Synthesis of WG3 meeting and topics for future activity

C.A. Belis
European Commission, Institute for Environment and Sustainability – JRC
G. Pirovano
RSE SpA

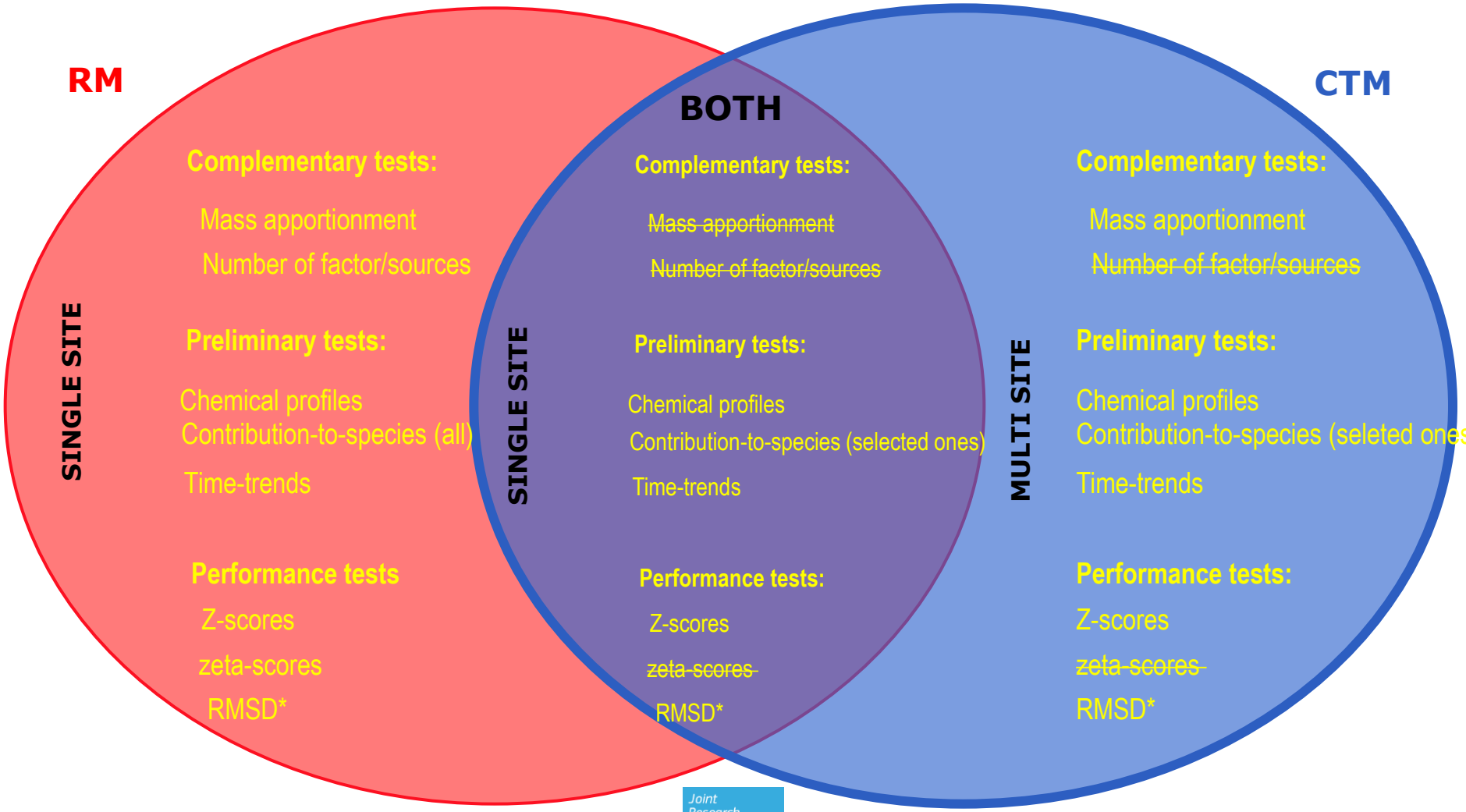
Fairmode Technical meeting
Zagreb, 27-29 June 2016

First intercomparison for Receptor (RM) and Chemical Transport models (CTM).

