InGOS project :
Task 15.7 : Network analysis and optimisation
(preliminary results)

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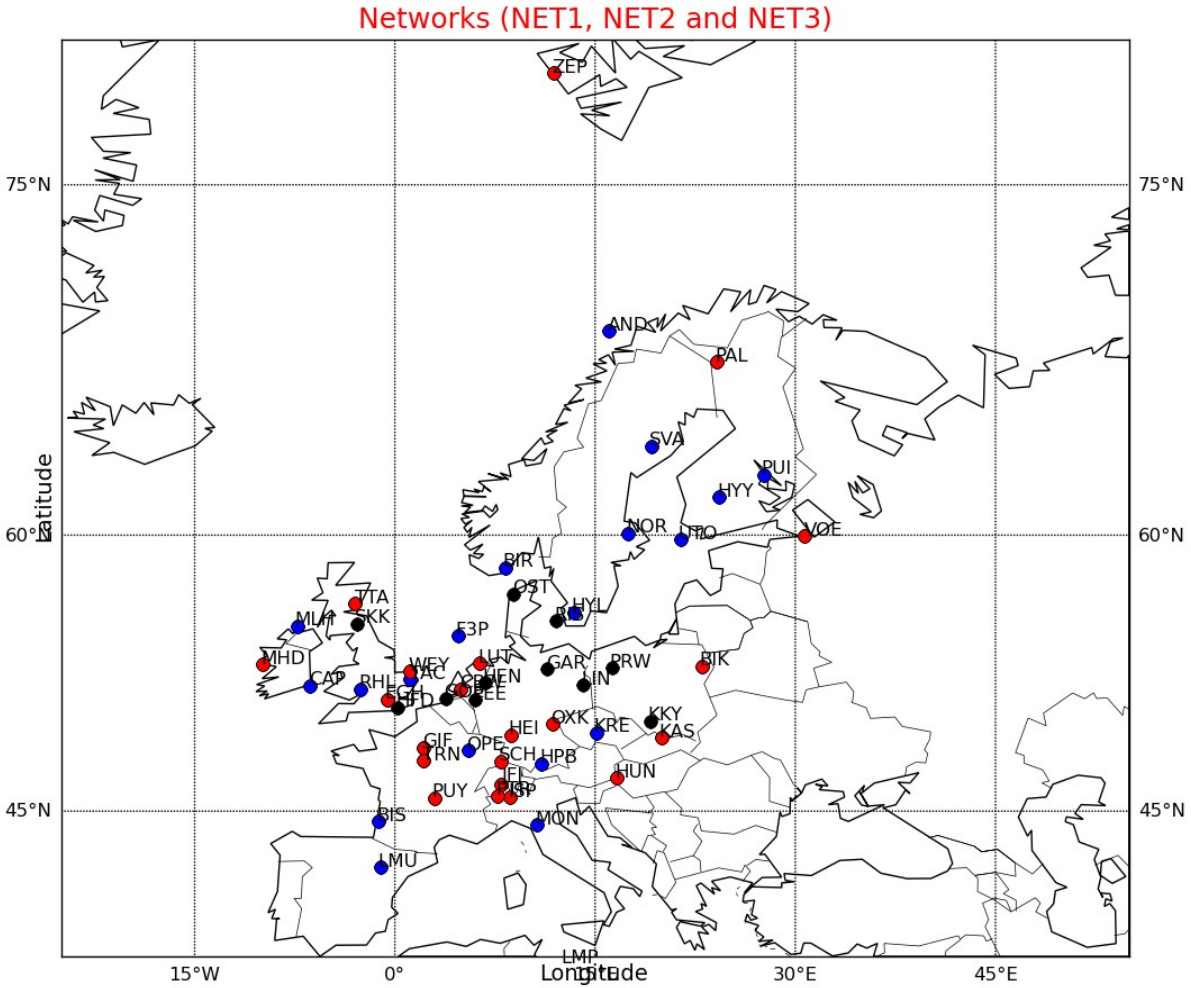
Task 15.7: Network analysis and optimization (led by LCSE)

- Contributors: LSCE, ECN, MPG, EMPA, JRC-IES, NILU, MET
- Analyse the sensitivity of the InGOS network to European emissions of CH_4, N_2O and halocarbons, based on footprint analysis and derived uncertainty reduction.

