Organic Aerosol source apportionment from ACSM measurements in London 2013 with ME-2:

Exploring the solution space with annual and seasonal analysis

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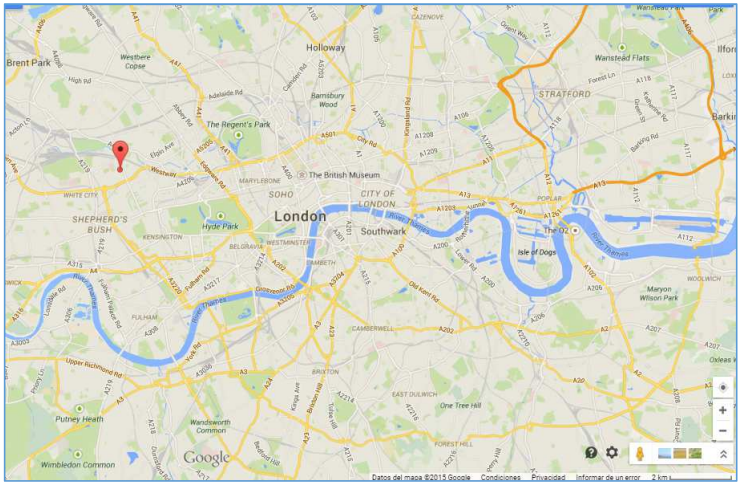
Paper in preparation

SoFi 4.8

North Kensington, London 2013

March –December 2013



Part of the London Air Quality Network

- Automatic Urban Monitoring Network
- ACTRIS Project

- Urban-background site
- Surrounding area mainly residential
- Residential road 5 m from station.

www.uk-air.defra.gov.uk

ACSM measurements from March-December 2013

Strategy to determine the best solution

- Run PMF.
- Look at the mass spectra
- Run ME-2
- Q/Qexp (close to one)
- Residual (close to zero)
- Multilinear regression
  NOx, BC and CO.
- Analyse diurnal and daily plots

