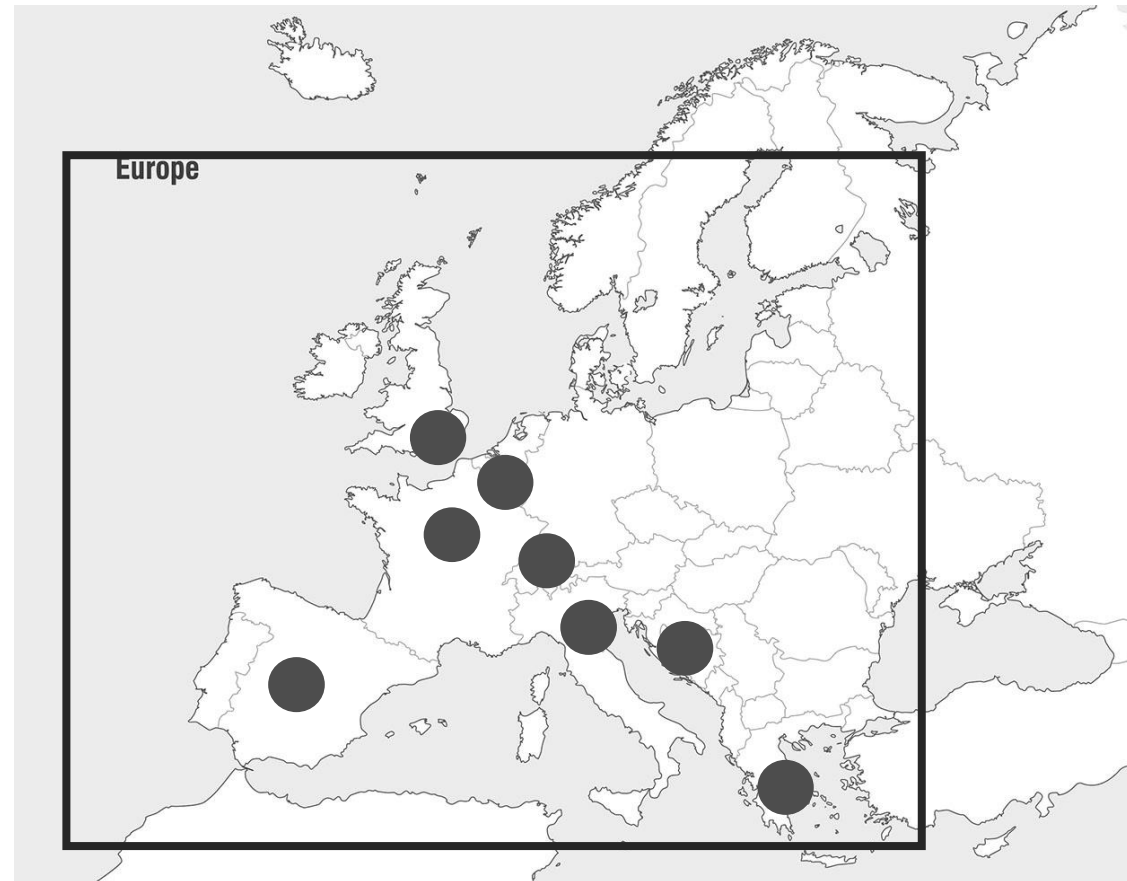
MET.NO, Norway

LMD, France

CIEMAT, Spain

HERTZ AC, UK

DHMZ, Croatia (Zagreb)

UNIV ATHENS, Greece

JRC, Italy

AMEGO - Amela.jericevic@amego.hr, Zagreb (NEW!)

CT9 Participants

Team	Model	Target area	Period of interest
ZMAG, Austria	WRF-Chem	Viena	Short-term
ENEA, Italy	WRF-MINNI	Po-Valley	Short-term
CYPRUS INSTITUTE, Cyprus	WRF-Chem	**Europe**	Long-term
IRCELINE, Belgic	CHIMERE+RIO+ATMOSTREET	**Europe**, Brussels, Belgique	Short-term & Long-term
MET.NO, Norway	EMEP; EMEP+uEMEP	**Europe**, all cities	Short-term & Long-term
LMD, France	WRF-CHIMERE	**Europe**, Paris	Short-term
CIEMAT, Spain	IFS-CHIMERE	**Europe**, Spain, Madrid	Short-term
UH-CACP, UK	WRF-CMAQ	**Europe**, UK, London	Short-term
DHMZ, Croatia (Zagreb)	ADMS-Urban; LOTOS-EUROS	Zagreb	Short-term & Long-term
NKUA-UOA, Greece	WRF-Chem	Athens	Short-term
JRC, Italy	EMEP	**Europe**, all cities	Short-term & Long-term