Contributors	Part1	Part2
LSCE (LMDZ-4DVAR)	X	
ECN (COMET/WRF-chem)		
MPG (TM3-STILT)	X	X
EMPA (FLEXPART)	X	
JRC-IES (TM5-4DVAR)	X	X
NILU		
MET (NAME)		

Networks



NET1 : ● 22 stations
NET2 : ●● 41 stations
NET3 : ●●● 52 stations

- 22 surface networks of InGOS
- 19 secured ICOS stations
- 11 planned ICOS stations

Simulations

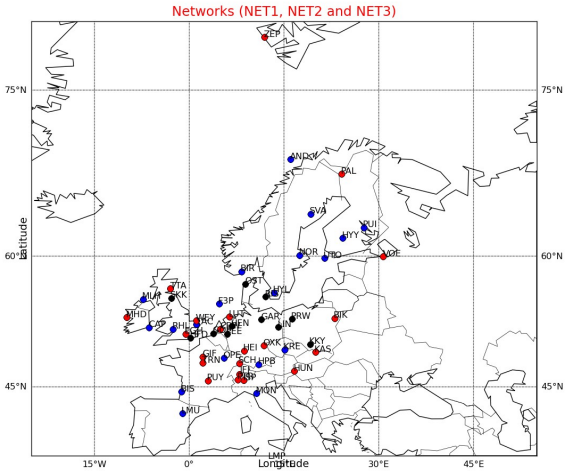
- One footprint every other week for each network (24 footprints in the year 2007)
- The starting days : 1st and 15th of each month
- 2 days and 6 days sensitivity are calculated

Following results are normalized by the maximum

Models	Institutions	Horizontal resolution
LMDZ	LSCE	2.5x3.75
LMDZEU	LSCE	[0.83,4.73]x[1.25,7.27]
TM3-STILT	MPG	0.25x0.25
FLEXPART	EMPA	0.25x0.25
TM5 6x4	JRC-IES	6x4
TM5 1x1	JRC-IES	1x1

Some preliminary results : 6 days sensitivity to the different networks

TM5 6x4, TM5 1x1 (November 15th)



NET1 : 22 stations
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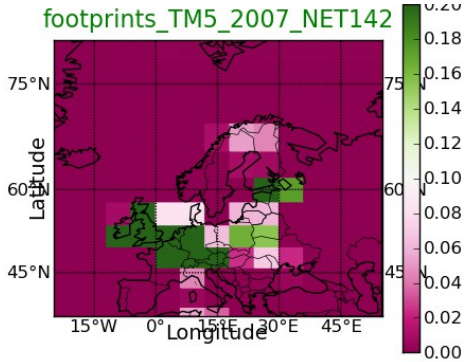
NET3 : 52 stations