Sets of target profiles used in the study

a	c	w
BBOA	BBOA	BBOA
HOA	HOA	HOA
COA	COA	COA

a = average TP
c = cToF TP
w = Winter HR TP

Crippa et al. 2013. ACP Young et al. 2015. ACP

Set of winter TP was used. Seed 1

w B5 _ H2 _ C3 _ S1

BBOA with an a-value of 0.5

HOA with an a-value of 0.2

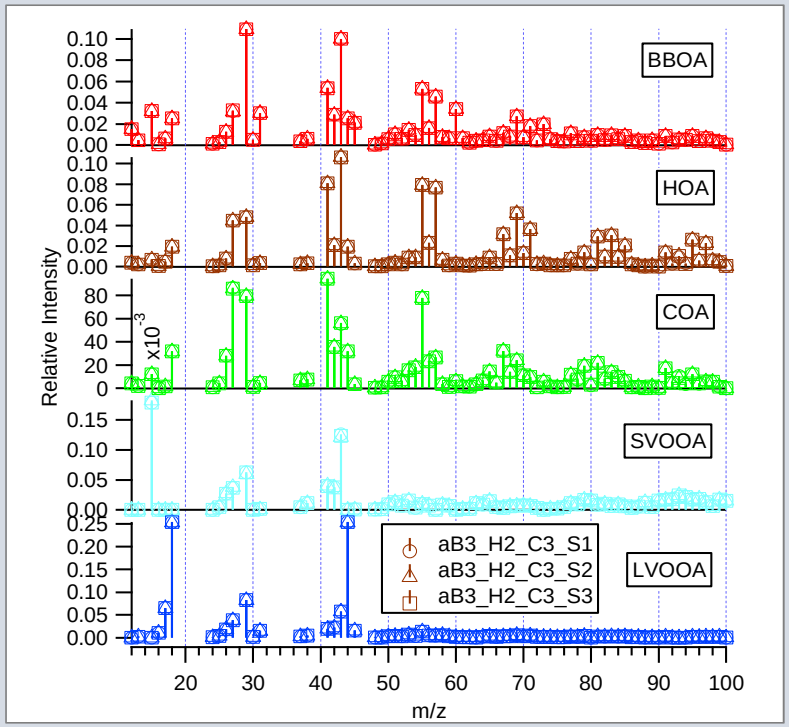
COA with an a-value of 0.3

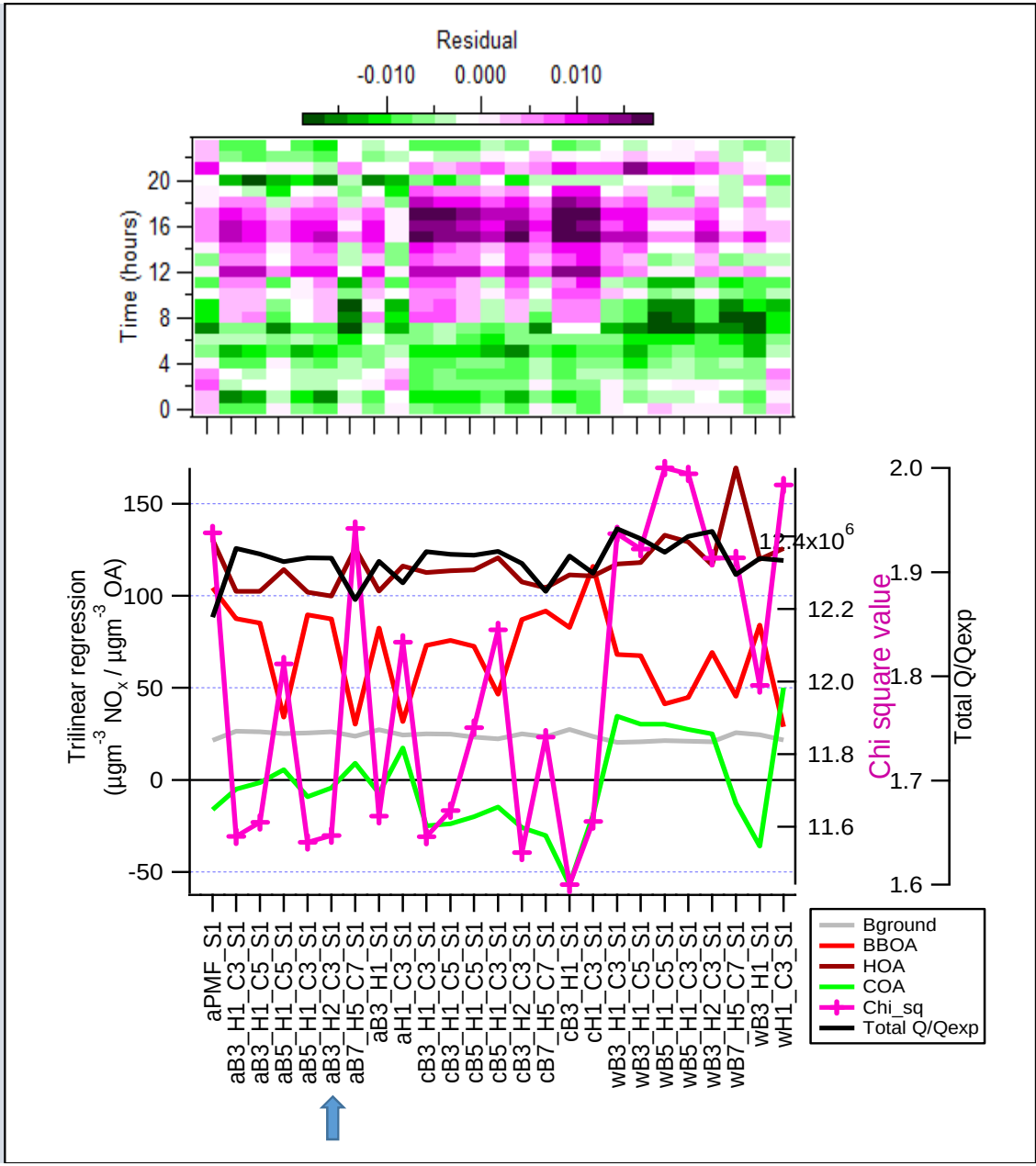
Diurnal residual and multilinear regression

