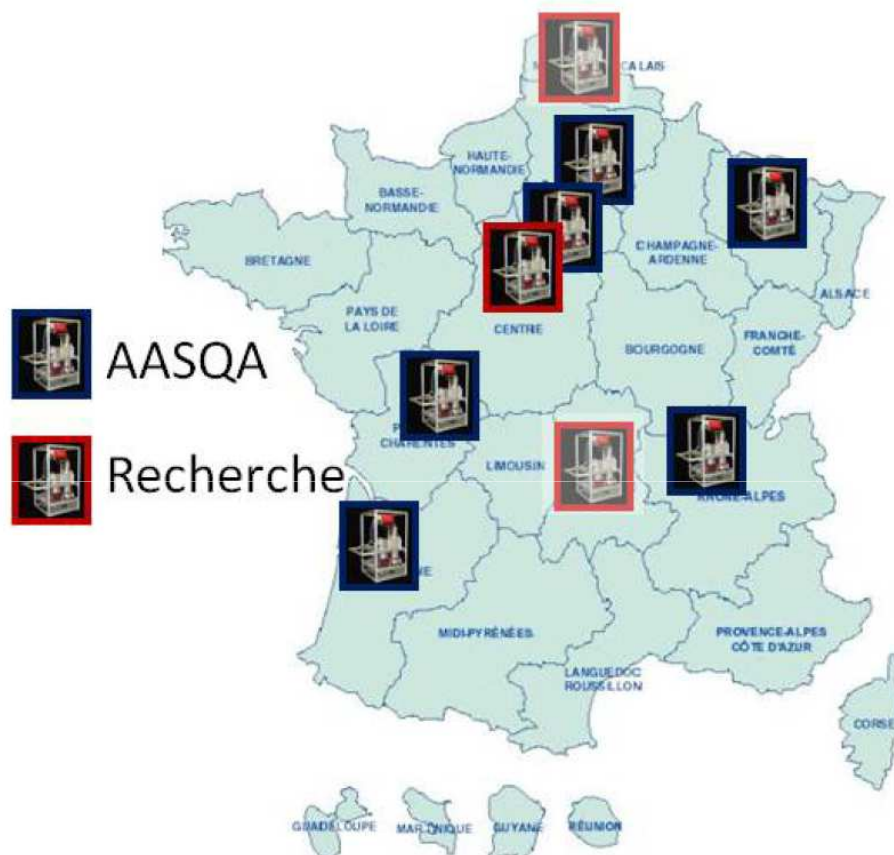


Comparaison des mesures ACSM avec des mesures sur filtres PM1



7 sites fond urbain :

- | | |
|-----------------------------------|--------------------------|
| - AirParif : <i>Gennevilliers</i> | - Leckel réfrigéré |
| - AtmoPicardie : <i>Creil</i> | - DA80 non réfrigéré |
| - Sirta/LSCE : Gif sur Yvette | - Partisol |
| | |
| Air Lorraine : <i>Metz Borny</i> | - Leckel réfrigéré |
| - Air RA : <i>Lyon Centre</i> | - Partisol non réfrigéré |
| - Atmo PC : <i>Poitier</i> | - Leckel réfrigéré |
| - AirAq : <i>Talence</i> | - Partisol non réfrigéré |

AASQA : Prélèvement filtres du 11/2015 au 04/2016 :

24h, 00h -00h en dec-janv , puis 09h-09h

SIRTA : Prélèvement filtres 4h du 03 au 04/2016

- Analyse ions/cation
- EC/OC Sunset , OM = 1,8 x OC
- ➔ Comparaison à l'ACSM et AE33

Atmo PC

28/10/2015

IE = $3.65 \cdot 10^{-11}$

RIE NH₄ = 6.7

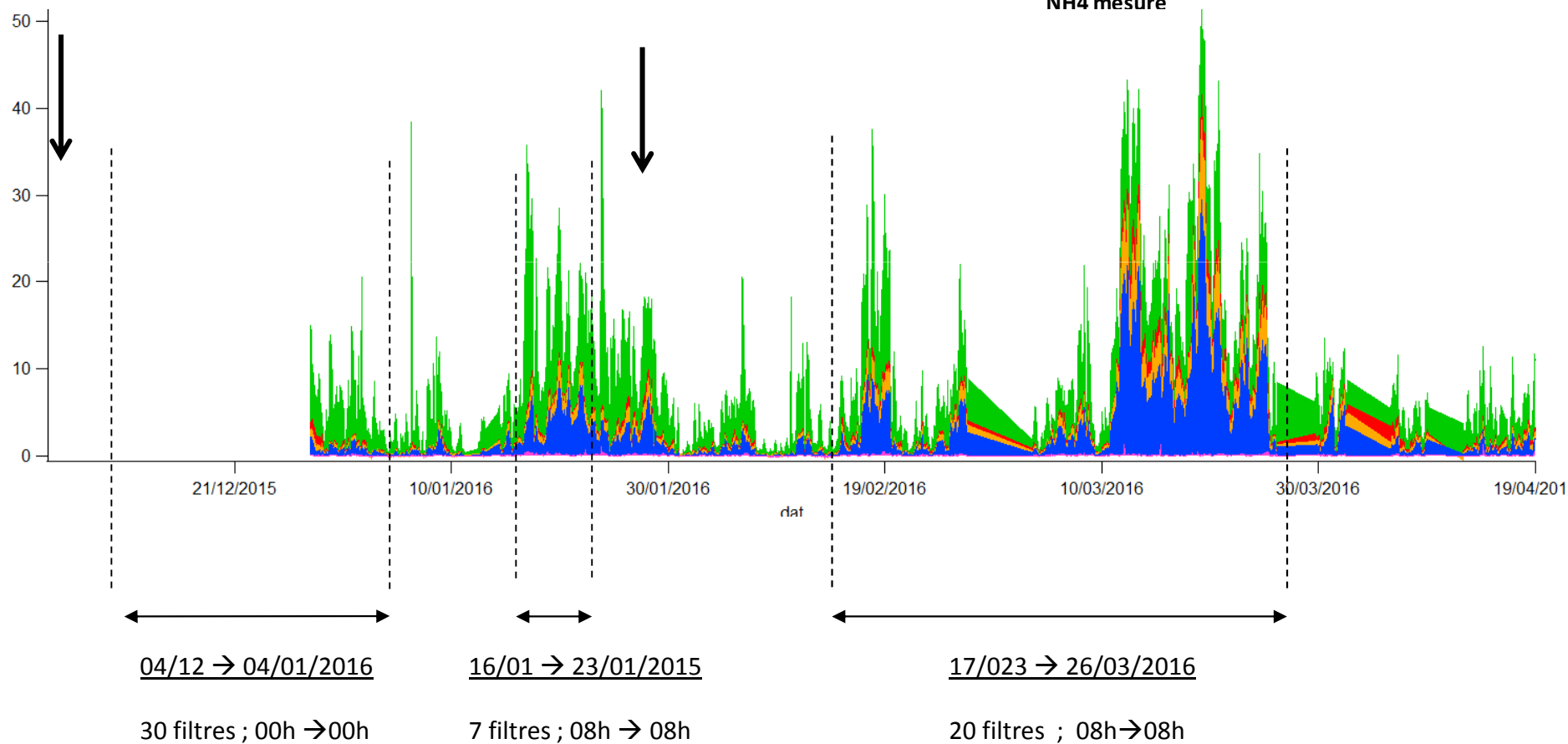
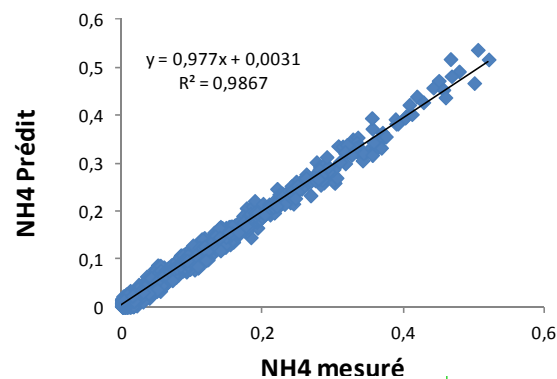
RIE SO₄ = 1.2

27/01/2016

IE = $3.77 \cdot 10^{-11}$

RIE NH₄ = 6.7

RIE SO₄ = 1.2



ATMO PC

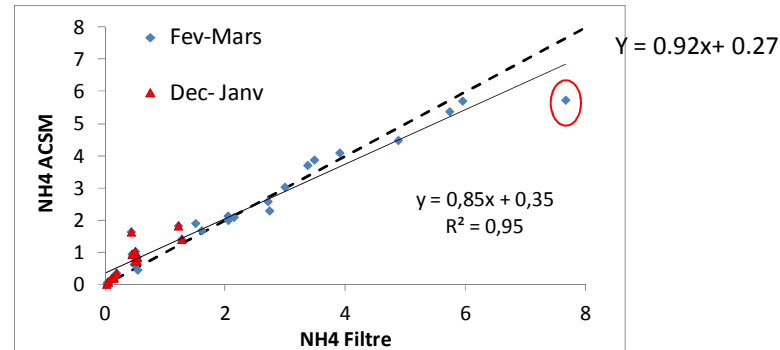
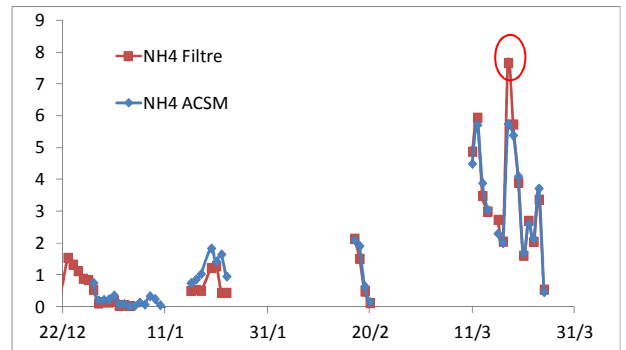
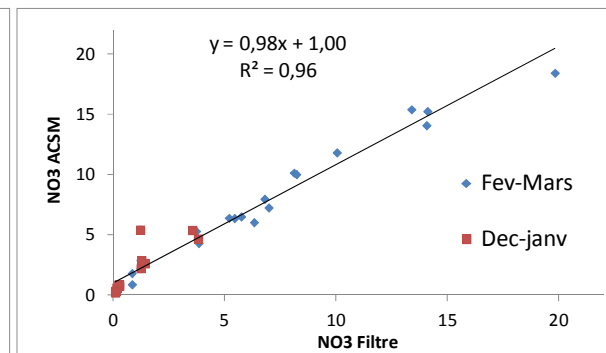
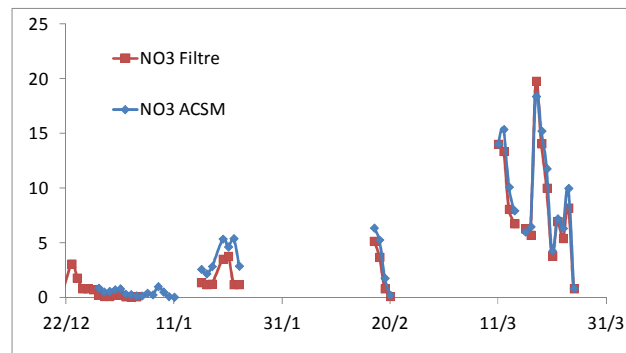
Etalonnage

✓ 27/01/2016

IE = $3.77 \cdot 10^{-11}$

RIE NH₄ = 6.7

RIE SO₄ = 1.2



LECKEL, 24h

✓ 04/12 → 04/01/2016

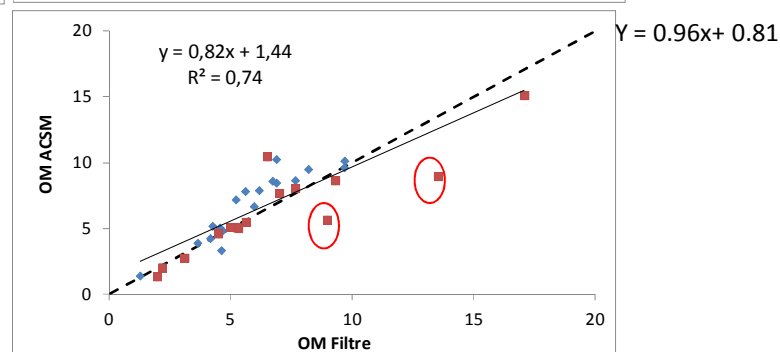
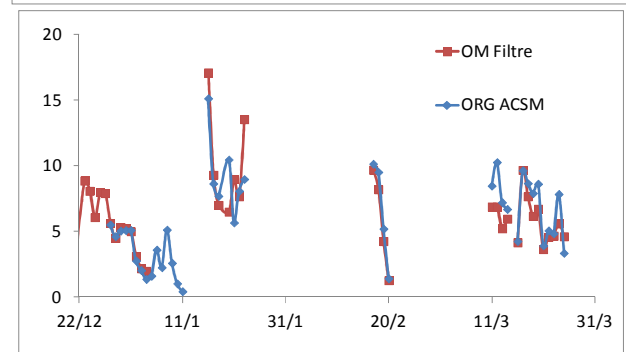
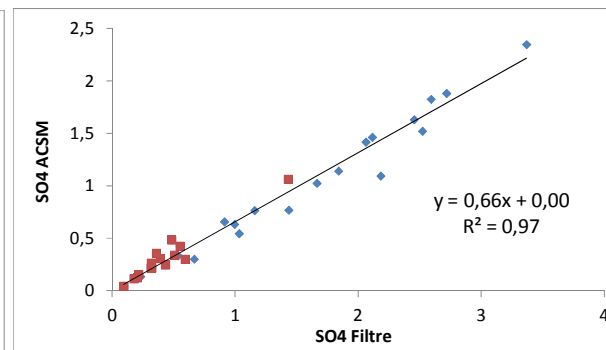
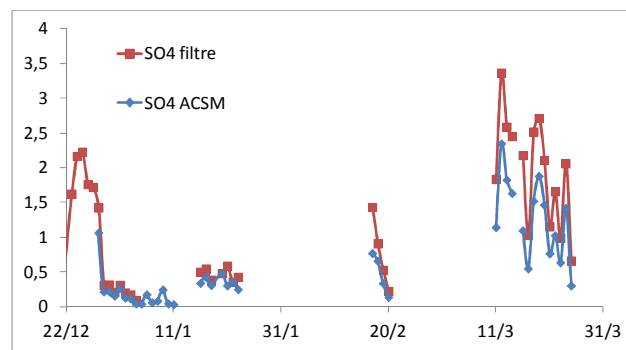
30 filtres ; 00h → 00h