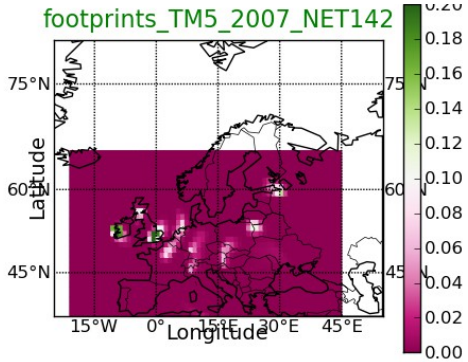
High sensitivity around stations

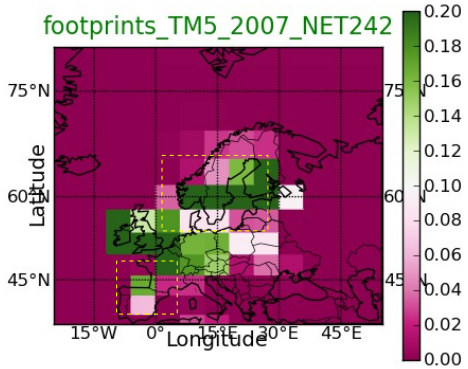
NET1

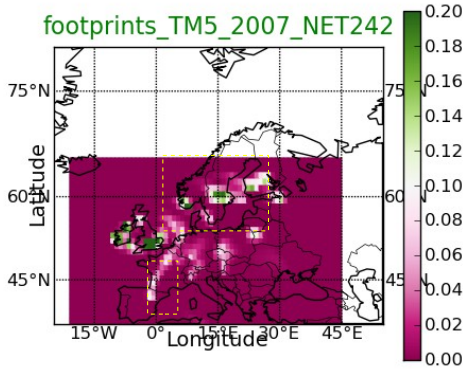
NET2

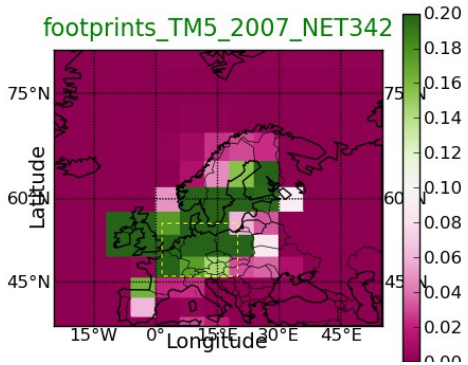
NET3

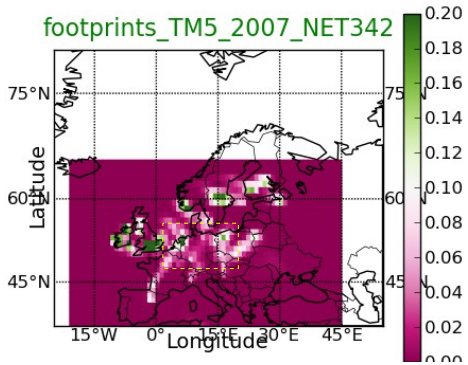










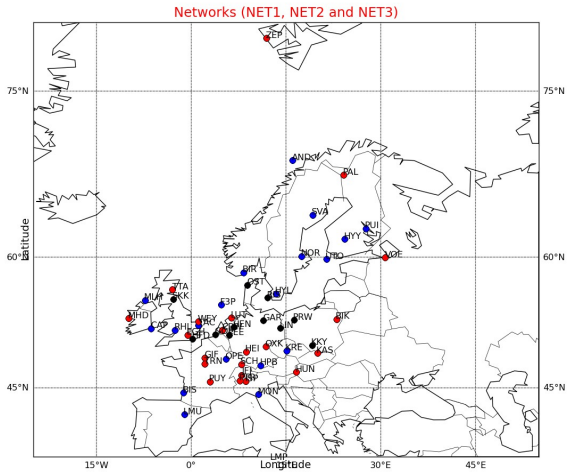


TM5 6x4

TM5 1x1

Some preliminary results : 6 days sensitivity (differences between networks)

TM5 6x4, TM5 1x1 (November 15th)