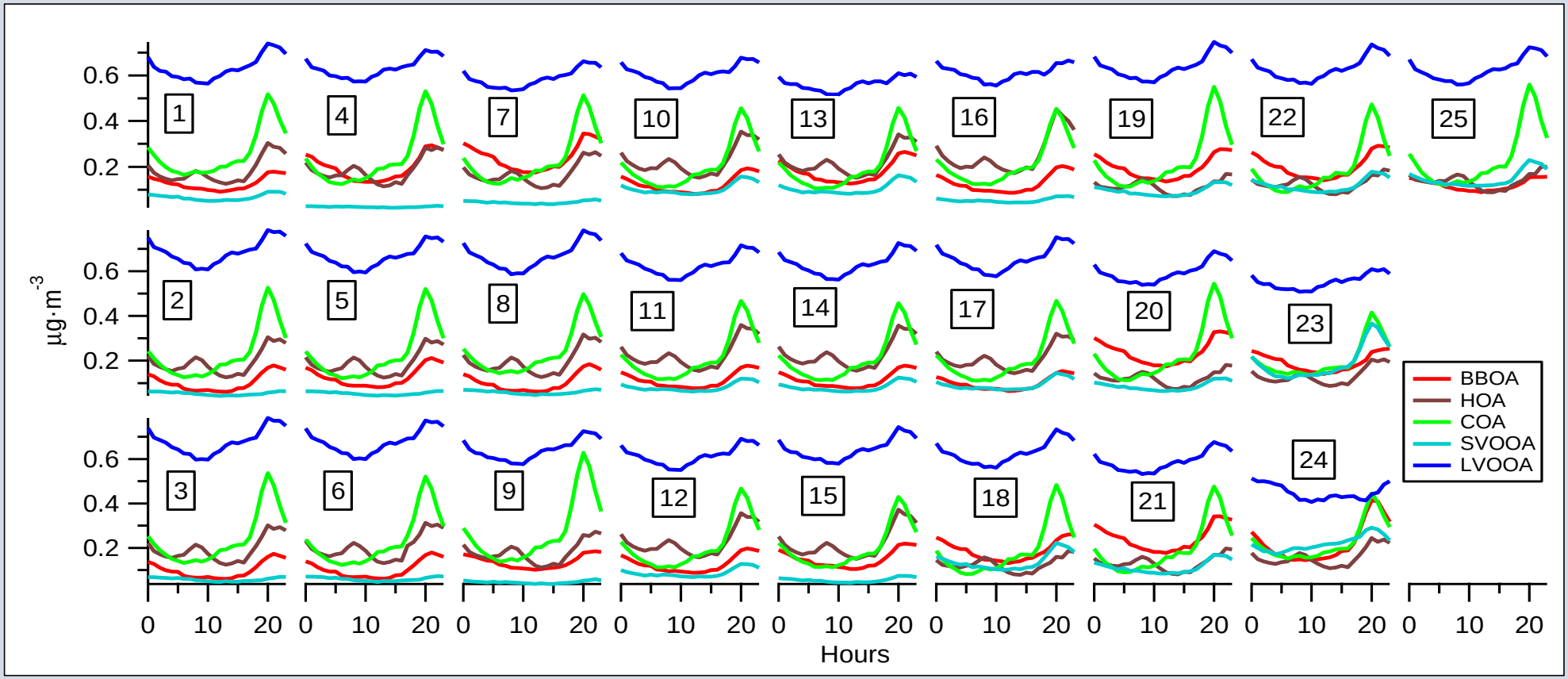
$$Y = A + B[BBOA] + C[HOA] + D[COA]$$

Where "Y" is NO_x, BC, or CO.