The intercomparison is useful for:

- Evaluating the overall source apportionment model performance on the basis of pre-established criteria,
  - ✓ *for the purposes of air quality management (AQM)*
- Obtaining an indirect measure of the overall output uncertainty,
- Generating more robust SA results (from a single outcome to an ensemble)
- Cross-validating results (to overcome the lack in observed data)
- Providing insights to understand the models behavior:
  - ✓ *influence of specific factors (e.g. input data, type of site, type of pollutant, meteorological conditions, etc…)*
  - ✓ *sensitivity to modelling approaches (e.g. RMs vs CTMs) and assumptions*
- Learning about CTMs performance when used for purposes other than SA

Evaluation in this IE



Participants

European Commission

RM: 33 participants – 38 results

AGH-UST	ISAC LE	RIVM
APPATN	FMI	SAGE
ARPA ER	IDAEA_T	UCC
ARPA LO	IDAEA_A	UMH
ARPA PU	IMROH	UNIBO
ARSO	ISSeP	UNIHE
AUTH	IST	UNIMI
CARES	LGGE+	UNMIB
CNR IIA	NCSR	UNIFI
ENEA	PSI	UNIGE
ISAC BO	PUC	WUT

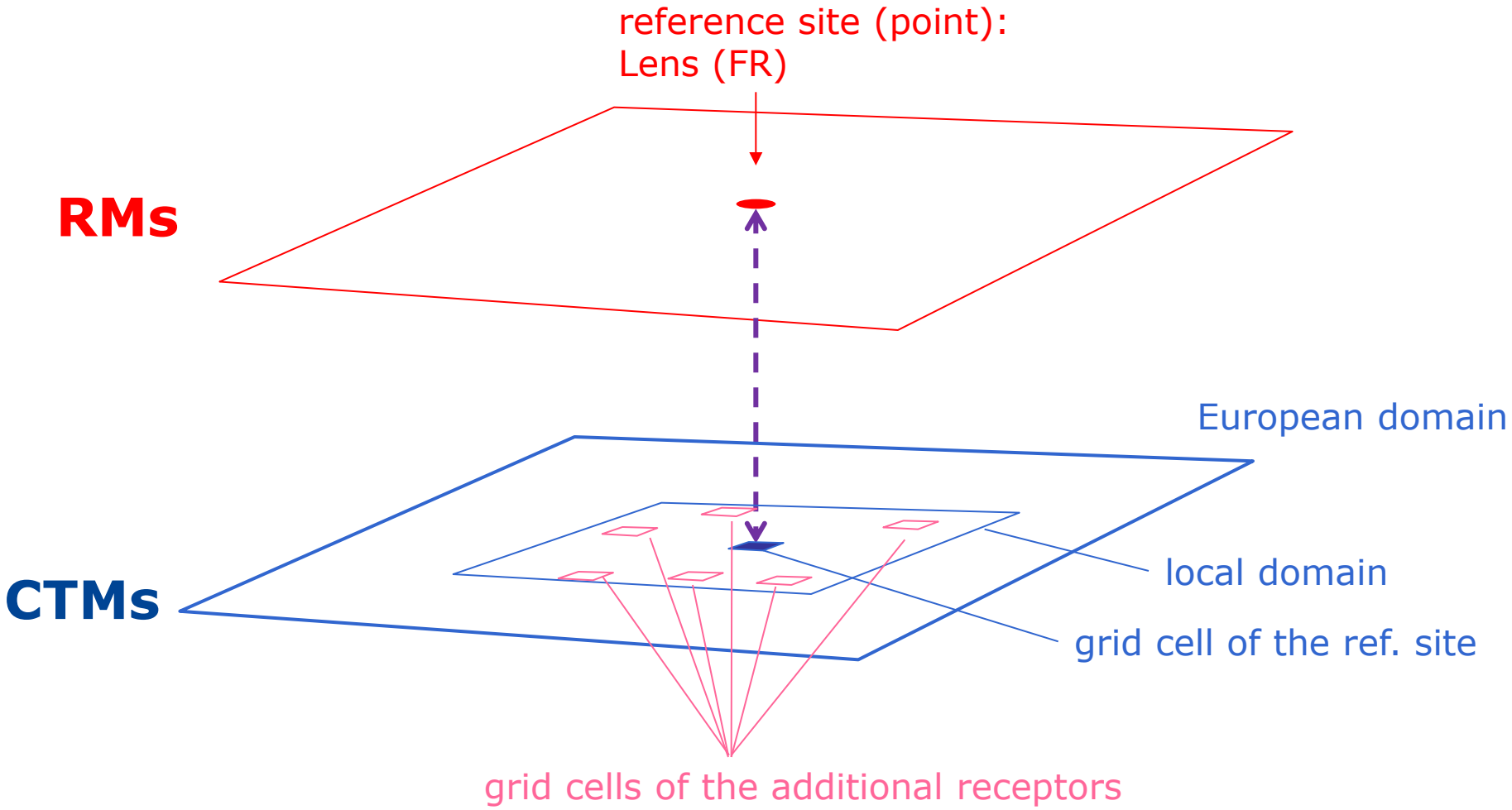
A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,*A,*B,*C,*D,*E,*F,*G,*H,*I,*J,*K,*L