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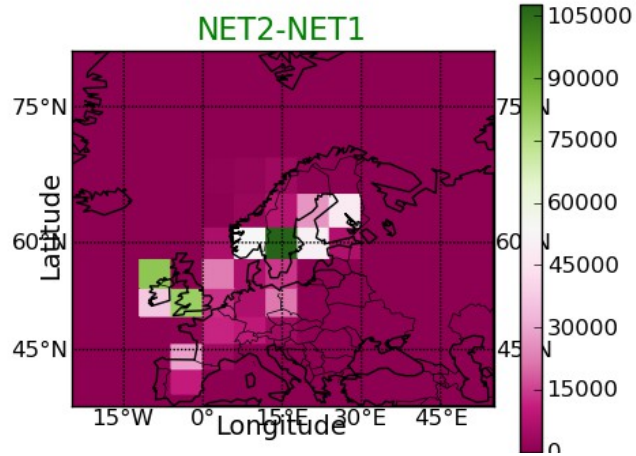
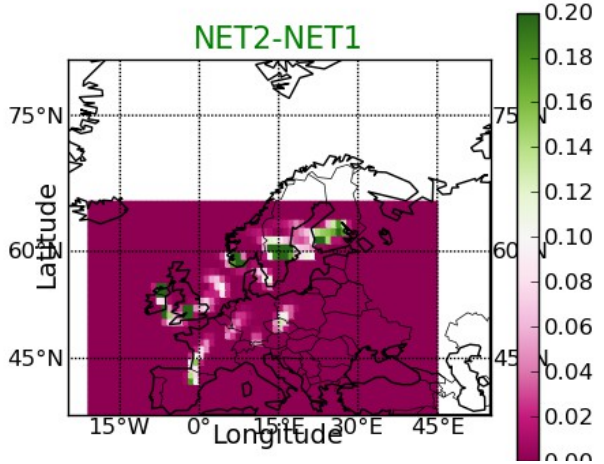
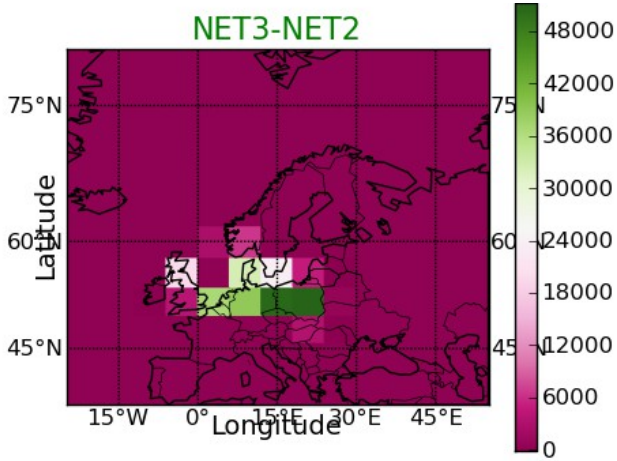
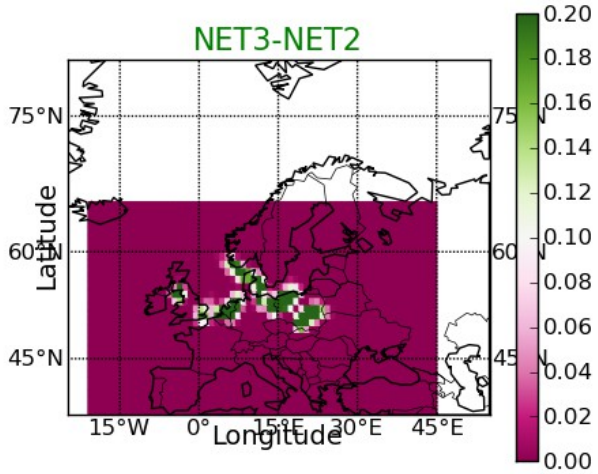






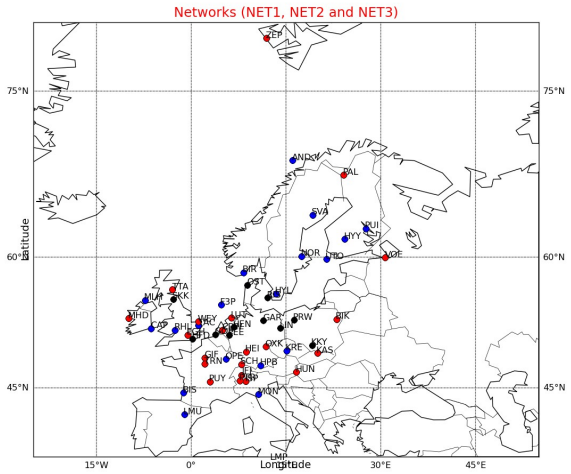


TM5 6x4

TM5 1x1

Some preliminary results : 6 days sensitivity to the different networks

TM3-STILT and FLEXPART (november 15th)