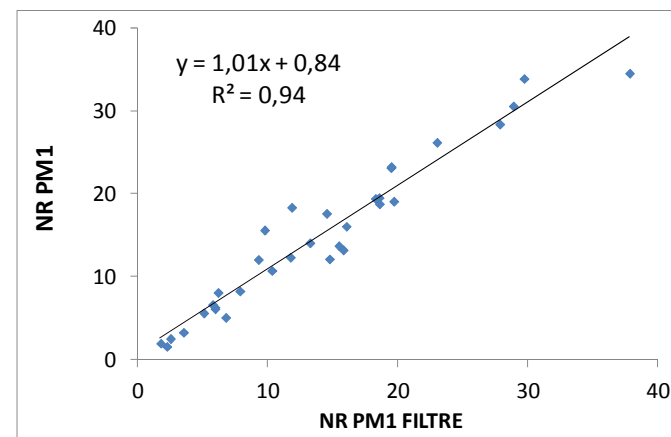
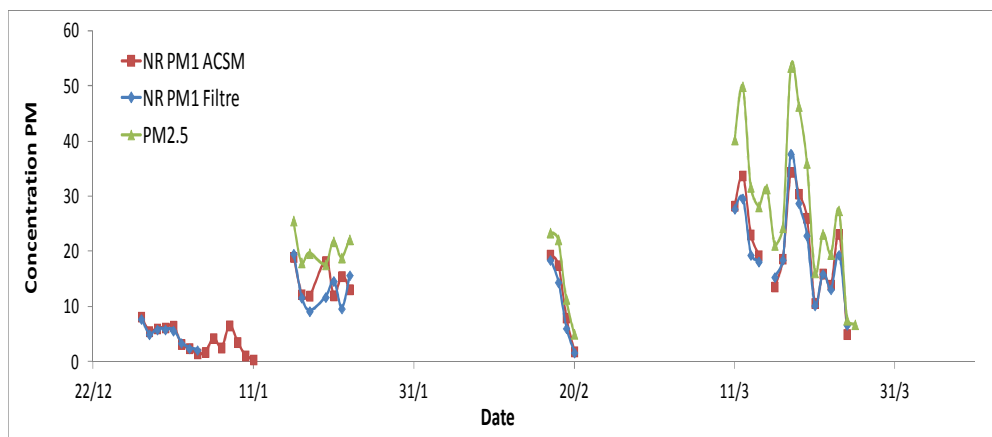
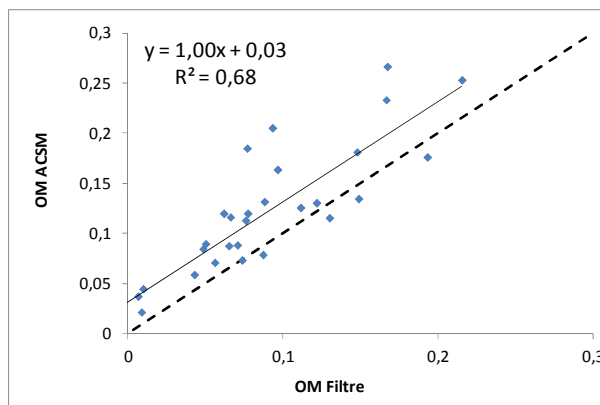
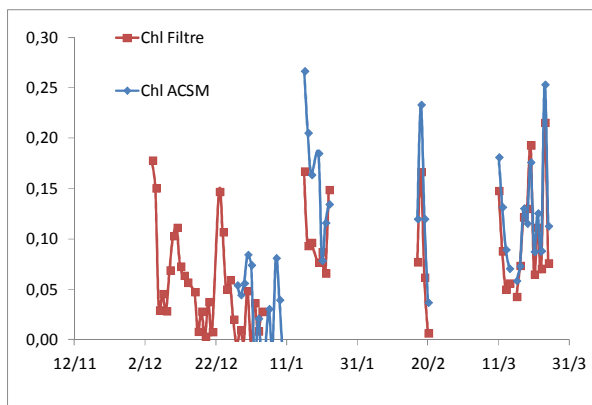
✓ 16/01 → 23/01/2015

7 filtres ; 08h → 08h

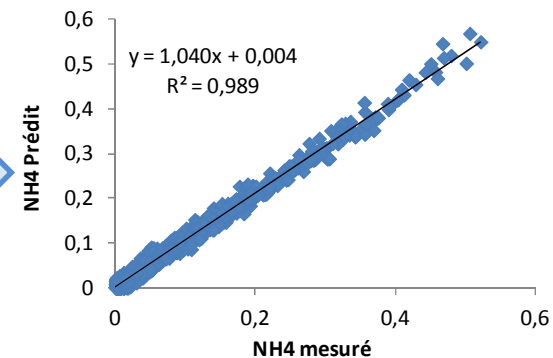
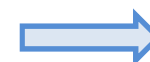
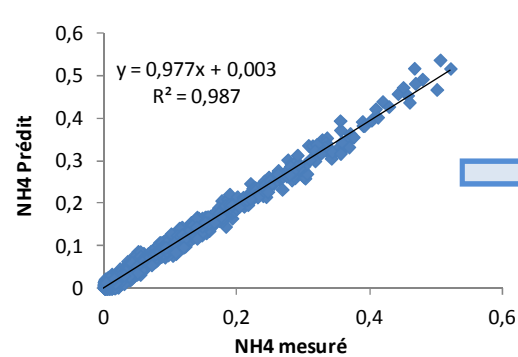
✓ 17/02 → 26/03/2016

20 filtres ; 08h → 08h





- $\text{NO}_3 \text{ ACSM} = 0.98 \cdot \text{NO}_3 \text{ Filtres} + 1$
- $\text{NH}_4 \text{ ACSM} = 0.92 \cdot \text{NH}_4 \text{ Filtres} + 0.27$
- $\text{OM ACSM} = 0.96 \cdot \text{OM Filtres} + 0.81$
- $\text{Cl ACSM} = 1 \cdot \text{Cl Filtres} + 0.03$
- $\text{SO}_4 \text{ ACSM} = 0.66 \cdot \text{SO}_4 \text{ Filtres}$



RIE SO4 : 1,2



0.8

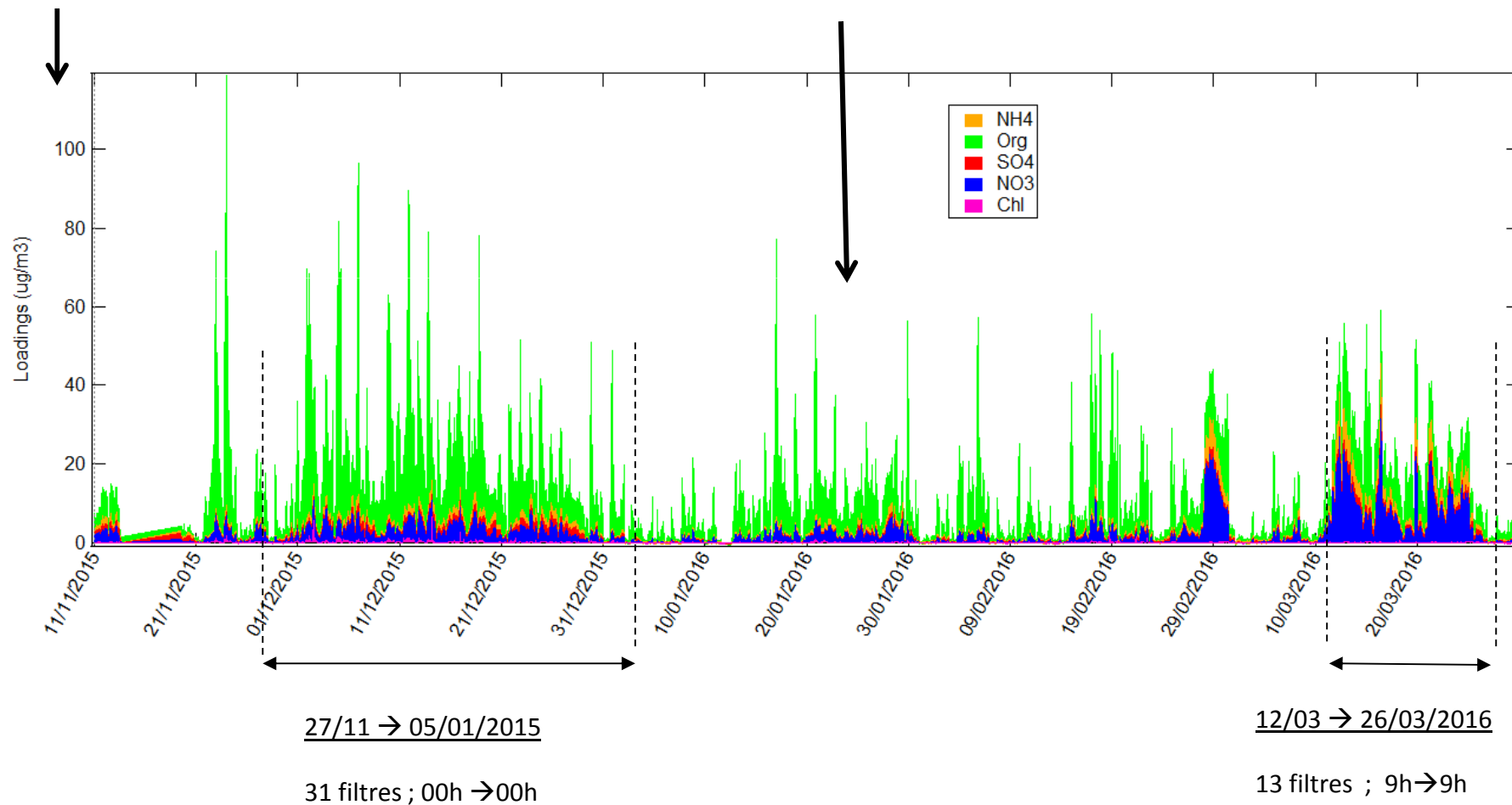
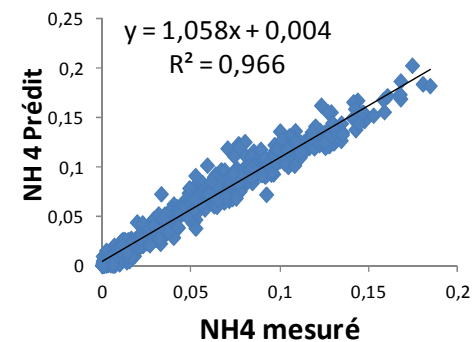
Air Aq

28/10/2015

IE = $4.52 \cdot 10^{-11}$
RIE NH4 = 5.88
RIE SO4 = 1.2

27/01/2016

IE = $4.13 \cdot 10^{-11}$
RIE NH4 = 6.04
RIE SO4 = 1.2



AIRAQ

Etalonnage

✓27/01/2016

IE = $4.13 \cdot 10^{-11}$

RIE NH4= 6.04

RIE SO4 = 1.2

PARTISOL 24h

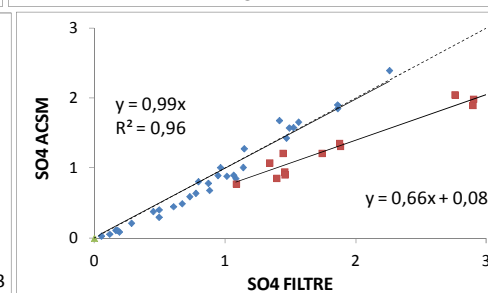
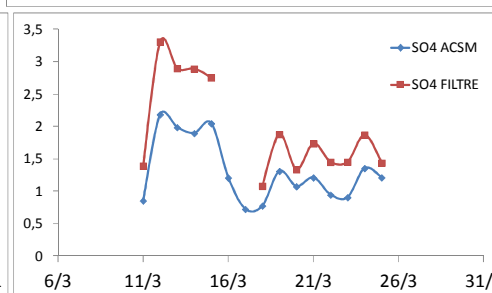
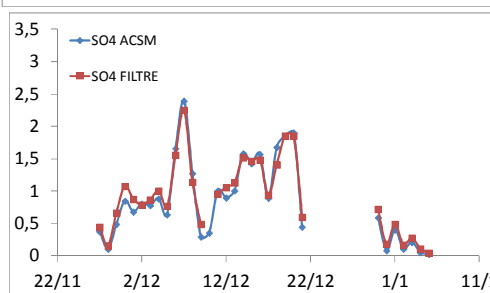
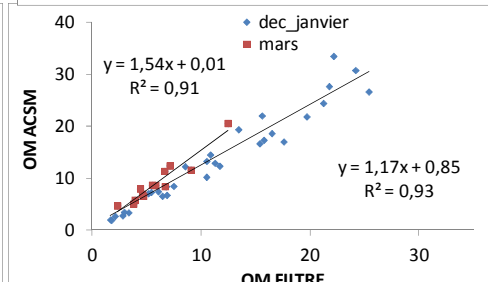
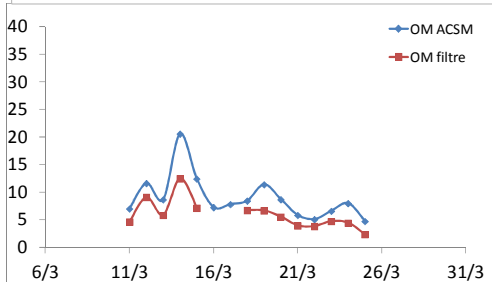
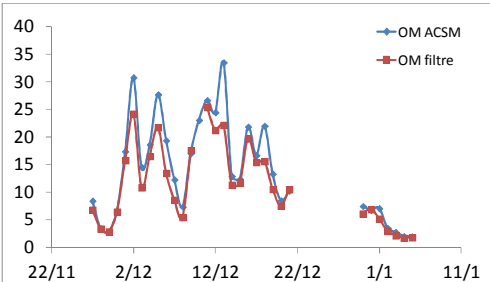
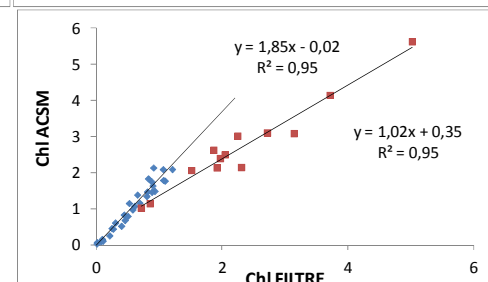
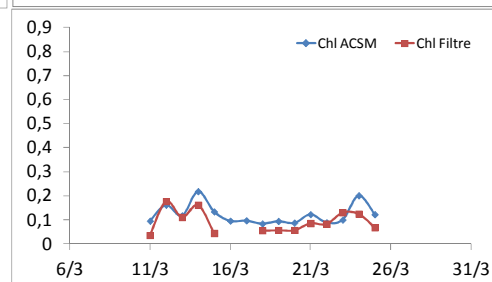
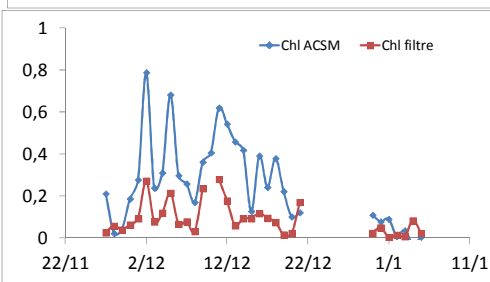
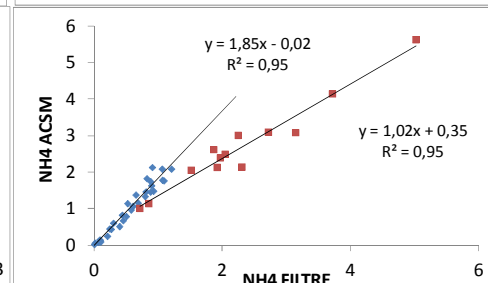
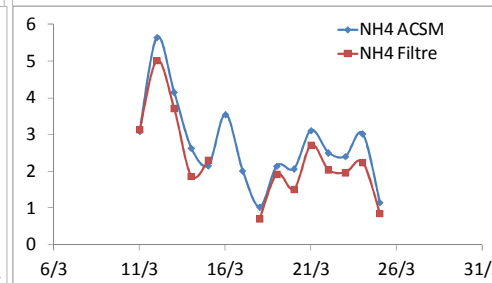
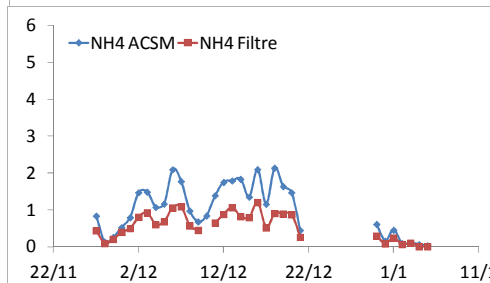
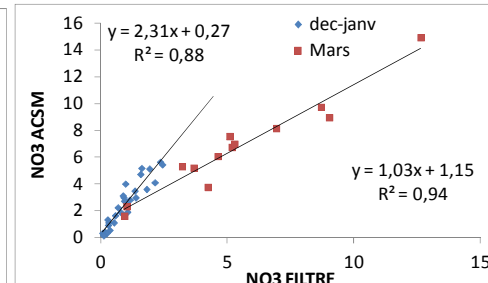
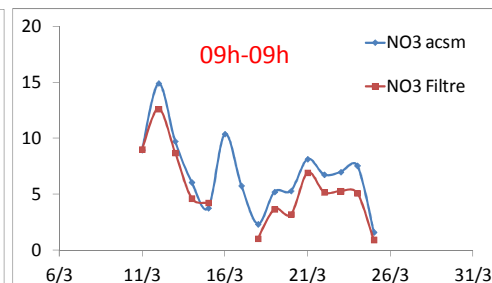
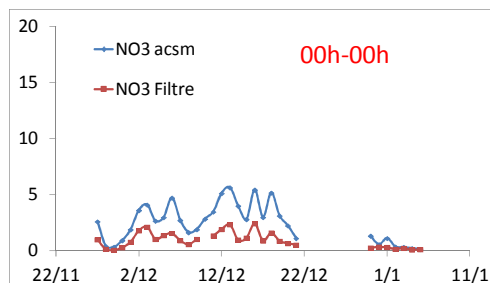
Non Réfrigéré