CTM: 7 participants – 11 results

ENEA /ARIANET/ ARPA PIEMONTE	joint result
CIEMAT/LISA CNRS	jont result
RIER- UNI KOLN	independent result
TNO	independent result
ARPAV	coodinated result
RSE	coordinated results
UNIAVE	cordinated results

cA,cAo,cAs,cAso,cAs2,cB,cBo,cD,cDo,cE,cEo,cF

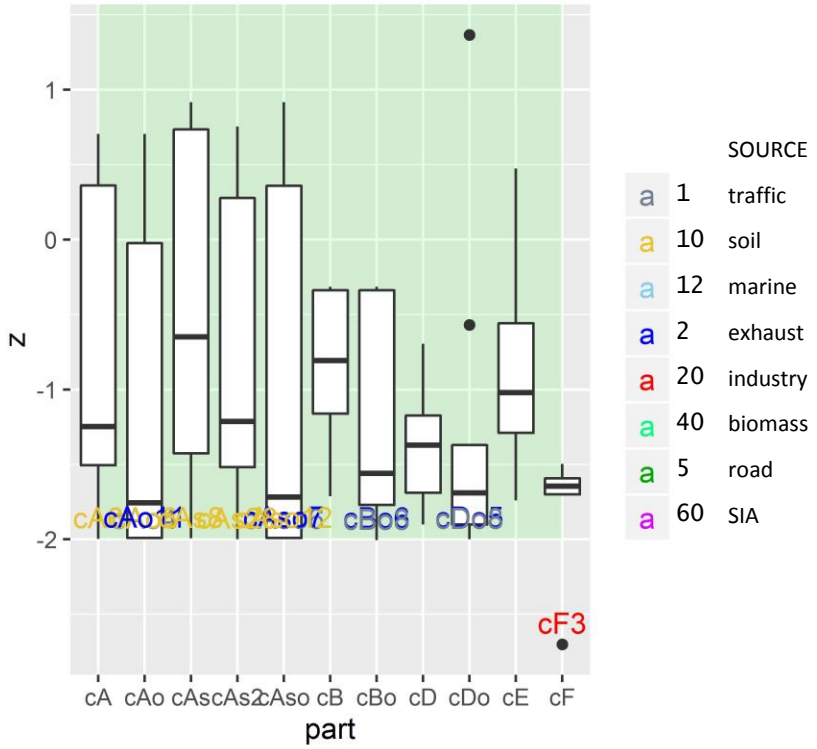
Domains


reference site (point):
Lens (FR)
RMs
European domain
CTMs
local domain
grid cell of the ref. site
grid cells of the additional receptors

Performance of CTMs using RM as reference

Site: Lens

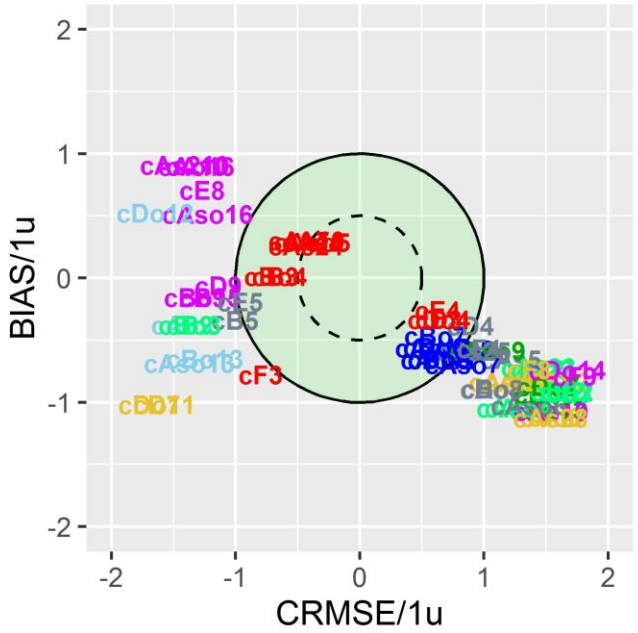
z-score



SOURCE

a	1	traffic
a	10	soil
a	12	marine
a	2	exhaust
a	20	industry
a	40	biomass
a	5	road
a	60	SIA