NET1

NET2

NET3

NET1 : ● 22 stations
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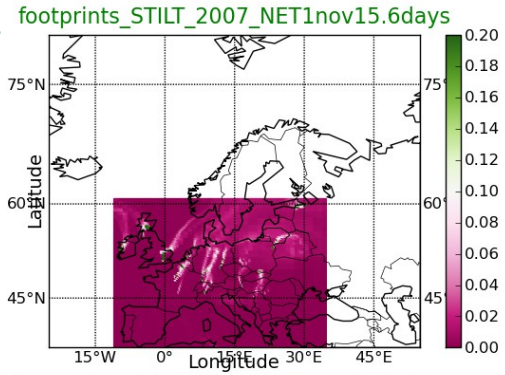
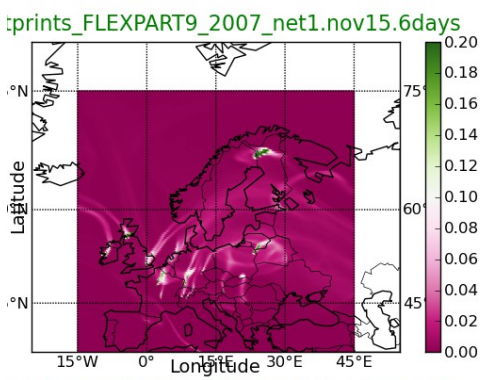
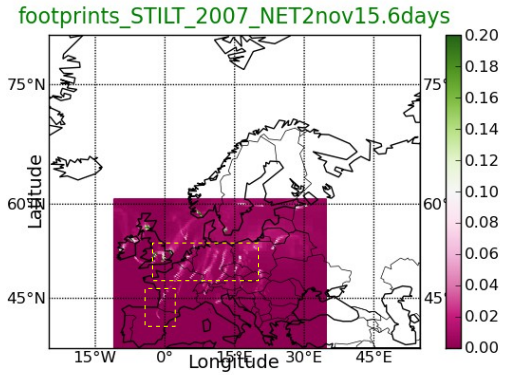
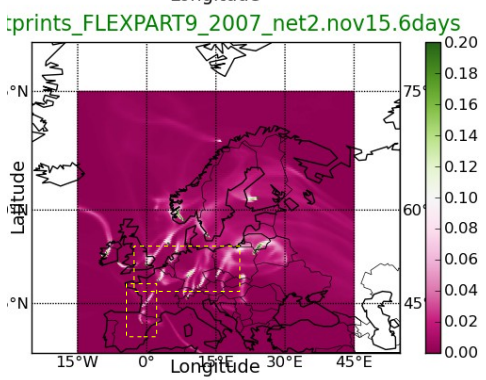
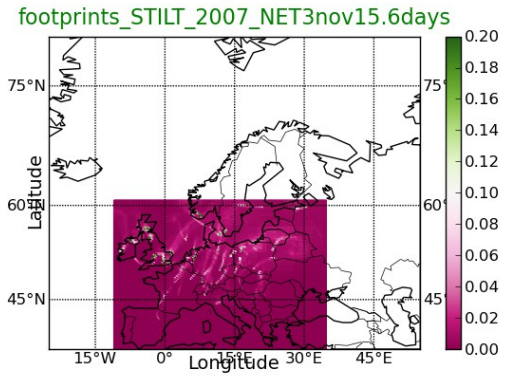
High sensitivity around stations

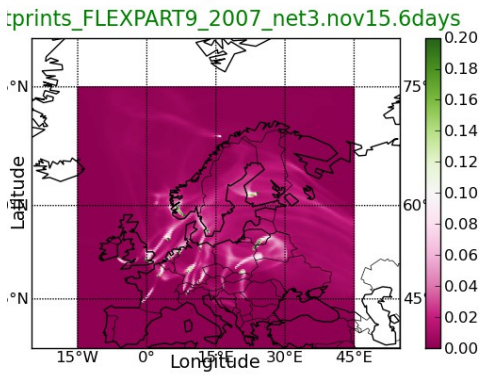










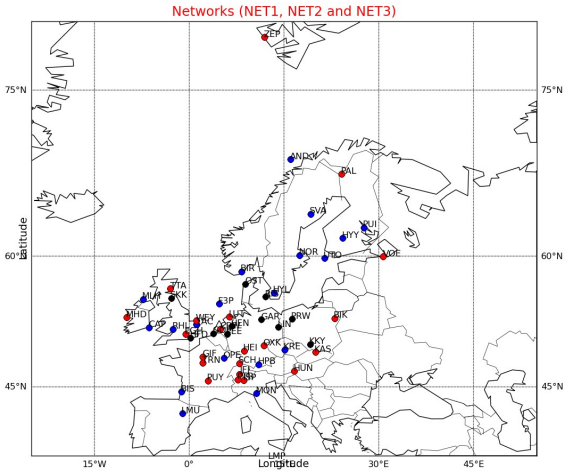


TM3-STILT

FLEXPART

Some preliminary results : 6 days sensitivity (differences between networks)

TM3-STILT and FLEXPART (November 15th)