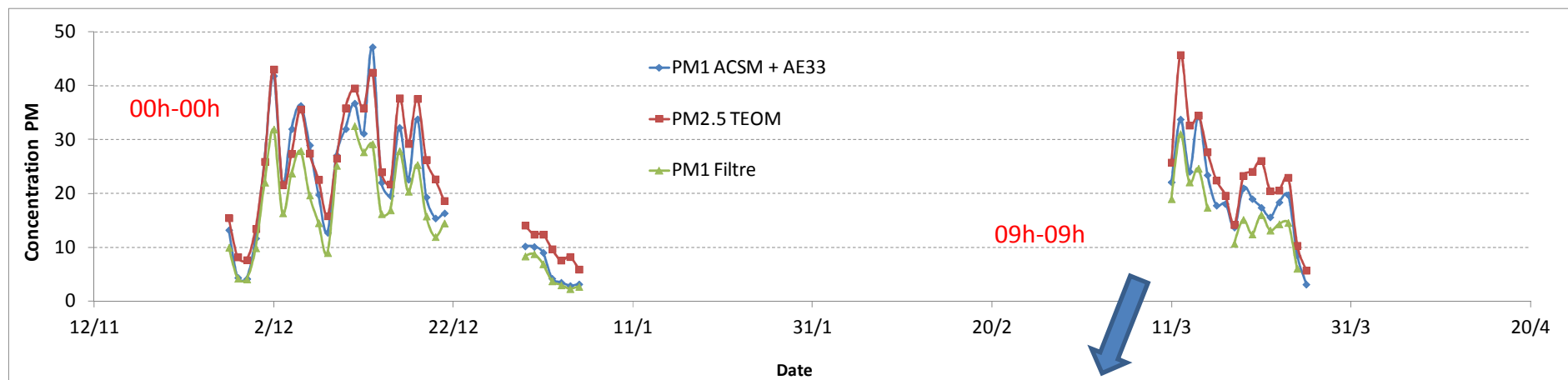
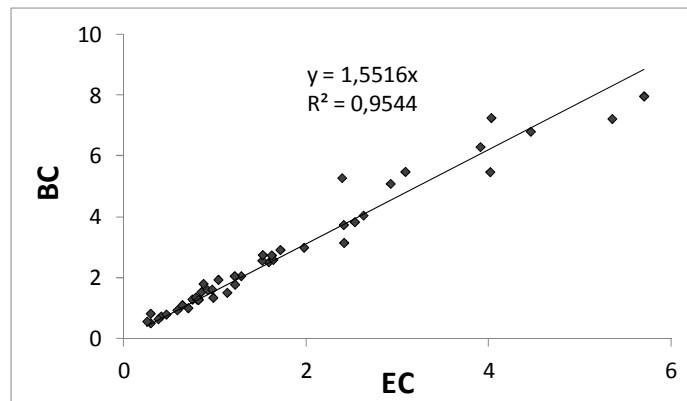
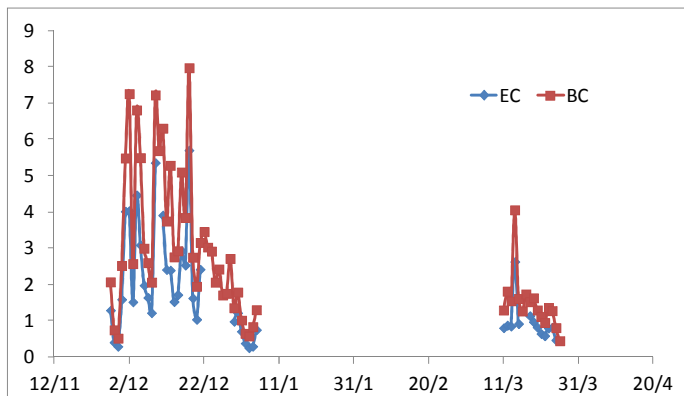
✓27/11 → 05/01/2015

31 filtres ; 00h → 00h

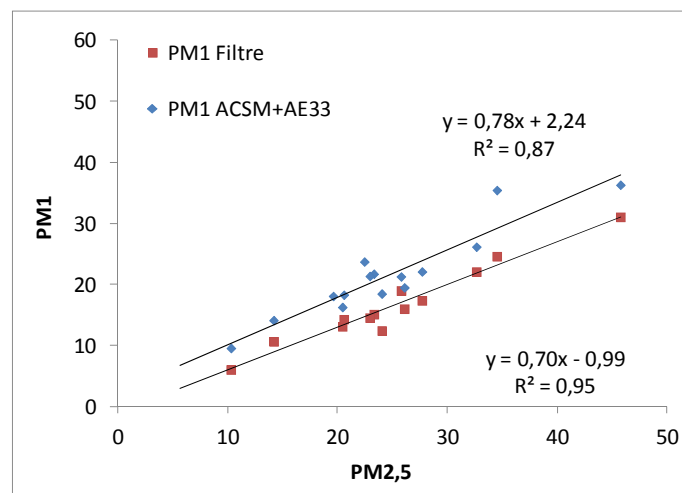
✓12/03 → 26/03/2016

13 filtres ; 9h → 9h





$PM_{1\text{ ACSM}} = PM_{1\text{ filtre}} = 70 - 80 \% PM_{2.5}$

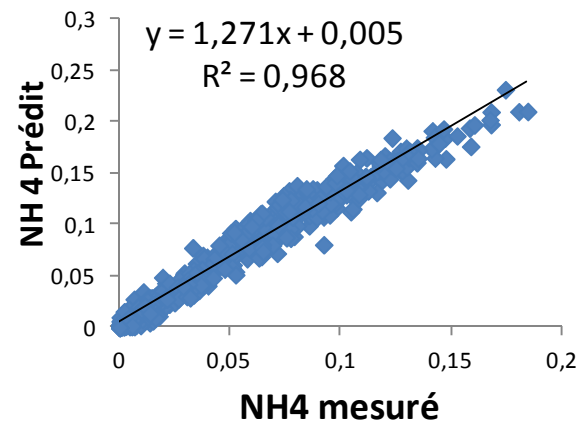
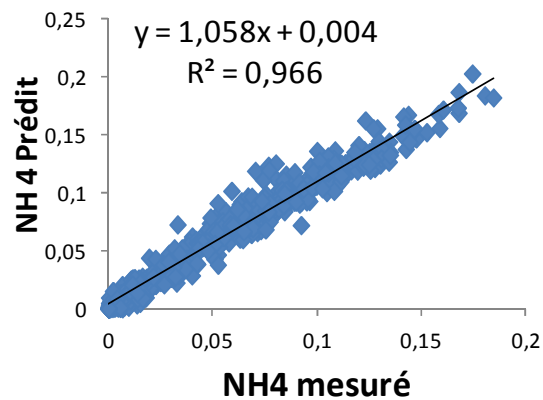


- $\text{NO}_3 \text{ ACSM} = 1,03 \cdot \text{NO}_3 \text{ Filtres} + 1.15$
- $\text{NH}_4 \text{ ACSM} = 1,02 \cdot \text{NH}_4 \text{ Filtres} + 0.35$
- $\text{Cl} \text{ ACSM} = 0,67 \cdot \text{Cl} \text{ Filtres} + 0.06$
- $\text{OM} \text{ ACSM} = 1,17 \cdot \text{OM} \text{ Filtres} + 0.85$
- $\text{SO}_4 \text{ ACSM} = 0.66 \cdot \text{SO}_4 \text{ Filtres} + 0.08$

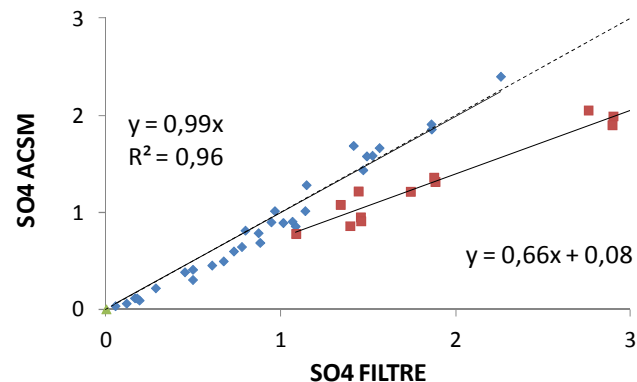
RIE SO_4 : 1,2



0.8



→ RIE = 0,8 : Dégradation de la droite de neutralisation ...



→ La pente du SO_4 était bonne avant le changement d'heure des prélèvements. Ce changement n'aurait pas dû impacter cette espèce non volatile

→ Le sulfate sera à surveiller lors de la prochaine campagne de prélèvement.

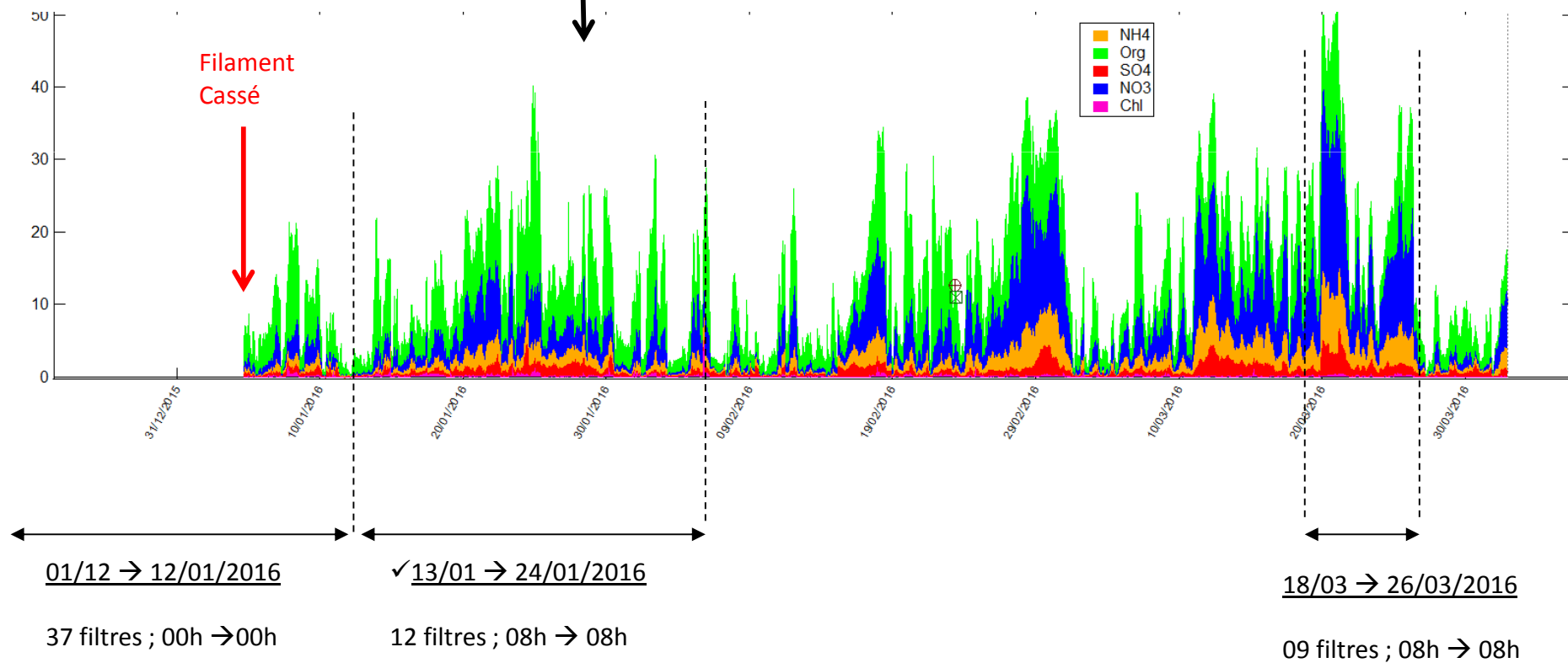
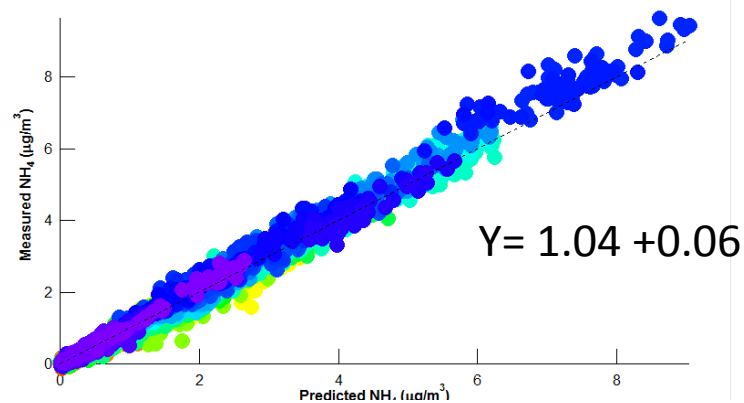
Air Rhône Alpes