target

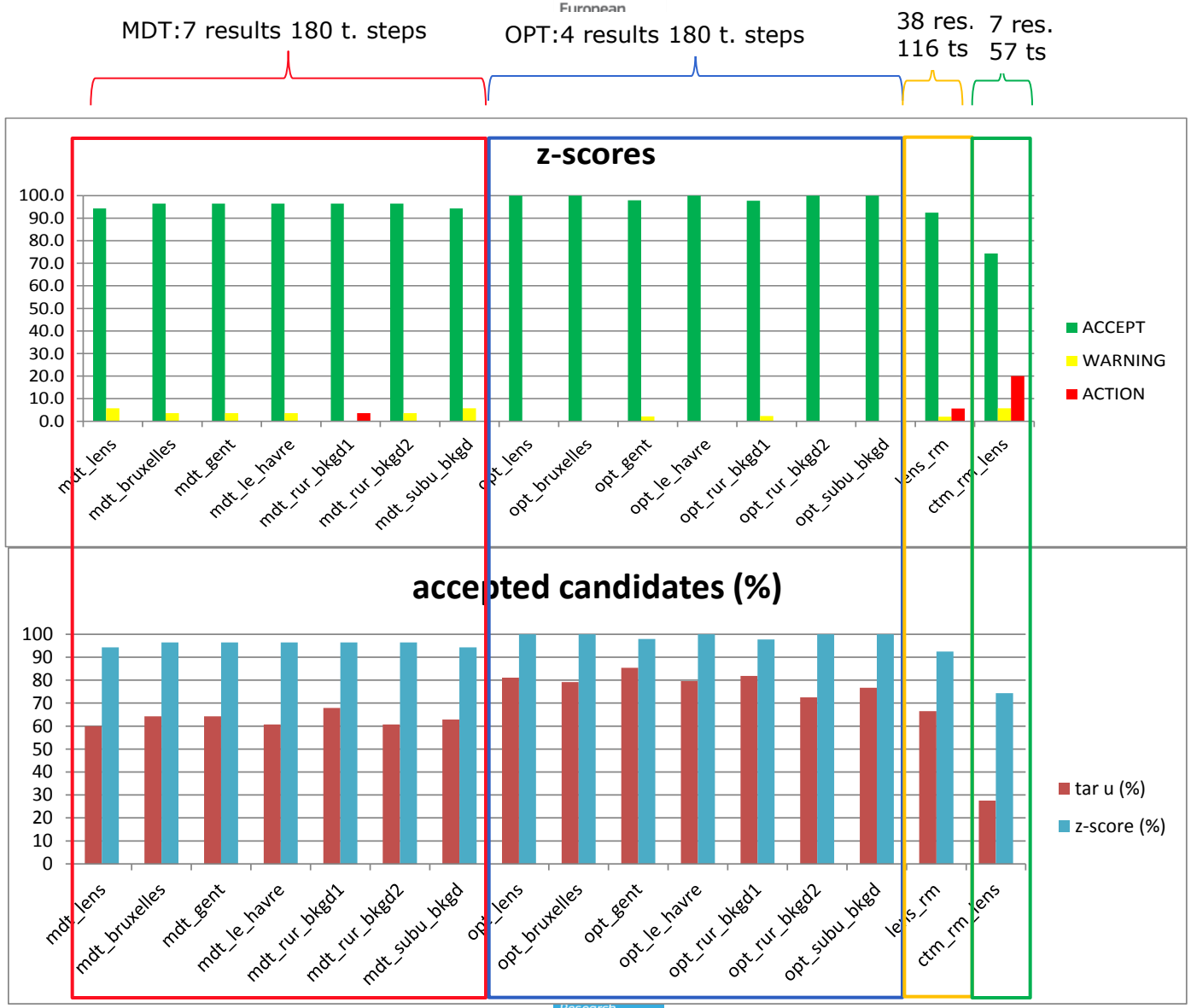


Sources

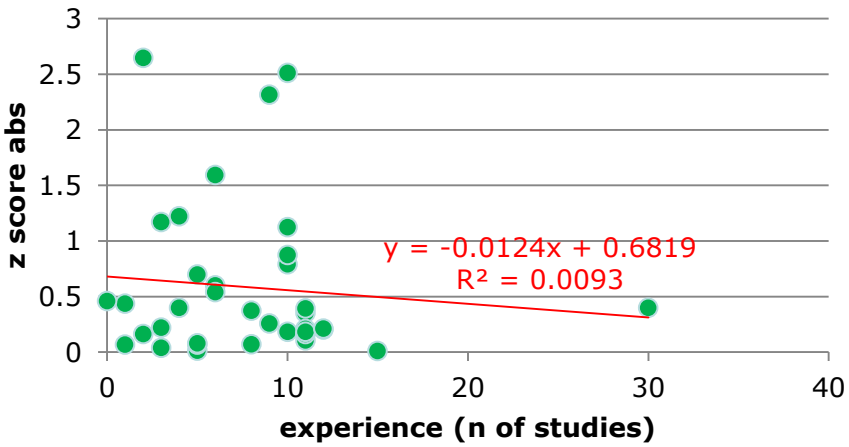
a	1_tra
a	10_soi
a	12_ss
a	2_exh
a	20_ind
a	40_bib
a	5_roa
a	60_sia

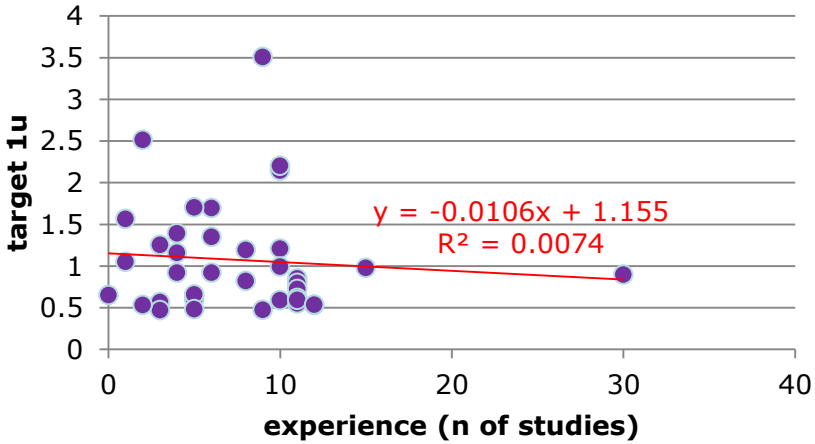
In both plots the best possible value is zero. The green background represents the acceptability area.

Performance RM and CTMs ALL RECEPTORS



RM: analysis of practitioner experience





Users with more experience (at least 10 studies) obtain better perfomance.

Preliminary conclusions of the IE

- In RMs convergence towards PMF5 (in part due to the good performances in previous IE) contributes to more homogeneous results.
- Industry source category needs better definition because too generic.
- CTMs show quite homogeneous behaviour when using exactly the same input data.
- the comparison of CTM with RM reference points out the underestimation of the some sources.
- Good perfomance for exhaust and biomass burning source categories which are comparable in the two families of models.
- Sensitivity analysis for CTM quantified the influence of vertical dispersion coefficient and of the grid scale in particular for urban areas.

Intercomparison follow up

- E.V. more technical discussions of factors influencing RM results
- Dalia (organics, importance of uncertainty)
- Constrained analysis can be useful to improve the results? e.g. force sensible factor profiles
- PP importance of pre-treatment
- Constraints beyond EPA PMF5 to be explored
- G.P first glance to the performance of CTM now should explore the dataset more in detail to learn more about the CTM (detailed set of questions see slide by G.P.) WHO CAN DO WHAT
- G.C. spatial aspects of source apportionment with the LENS Data (timing to be decided)
- MM seasonal analysis of Lens data

On-line Delta SA tool

New on-line tool to test SA model performance using existing testing datasets developed by JRC.

WG3 topics for future activity

Guidelines: development of CTM area and update the RM existing document (M. Mircea coordinator, G. Pirovano,. G.Calori., O.Favez., I. El Haddad.)

E-reporting: creation of dedicated task force inter WGs to address the different aspects. In particular, propose sensible and robust SA approach

Standardization: continue collaboration for the Technical Specification, comments to the method are welcome, take advantage of the intercomparison, use the Delta SA tool

Specific pollutants put an enphasis on the apportionment of key pollutants like BC and PAHs

Delta SA tool: test and implementation for online model evaluation (D. Salameh, E. Venturini, Z. Kertesz test users)