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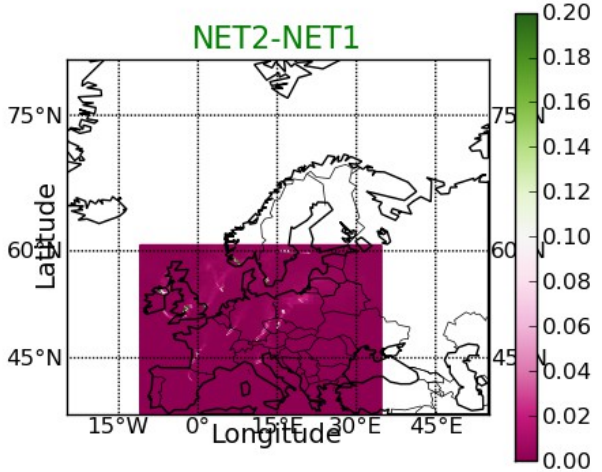
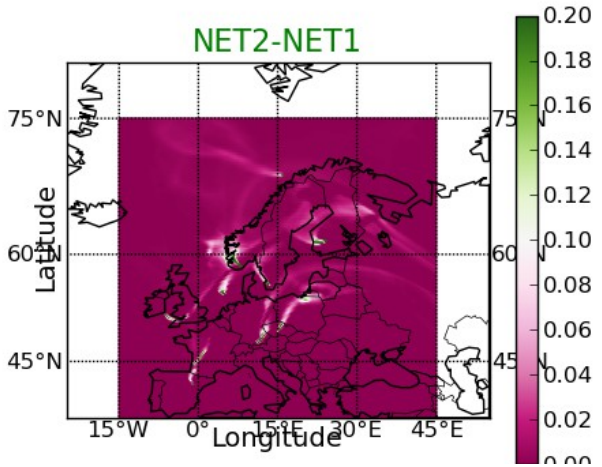
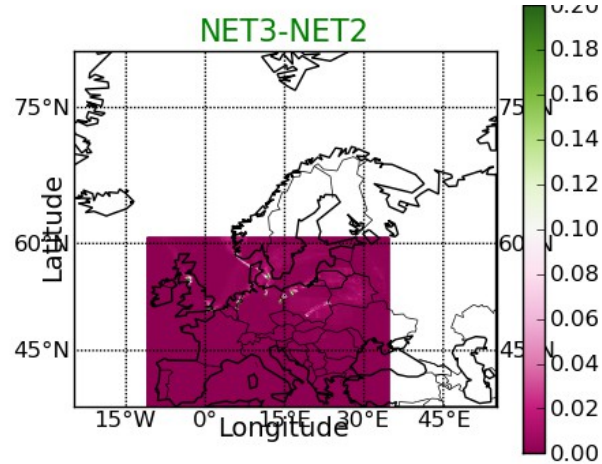
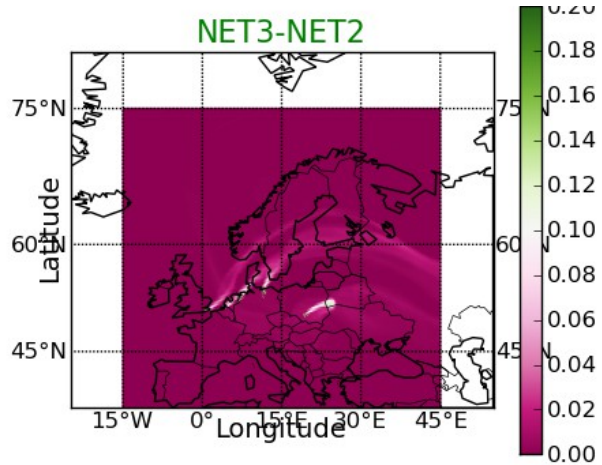






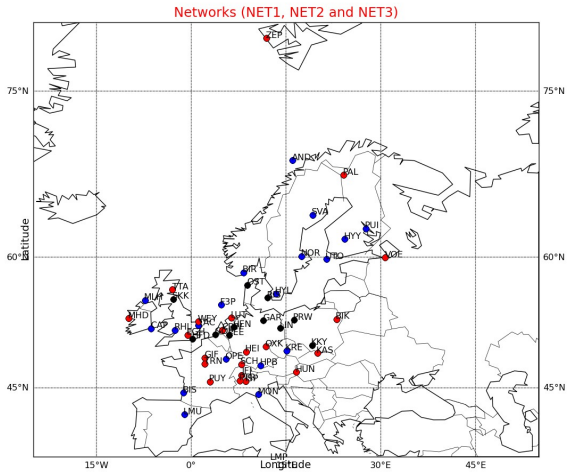


TM3-STILT

FLEXPART

Some preliminary results : 6 days sensitivity to the different networks

LMDZ and LMDZEU (november 15th)