04/03/2015

IE = $5.34 \cdot 10^{-11}$
 RIE NH₄ = 6.41
 RIE SO₄ = 1.2

26/01/2016

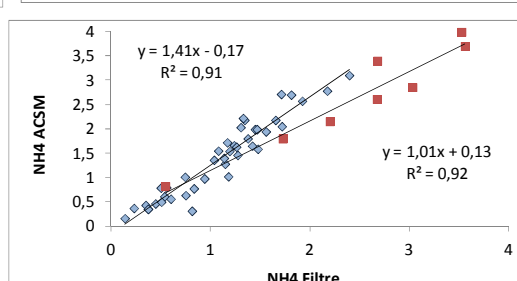
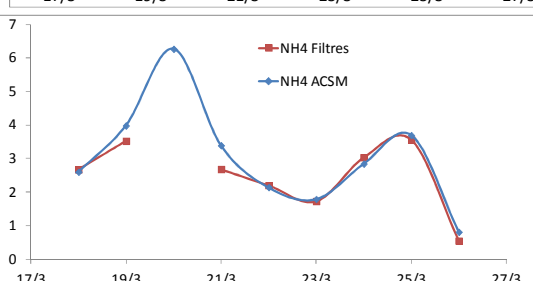
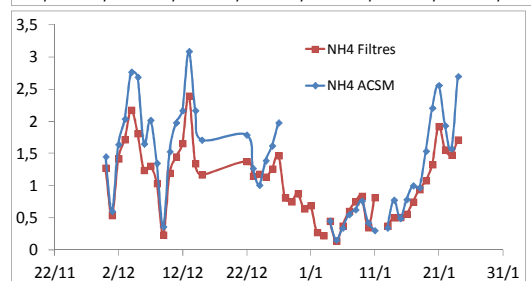
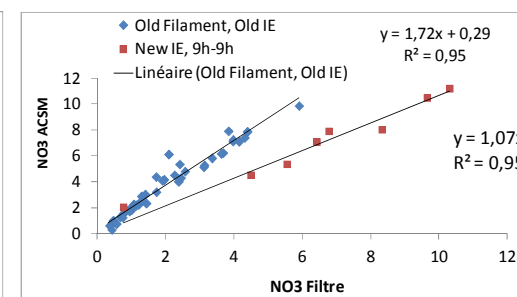
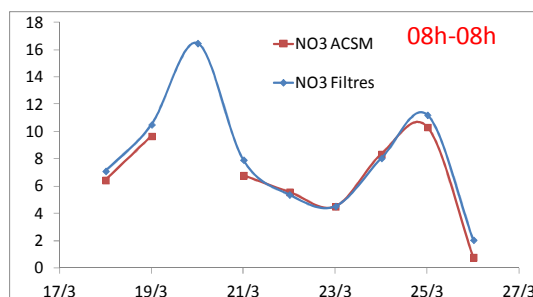
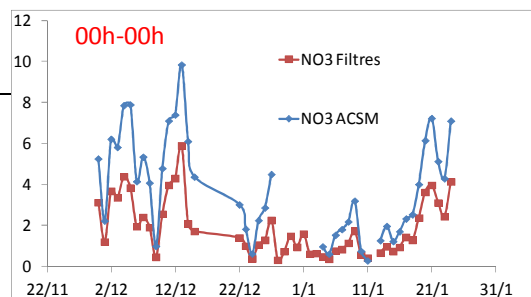
IE = $4.5 \cdot 10^{-11}$
 RIE NH₄ = 5.96
 RIE SO₄ = 1.2



Air RA

26/01/2016

IE = $4.5 \cdot 10^{-11}$
 RIE NH4 = 5.96
 RIE SO4 = 1.2



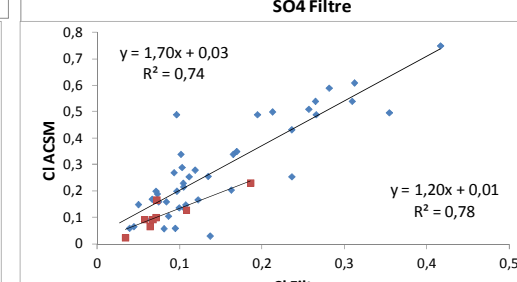
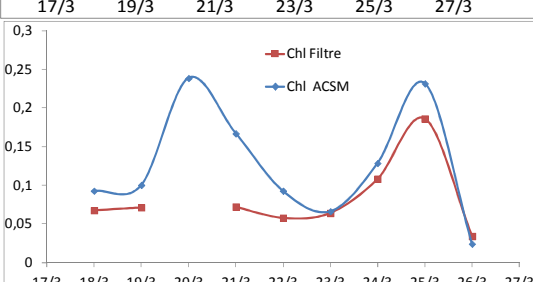
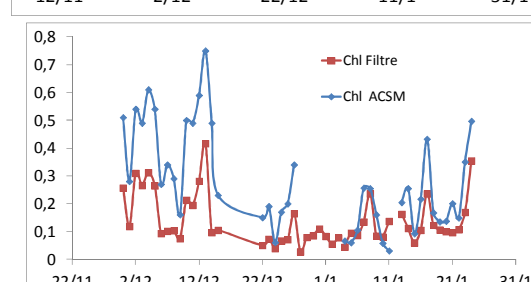
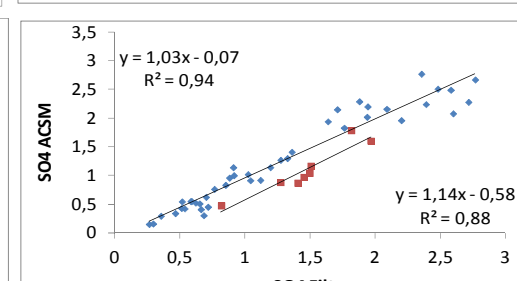
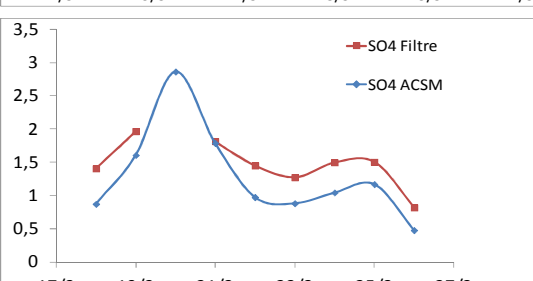
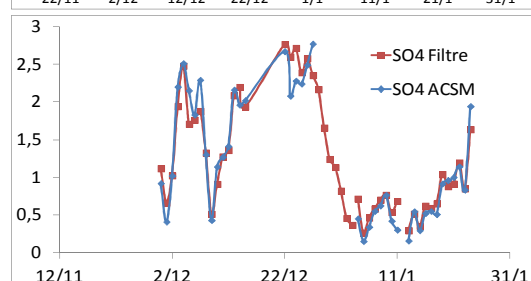
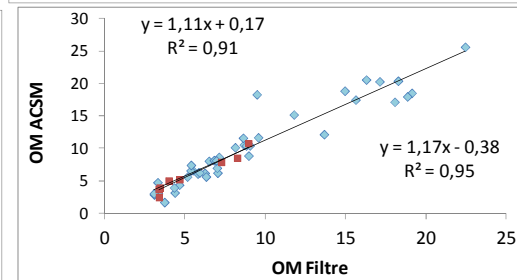
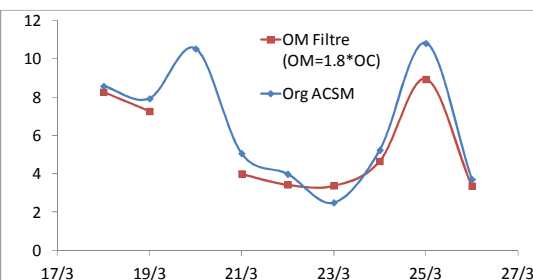
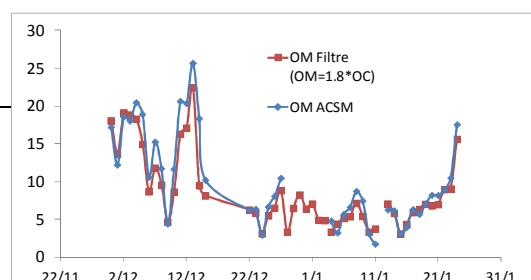
PARTISOL 24h Non réfrigéré

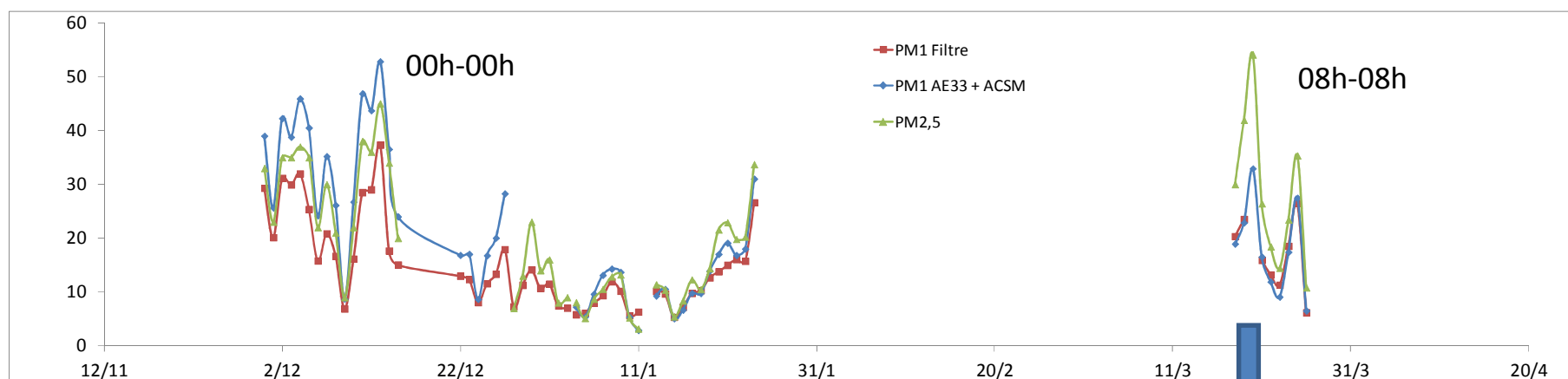
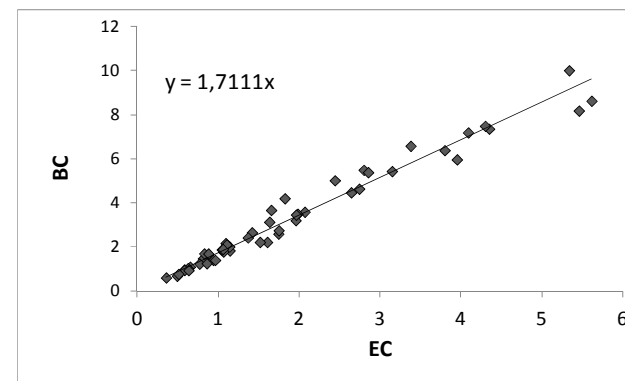
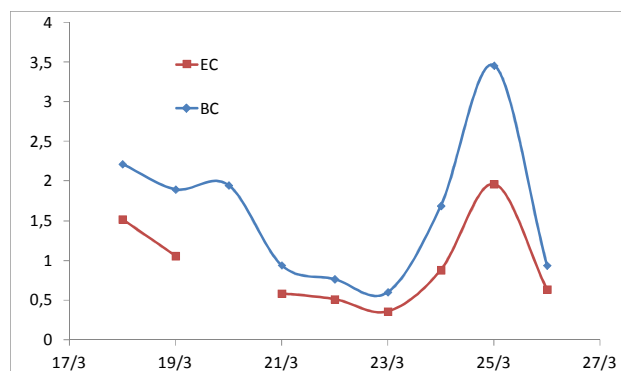
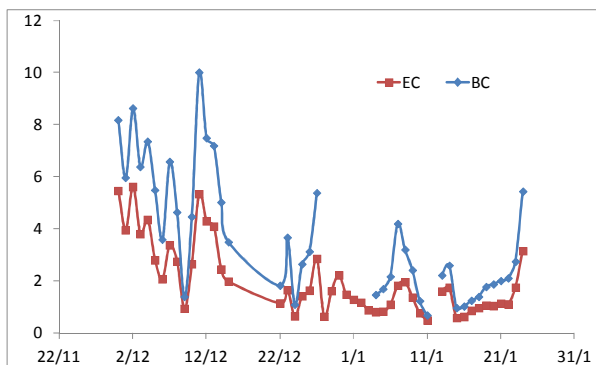
✓ 01/12 → 21/01/2016

48 filtres ; 00h → 00h

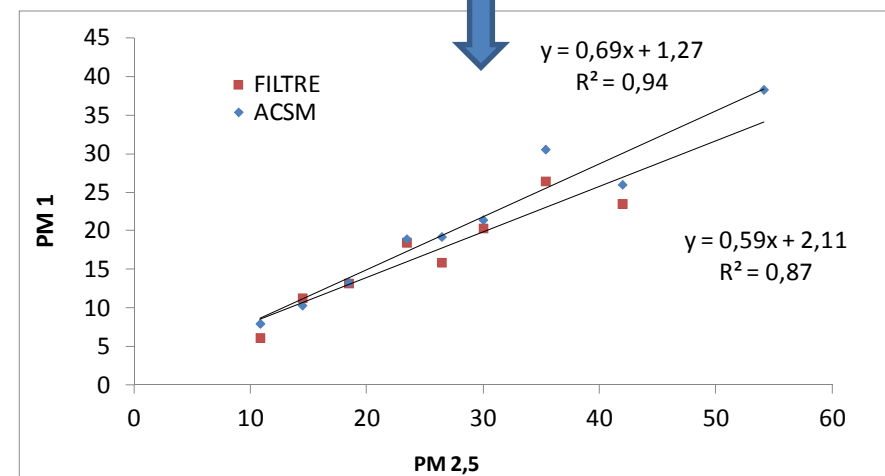
✓ 13/01 → 26/03/2016

9 filtres ; 08h → 08h





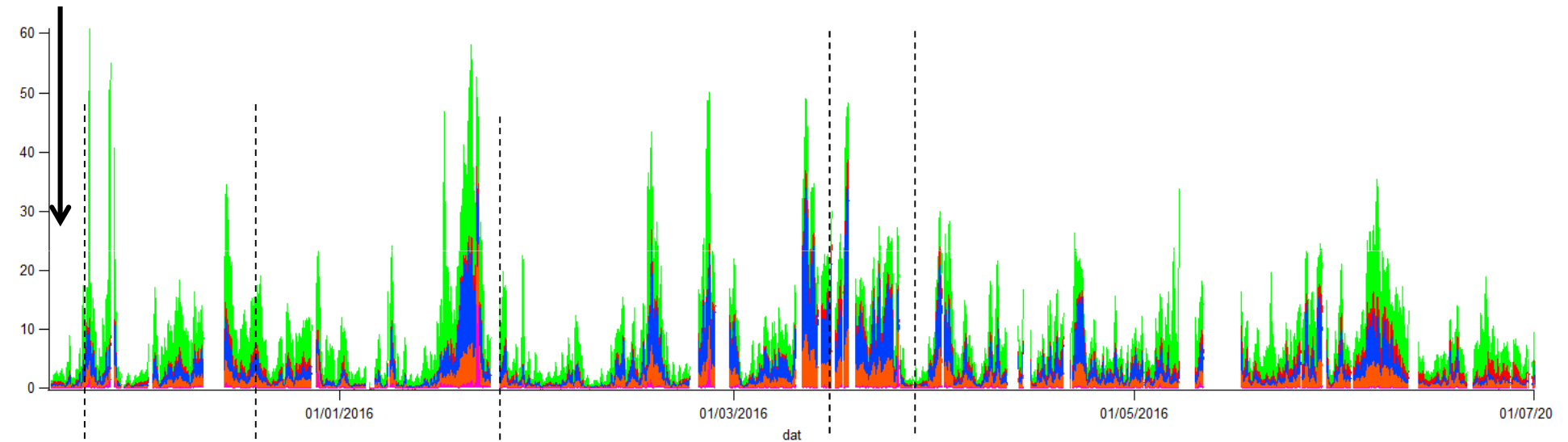
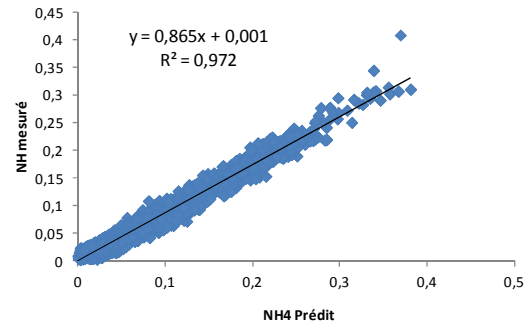
- $\text{NO}_3 \text{ ACSM} = 1,07 \cdot \text{NO}_3 \text{ Filtres} + 0,29$
- $\text{NH}_4 \text{ ACSM} = 1,01 \cdot \text{NH}_4 \text{ Filtres} + 0,13$
- $\text{Cl}_{\text{ACSM}} = 1,20 \cdot \text{Cl}_{\text{Filtres}} + 0,1$
- $\text{OM}_{\text{ACSM}} = 1,17 \cdot \text{OM}_{\text{Filtres}} - 0,38$
- $\text{SO}_4 \text{ ACSM} = 1,03 \cdot \text{SO}_4 \text{ Filtres} - 0,07 : 00\text{h}-00\text{h}$
- $\text{SO}_4 \text{ ACSM} = 1,14 \cdot \text{SO}_4 \text{ Filtres} - 0,58 : 08\text{h}-08\text{h}$