* Chi square – the lowest the best
* Q/Qexp

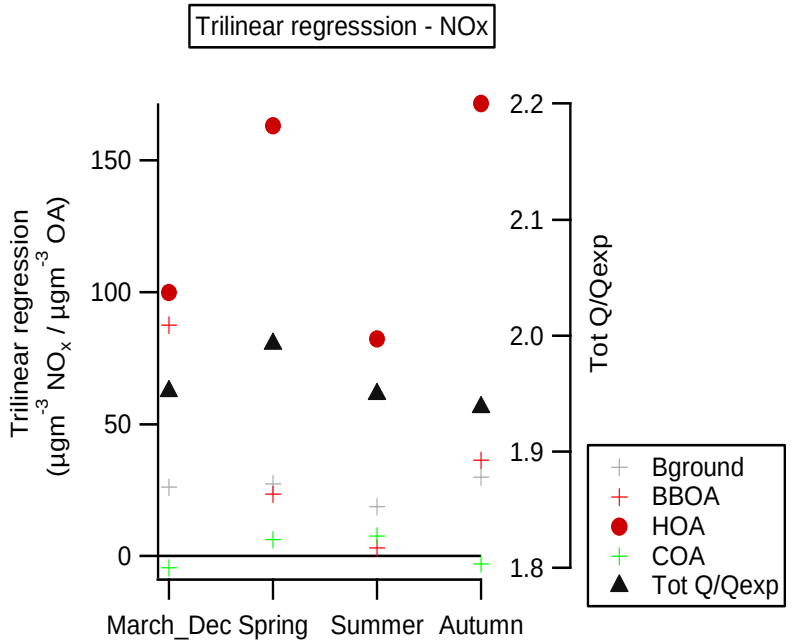


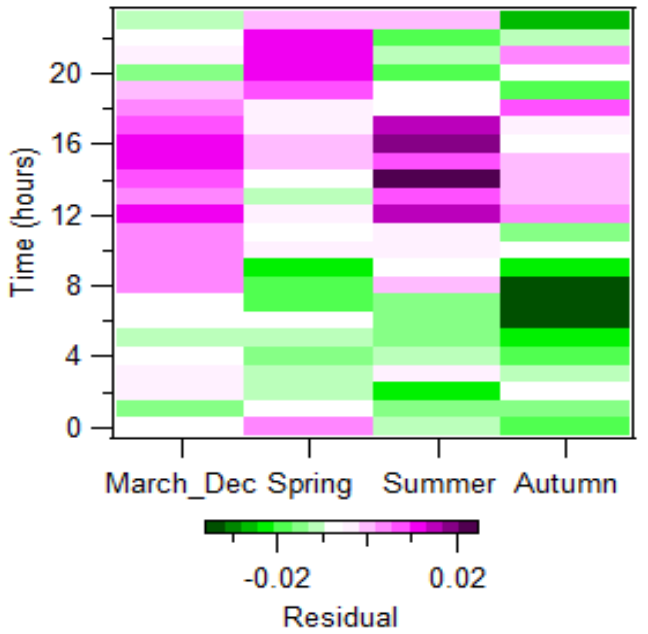




1	aPMF_S1	6	aB3_H2_C3_S1	11	cB3_H1_C5_S1	16	cB3_H1_S1	21	wB5_H1_C3_S1
2	aB3_H1_C3_S1	7	aB7_H5_C7_S1	12	cB5_H1_C5_S1	17	cH1_C3_S1	22	wB3_H2_C3_S1
3	aB3_H1_C5_S1	8	aB3_H1_S1	13	cB5_H1_C3_S1	18	wB3_H1_C3_S1	23	wB7_H5_C7_S1
4	aB5_H1_C5_S1	9	aH1_C3_S1	14	cB3_H2_C3_S1	19	wB3_H1_C5_S1	24	wB3_H1_S1
5	aB5_H1_C3_S1	10	cB3_H1_C3_S1	15	cB7_H5_C7_S1	20	wB5_H1_C5_S1	25	wH1_C3_S1

March-December and seasonal analysis





March-Dec: aB3_H2_C3_S1 Spring: wB3_H1_C3_S1 Summer: aB5_H1_C3_S1 Autumn: wB3_H1_S1

Summary

- A strategy to explore the solution space is suggested
- Multilinear analysis showed to be a useful tool in determining the best solution
- With long datasets is recommended to do seasonal analysis
- It was shown the importance to use different a-values and target profiles

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