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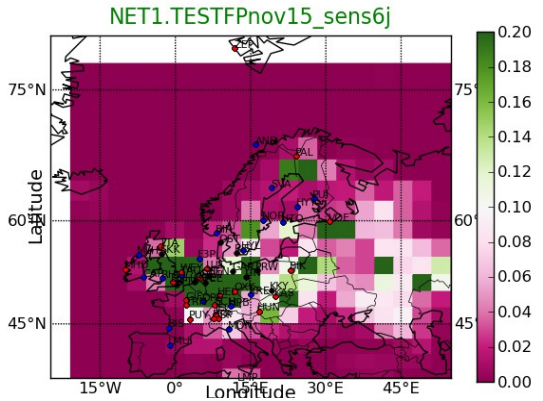
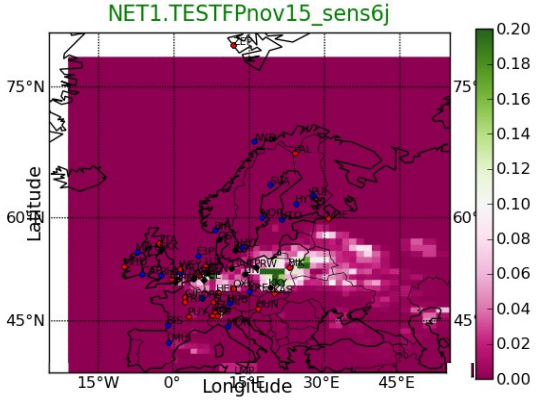
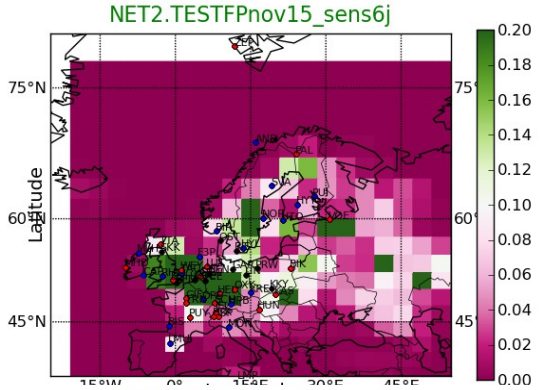
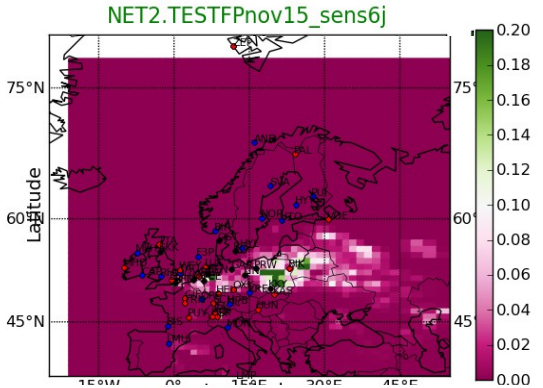
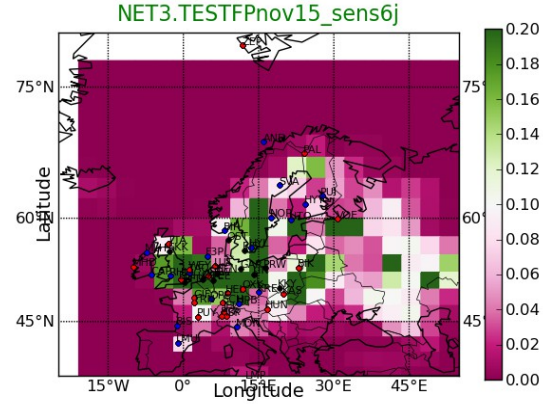
High sensitivity around stations