$\text{PM}_{1 \text{ ACSM}} \sim \text{PM}_{1 \text{ filtre}} = 60 - 70 \% \text{ PM}_{2,5}$

Air Parif

✓10/11/2015
 $IE = 4.84 \times 10^{-11}$
RIE = 5.63



20/11 → 23/12/2015

21 filtres ; 00h → 00h

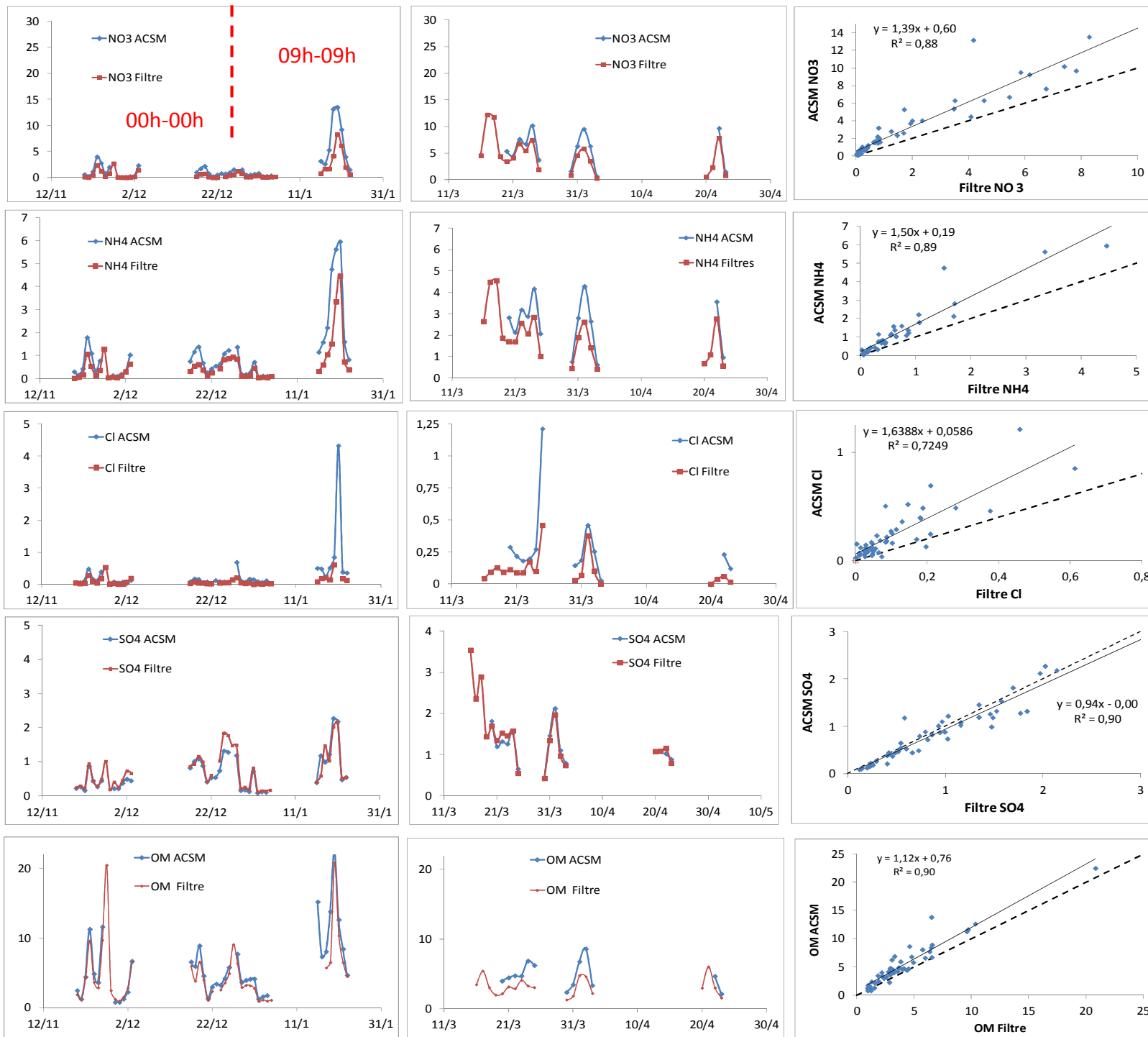
24/12 → 23/01/2016

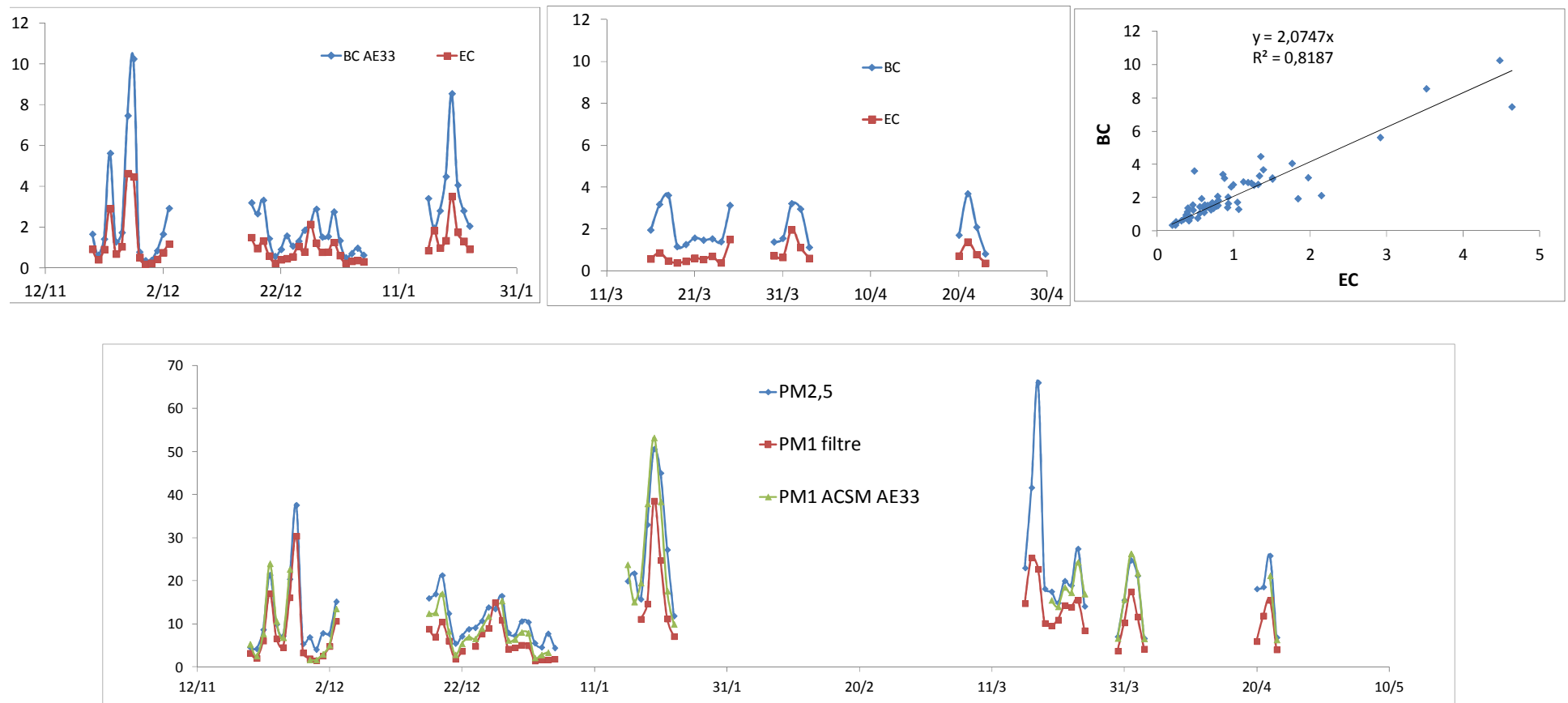
21 filtres ; 09h → 09h

16/03 → 23/04/2016

19 filtres, 09h → 09h

AirParif





$$\begin{aligned}
 - \text{NO}_3 \text{ ACSM} &= 1,39 \cdot \text{NO}_3 \text{ Filtres} + 0,6 \\
 - \text{NH}_4 \text{ ACSM} &= 1,50 \cdot \text{NH}_4 \text{ Filtres} + 0,19 \\
 - \text{Cl} \text{ ACSM} &= 1,63 \cdot \text{Cl} \text{ Filtres} + 0,05 \\
 - \text{OM} \text{ ACSM} &= 1,12 \cdot \text{OM} \text{ Filtres} - 0,76 \\
 - \text{SO}_4 \text{ ACSM} &= 0,94 \cdot \text{SO}_4 \text{ Filtres}
 \end{aligned}$$

Pertes des espèces volatiles et pas de changement des pentes avec le changement d'heure des filtres

Résultats satisfaisant pour OM et SO_4

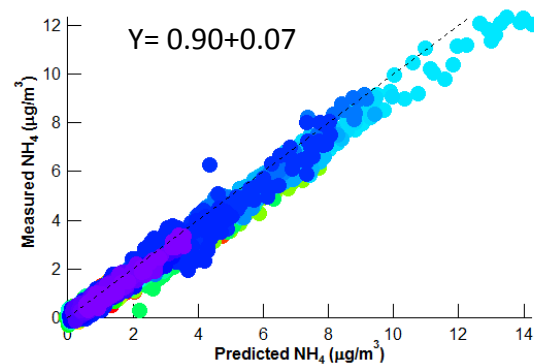
➔ Voir la comparaison des données avec le site du SIRTA