European Commission

Visualization platform tool
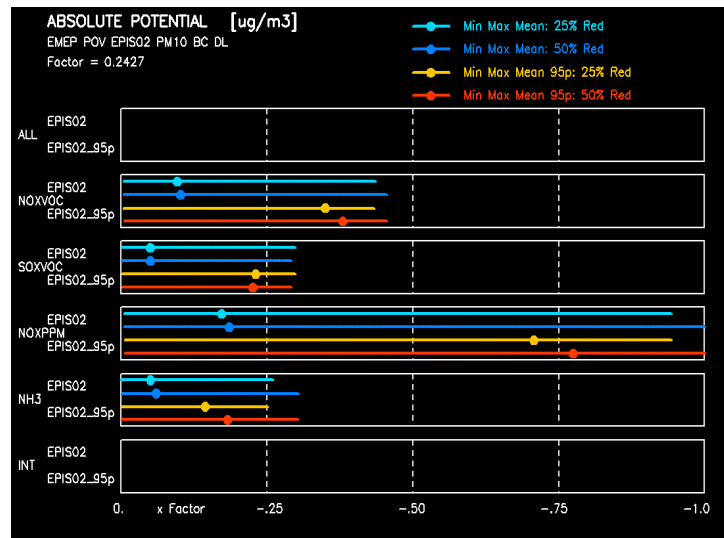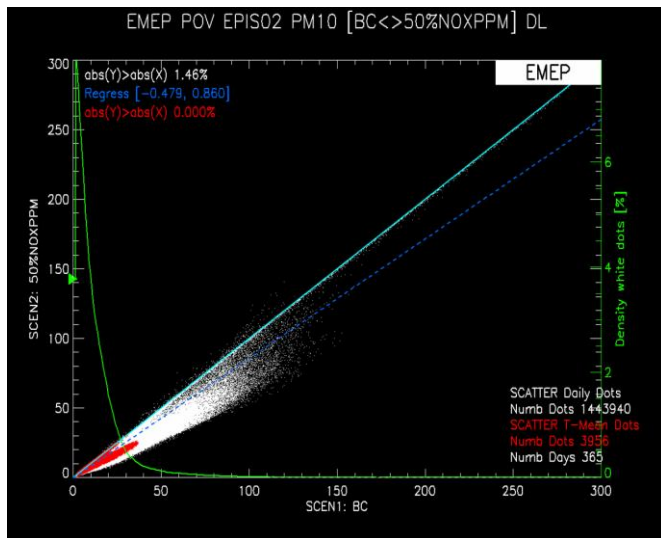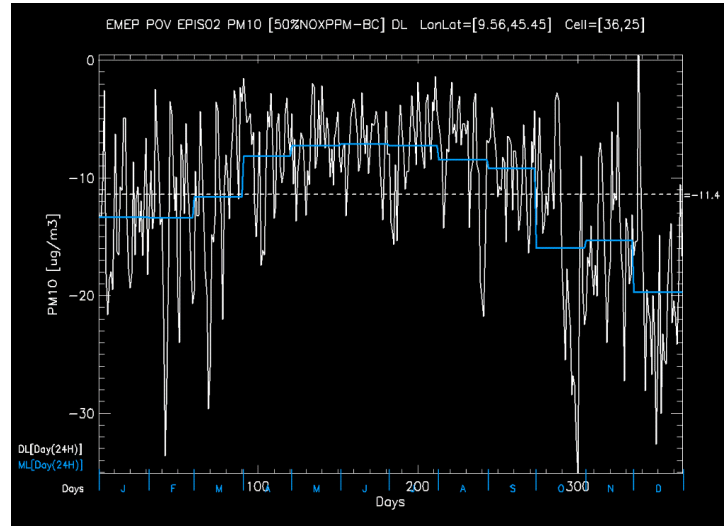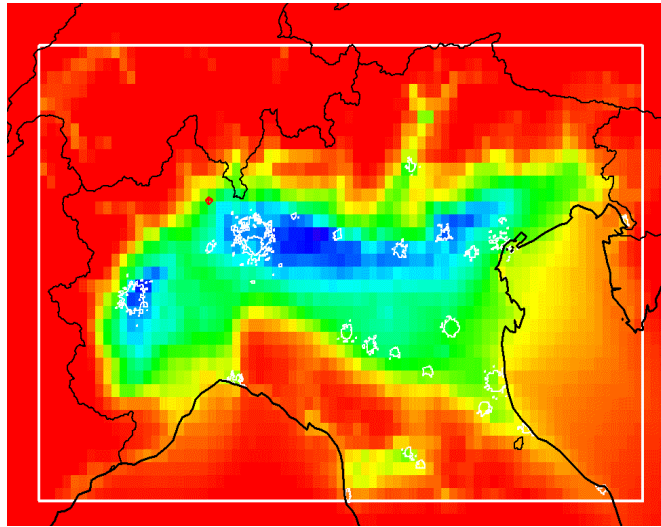
First paper submitted!

1 Assessment of model responses' sensitivity to emission changes in support of
2 local emission reduction strategies: the FAIRMODE CT9 platform.

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6 Ummugulsum Alyuz[7], Rajasree VPM[7], Saurabh Kumar[7], Elissavet Bossioli[8], Georgia Methymaki[8], Darijo
7 Brzoja[9], Velimir Milić[9], Arineh Cholakian[10], Romain Pennel[10], Sylvain Mailler[10], Laurent Menut[10], Gino
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35   *Retired with Active Senior Agreement
36

37 **Abstract**
38 The sensitivity of air quality model responses to emission reductions when input data (e.g. emissions,
39 meteorology and boundary conditions) or the model set-up configurations are changed is recognised
40 as an important issue for the optimisation of model simulations. In the framework of FAIRMODE
41 (Forum of Air Quality Modelling in Europe) and, in particular, in its Cross Cutting Task 9 (CT9), a

European
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CT9 agenda

part I: what have we done

Overview of results | Bertrand + Kees

Recent model result analysis by **CIEMAT** | Marta Vivanco

Recent model result analysis by **ENEA** | Mihaela Mircea

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CT9 agenda

part II: what we should do in the future

Organization
3 sub-groups are formed, adressing two **topics** (break-out sessions in small rooms).

Topic 1 (TODAY):
How can we best use the platform and available results to understand the variablity of the responses. Is there a need for additional simulations and if so which ones?
3 sub-groups (~ 10 persons)
(30 min of work in SG + 30 min for restitution in plenary parallel)

Topic 2 (TOMORROW)
Use of modeled delta for impact assessment (Case study)
3 sub-groups (~10 persons)
(30 min of work in SG + 30 min for restitution in plenary parallel)

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