Atmo Picardie

10/11/2015

IE = 4.17×10^{-11}

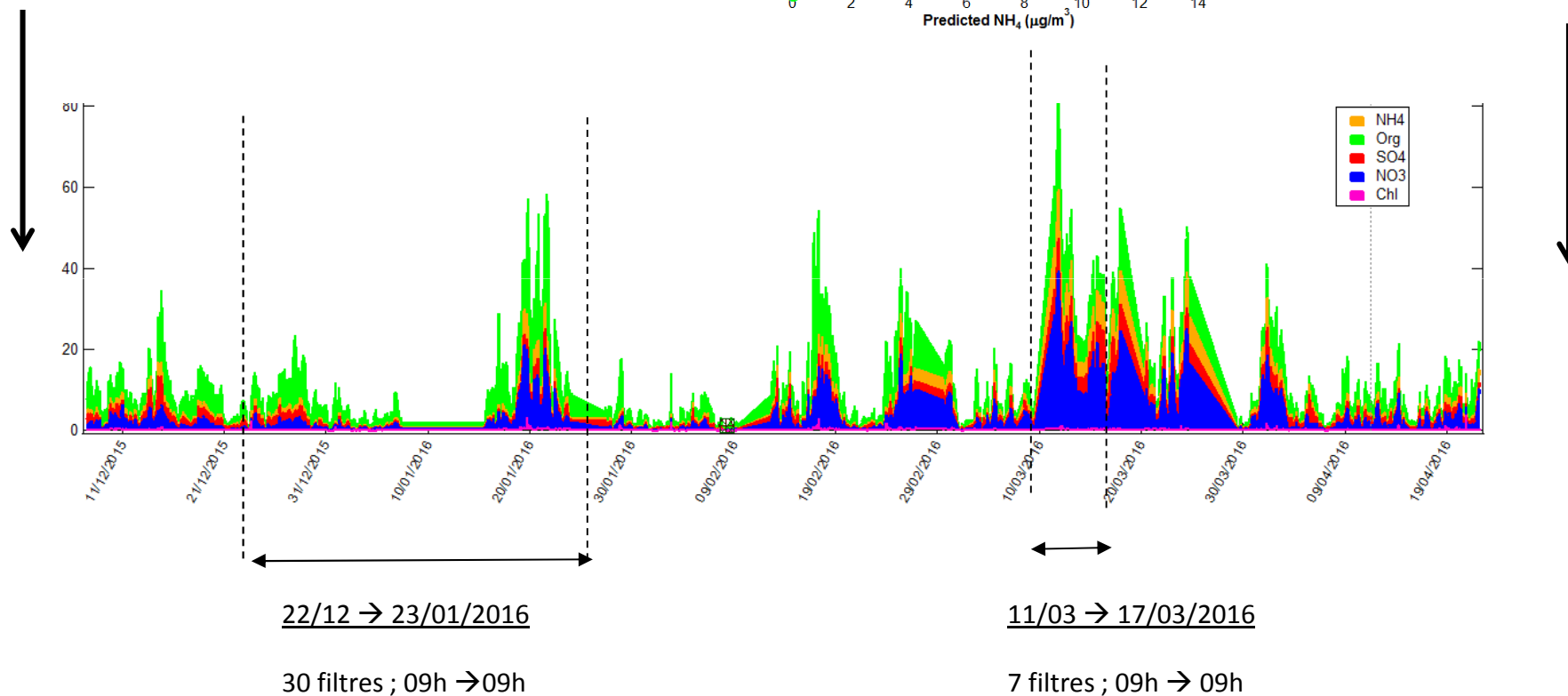
RIE = 6.19



08/09/2016

IE = 4.17×10^{-11}

RIE = 6.19



Etalonnage

10/11/2015
IE = 4.17×10^{-11}
RIE = 6.19

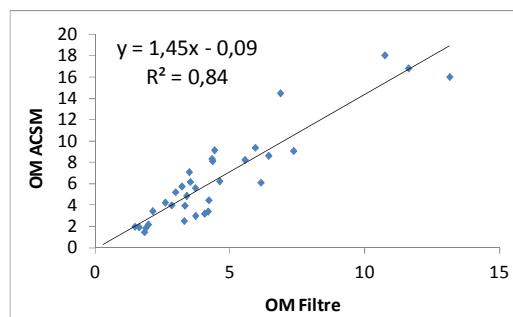
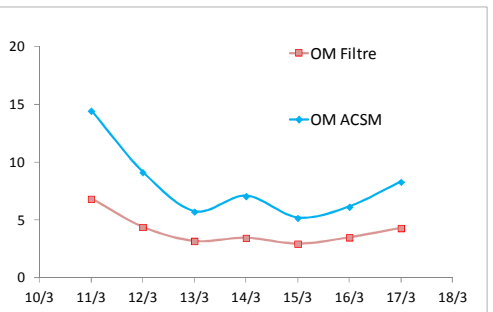
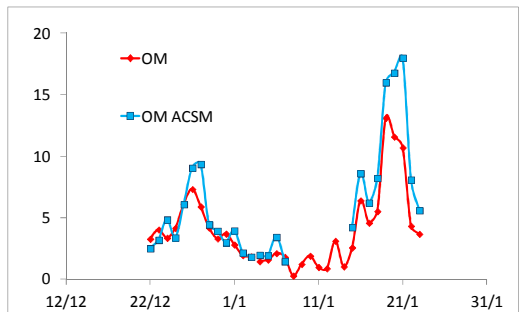
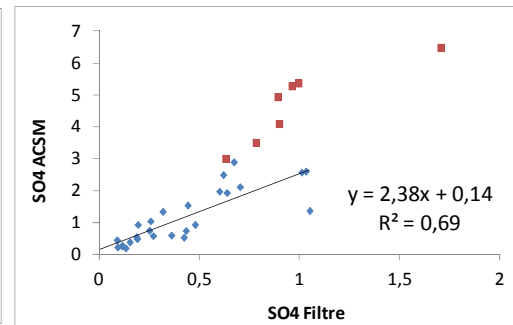
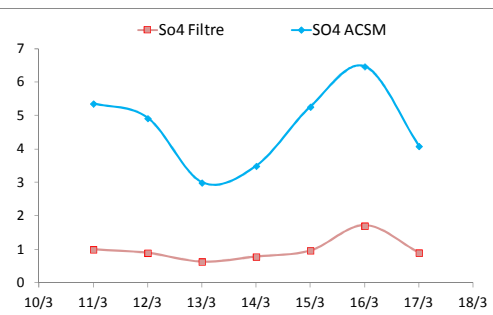
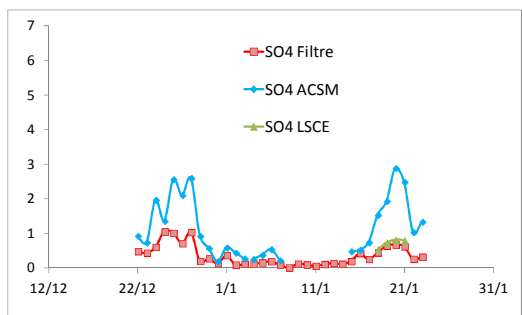
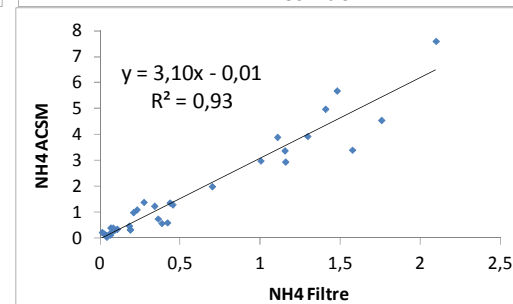
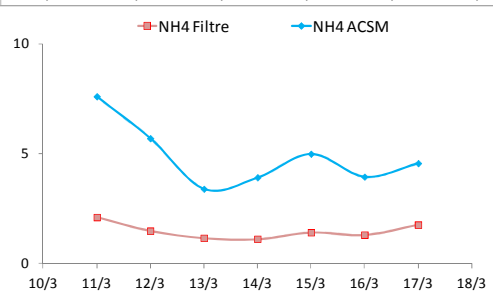
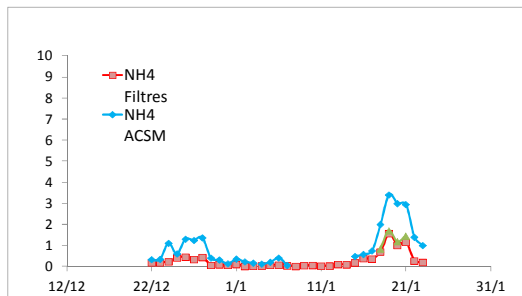
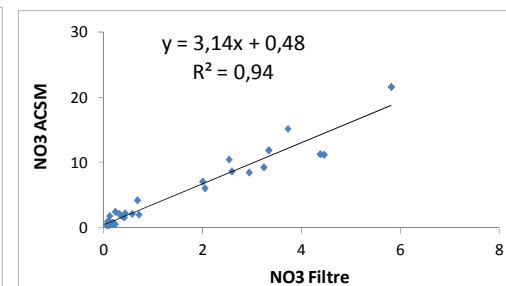
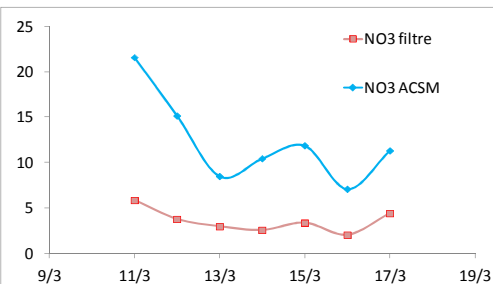
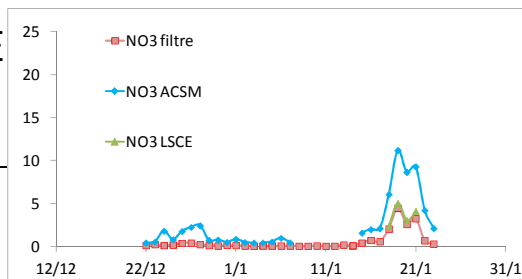
DA 80 24h
Non réfrigéré

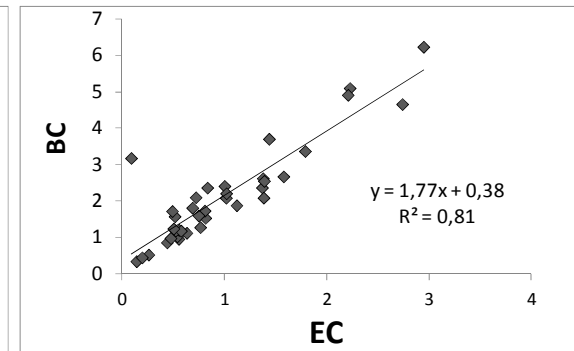
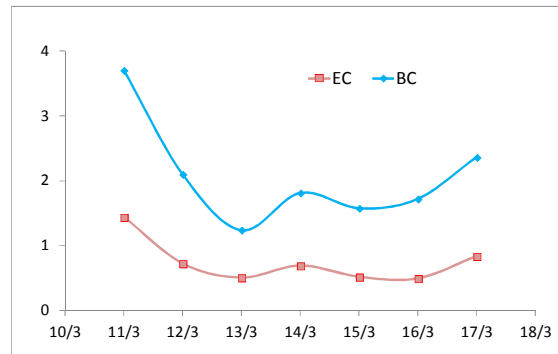
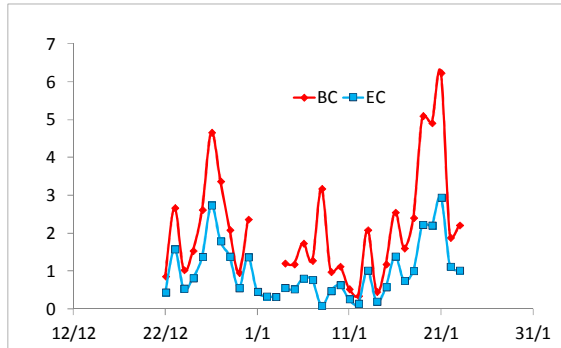
✓ 22/12 → 23/01/2016

30 filtres ; 09h → 09h

✓ 11/03 → 17/03/2016

7 filtres ; 09h → 09h





$$\begin{aligned}
 - \text{NO}_3_{\text{ACSM}} &= 3.14 \cdot \text{NO}_3_{\text{Filtres}} + 0,48 \\
 - \text{NH}_4_{\text{ACSM}} &= 3.10 \cdot \text{NH}_4_{\text{Filtres}} - 0,01 \\
 - \text{Cl}_{\text{ACSM}} &> 2 \cdot \text{Cl}_{\text{Filtres}} \\
 - \text{OM}_{\text{ACSM}} &= 1.45 \cdot \text{OM}_{\text{Filtres}} - 0,09 \\
 - \text{SO}_4_{\text{ACSM}} &= 2.38 \cdot \text{SO}_4_{\text{Filtres}} + 0.14
 \end{aligned}$$



Pertes des espèces volatiles probables



Incohérence des résultats de SO_4 avant et après le changement d'heure de prélèvement

➔ Voir la comparaison des données avec les sites de AirParif et SIRTa

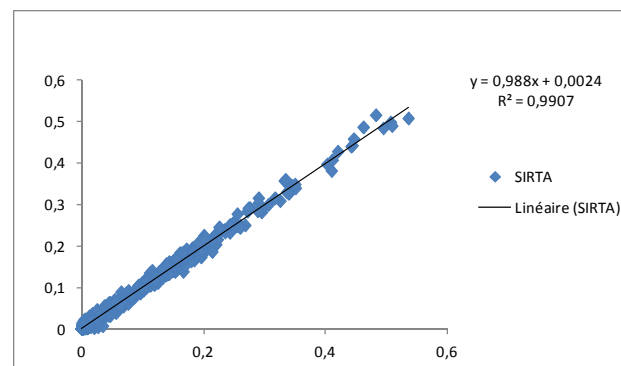
Sirta

✓ 11/03/2016

IE = 3.15

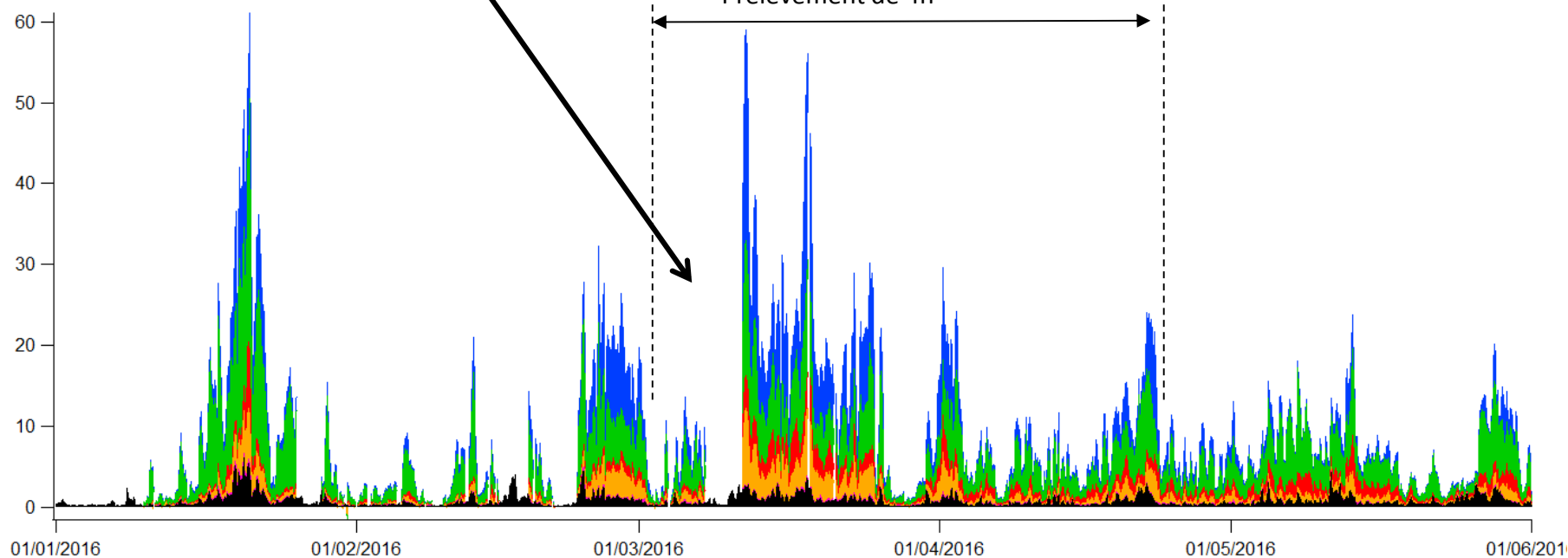
RIE = 4.86

RIE SO₄ = 0.86 (Nouvelle méthode de calibration)

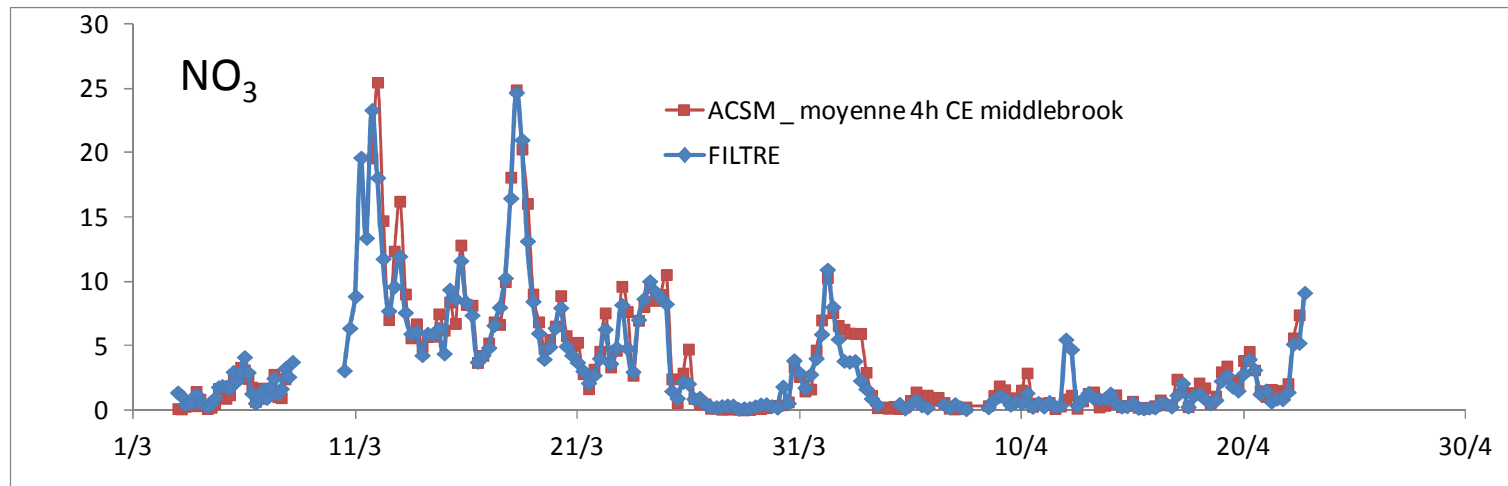


✓ 03/03/2016 → 22/04/2016

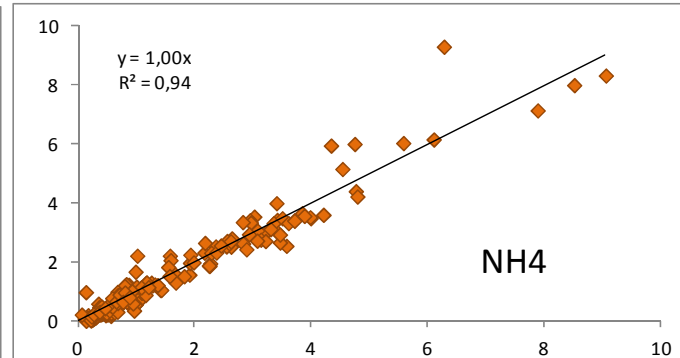
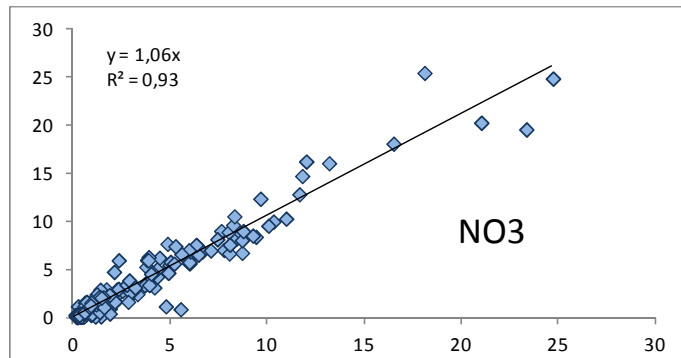
Prélèvement de 4h



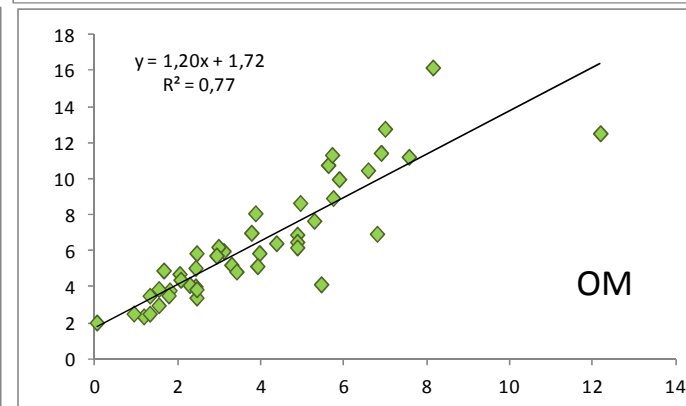
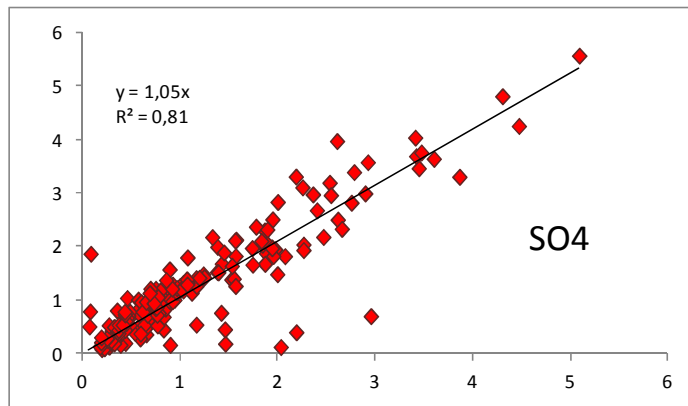
Sirta



ACSM

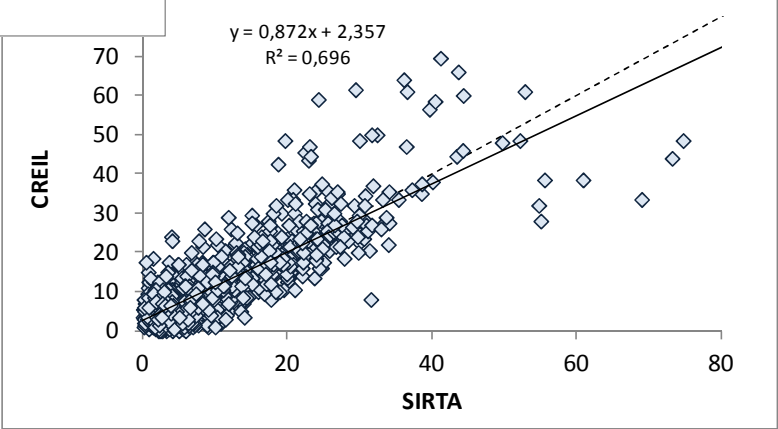
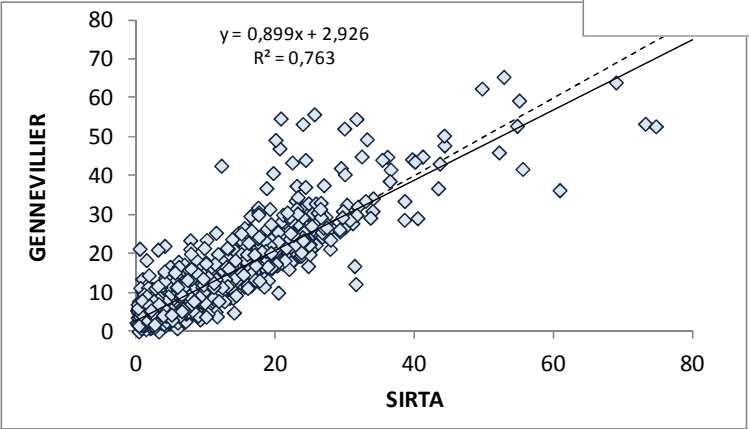
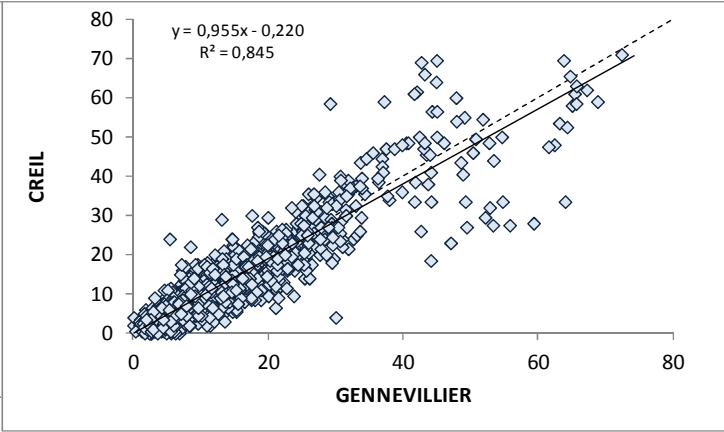
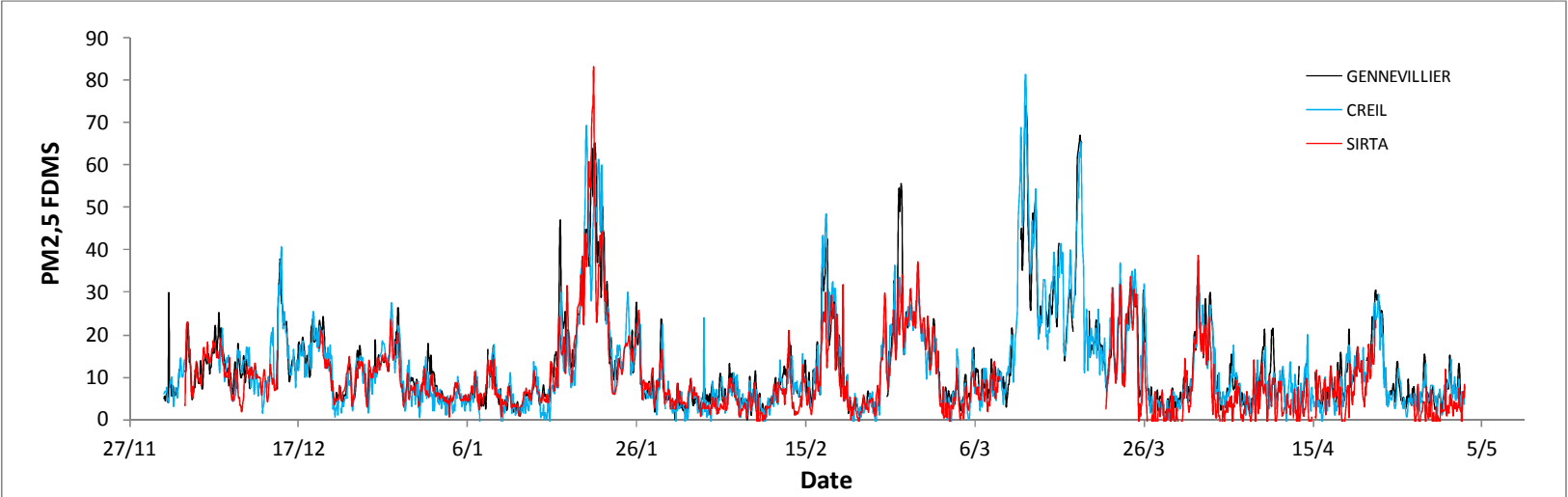


Résultats satisfaisants

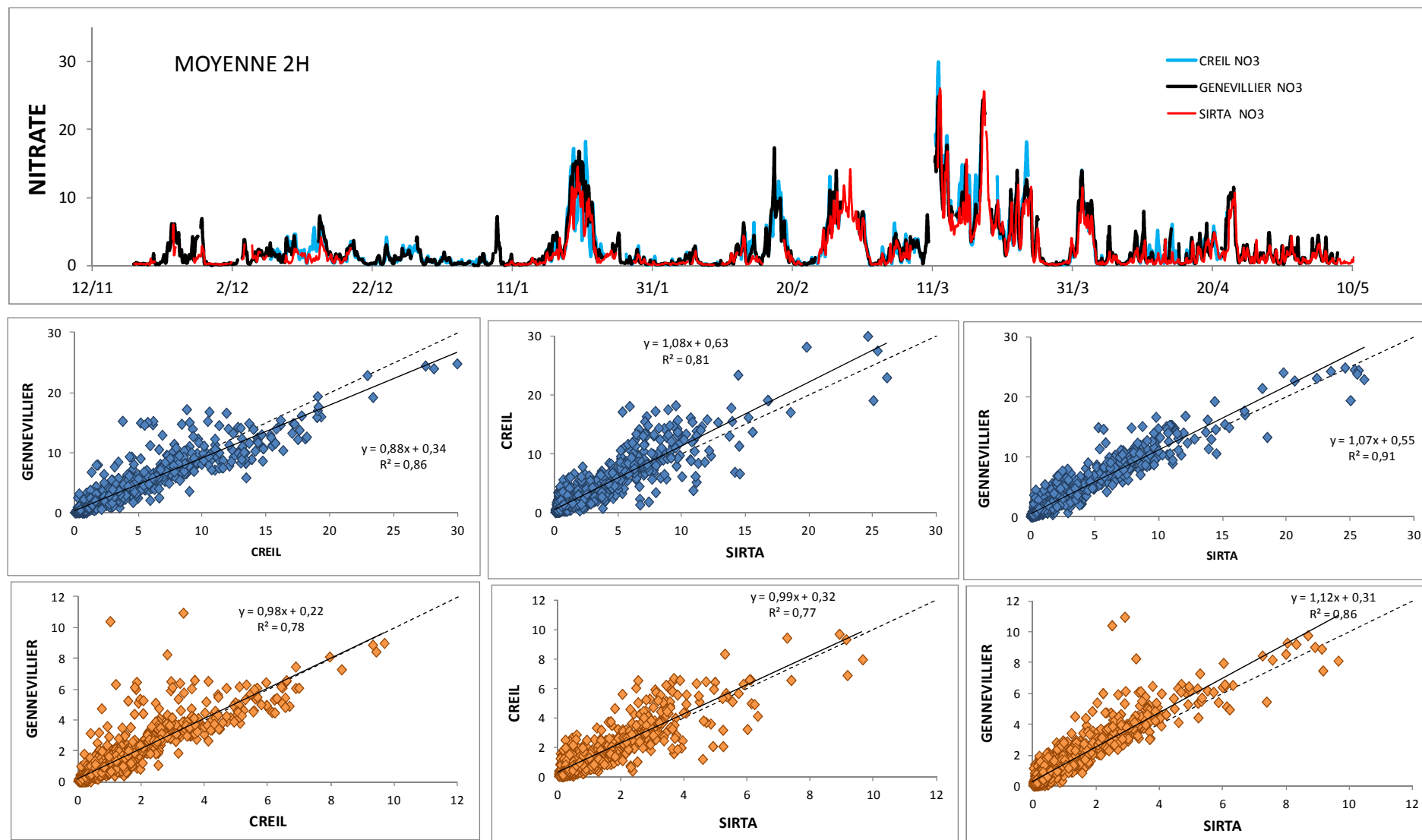


Filtres PM1

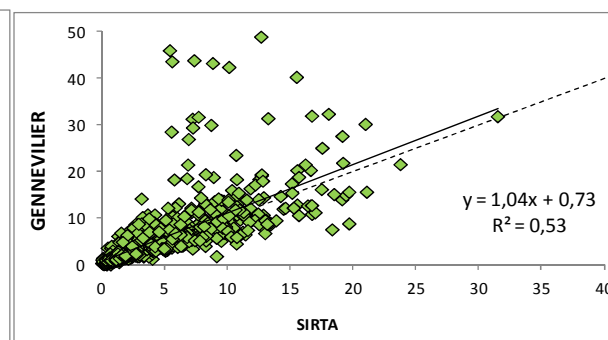
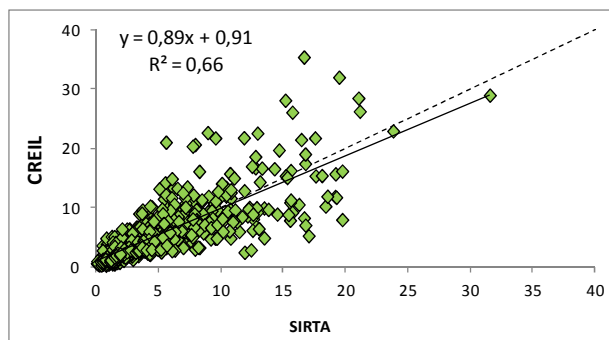
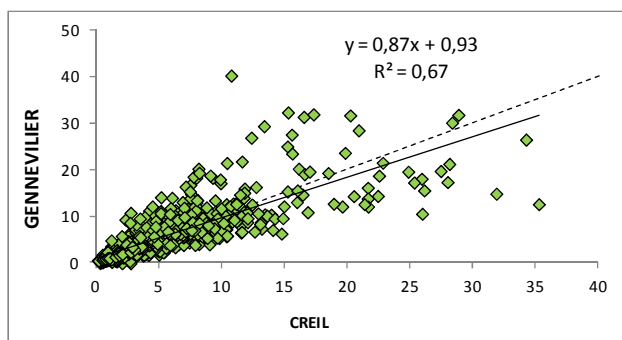
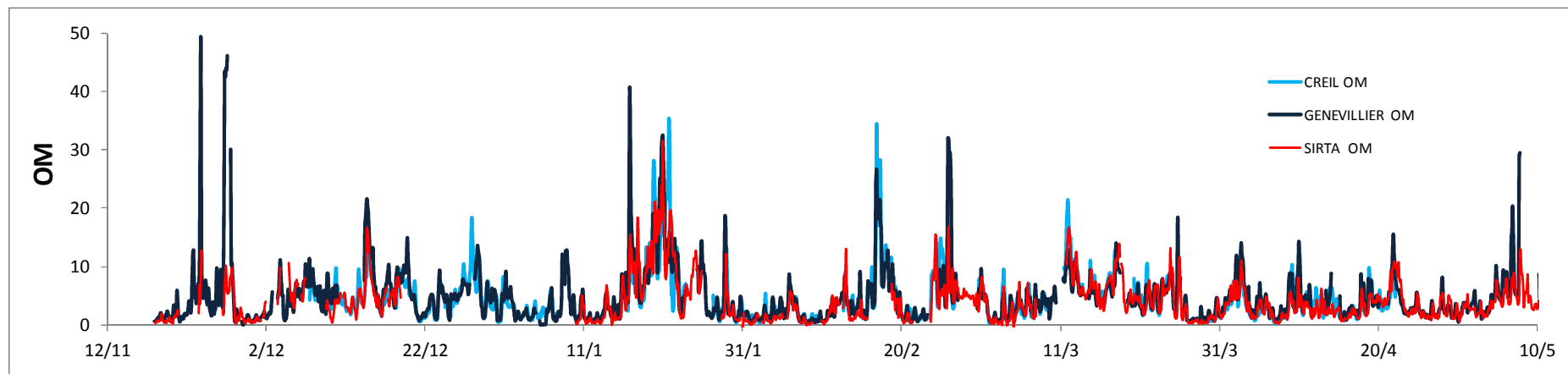
COMPARAISONS CREIL-GENNEVILLIERS-SIRTA : *PM2.5 FDMS*



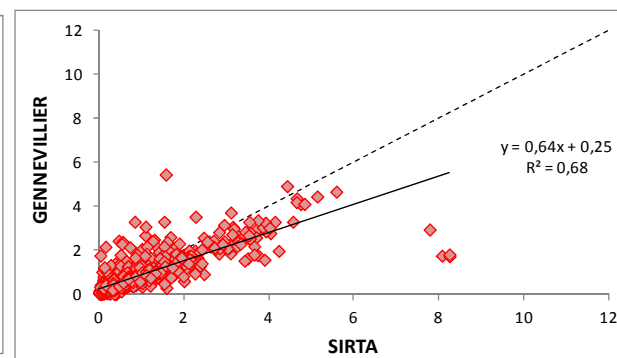
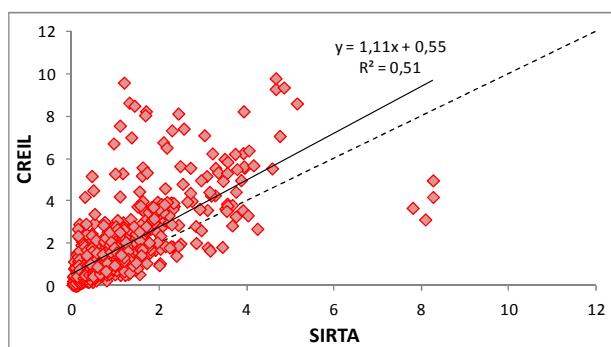
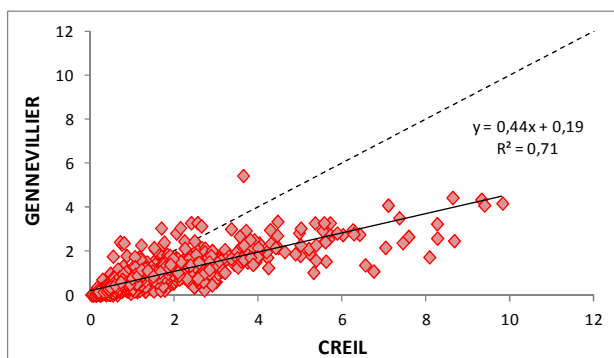
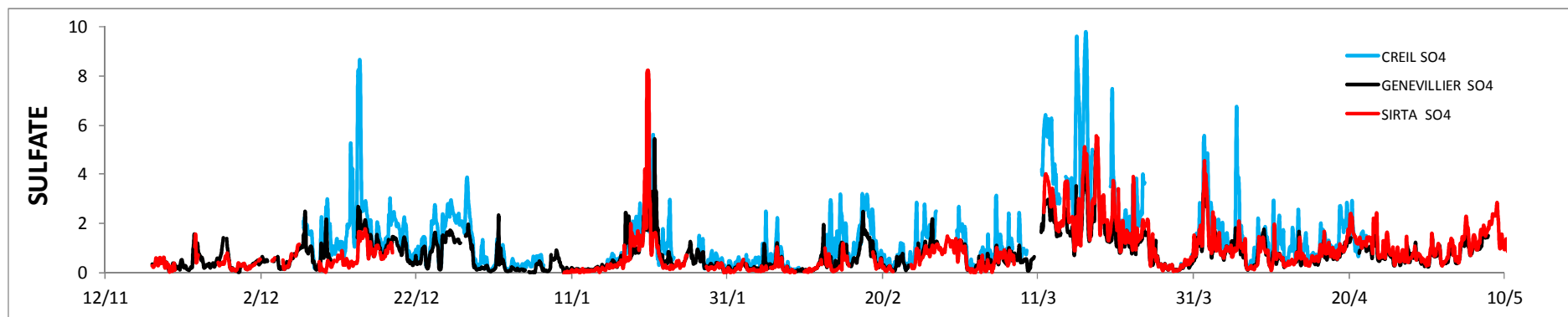
COMPARAISON CREIL-GENNEVILLIERS-SIRTA : NO_3 et NH_4



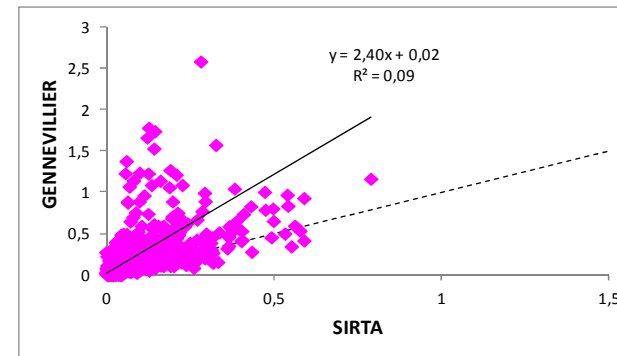
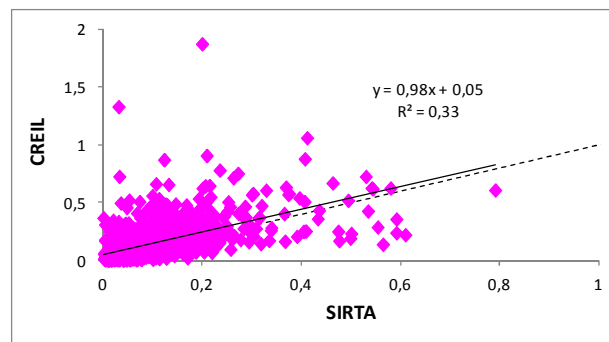
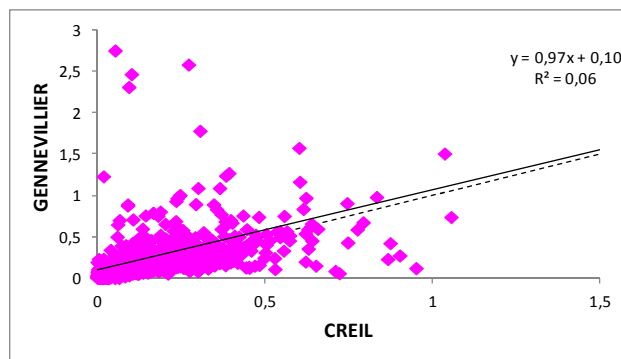
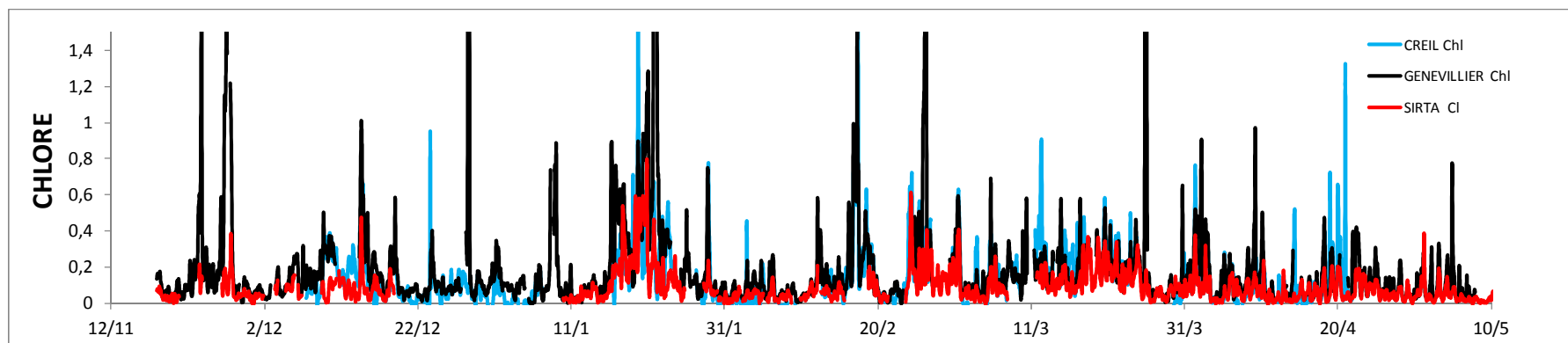
COMPARAISON CREIL-GENNEVILLIERS-SIRTA : OM



COMPARAISON CREIL-GENNEVILLIERS-SIRTA : SO_4

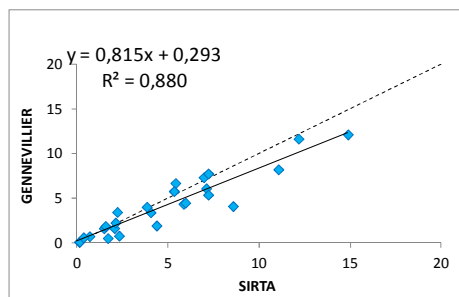


ACSM Chlore: CREIL-GENNEVILLIERS-SIRTA

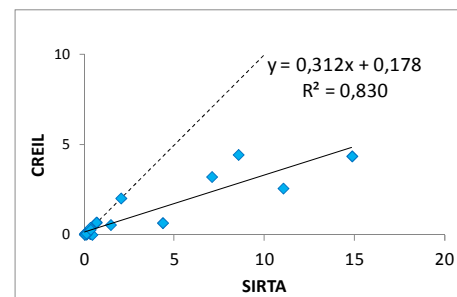


COMPARAISON FILTRES PM1 (CREIL & GENNEVILLIERS) vs FILTRE PM1 SIRT

GENNEVILLIERS

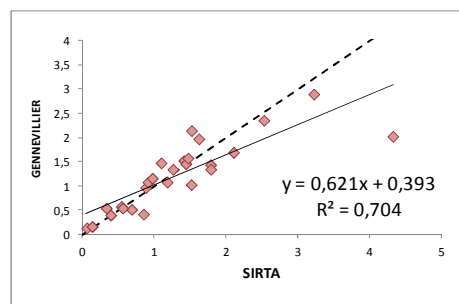
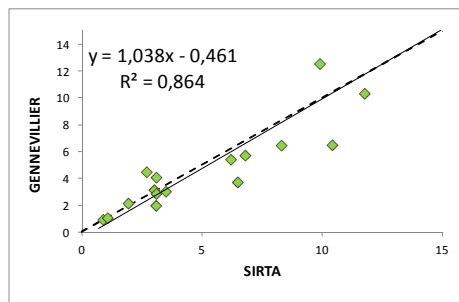
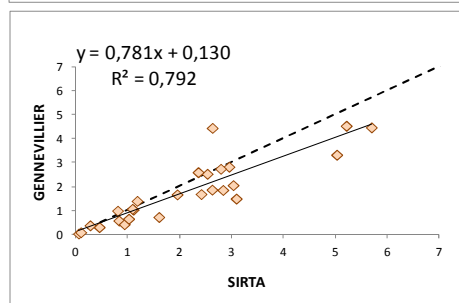


CREIL



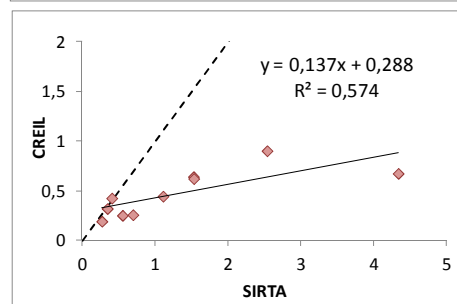
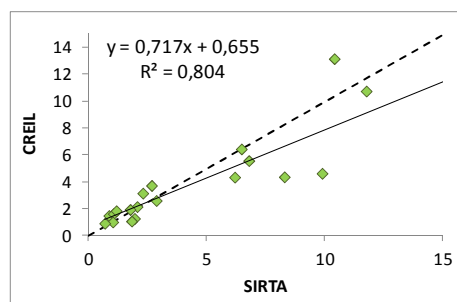
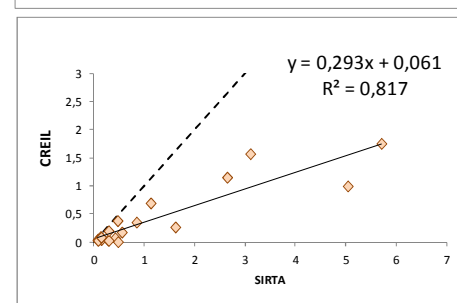
ACSM vs Filtres GENNEVILLIERS

- $\text{NO}_3 \text{ ACSM} = 1,39 \cdot \text{NO}_3 \text{ Filtres} + 0,6$
- $\text{NH}_4 \text{ ACSM} = 1,50 \cdot \text{NH}_4 \text{ Filtres} + 0,19$
- $\text{Cl}_{\text{ACSM}} = 1,63 \cdot \text{Cl}_{\text{Filtres}} + 0,05$
- $\text{OM}_{\text{ACSM}} = 1,12 \cdot \text{OM}_{\text{Filtres}} - 0,76$
- $\text{SO}_4 \text{ ACSM} = 0,94 \cdot \text{SO}_4 \text{ Filtres}$



ACSM vs Filtres CREIL

- $\text{NO}_3 \text{ ACSM} = 3,14 \cdot \text{NO}_3 \text{ Filtres} + 0,48$
- $\text{NH}_4 \text{ ACSM} = 3,10 \cdot \text{NH}_4 \text{ Filtres} - 0,01$
- $\text{Cl}_{\text{ACSM}} > 2 \cdot \text{Cl}_{\text{Filtres}}$
- $\text{OM}_{\text{ACSM}} = 1,45 \cdot \text{OM}_{\text{Filtres}} - 0,09$
- $\text{SO}_4 \text{ ACSM} = 2,38 \cdot \text{SO}_4 \text{ Filtres} + 0,14$



Les comparaisons des 3 sites montrent des différences de concentration plus faible sur les ACSM que sur les filtres :

- ➔ Invalidation des filtres de CREIL
- ➔ Validation des pertes par volatilisation à PARIS
- ➔ Validation des résultats OM et SO_4 à Paris