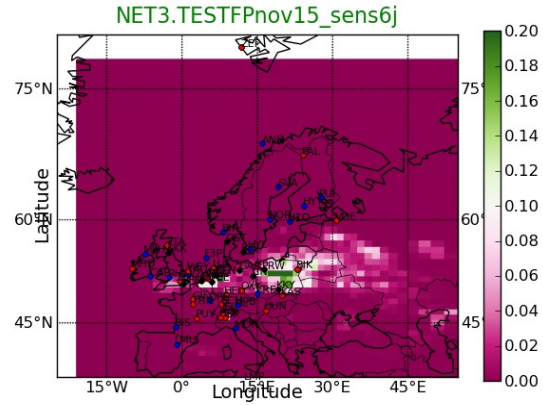










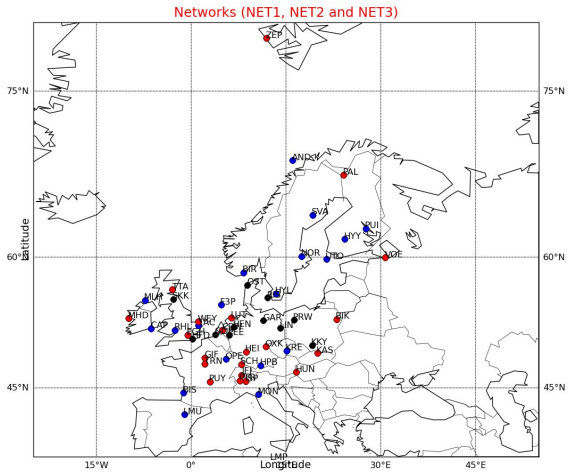


LMDZ

LMDZEU

Some preliminary results : 6 days sensitivity (differences between networks)

LMDZ and LMDZEU (November 15th)



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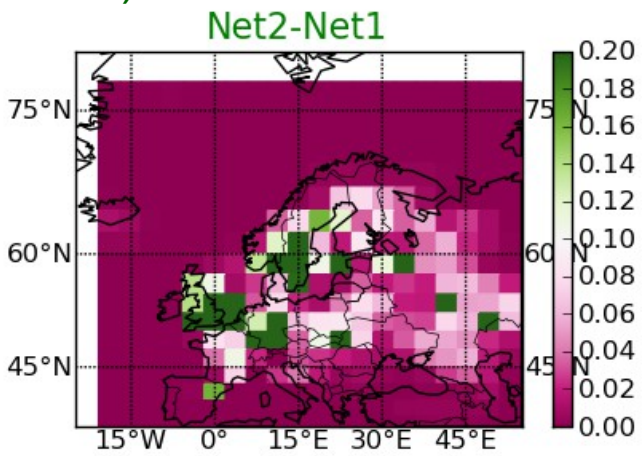
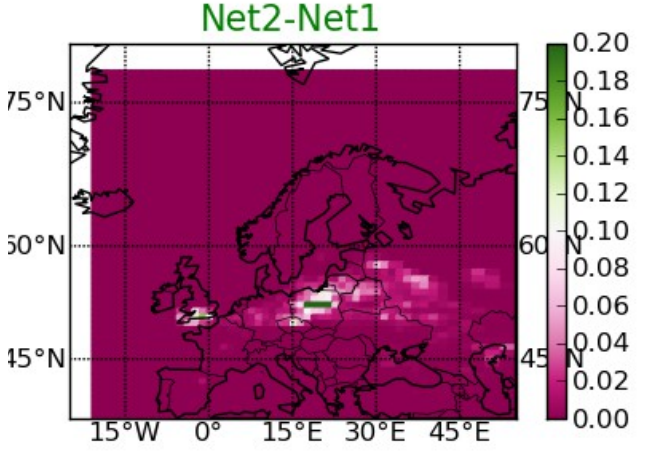
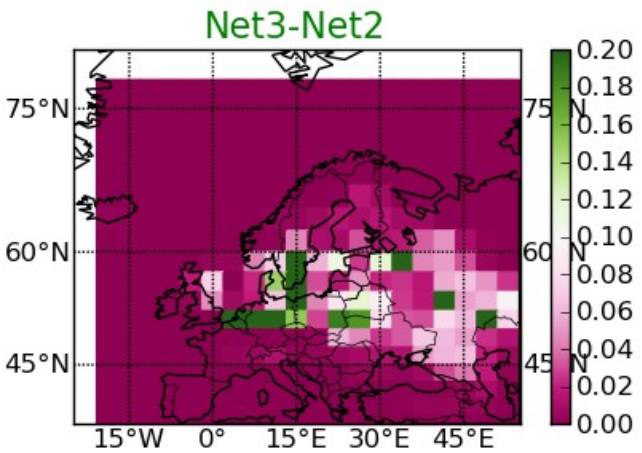
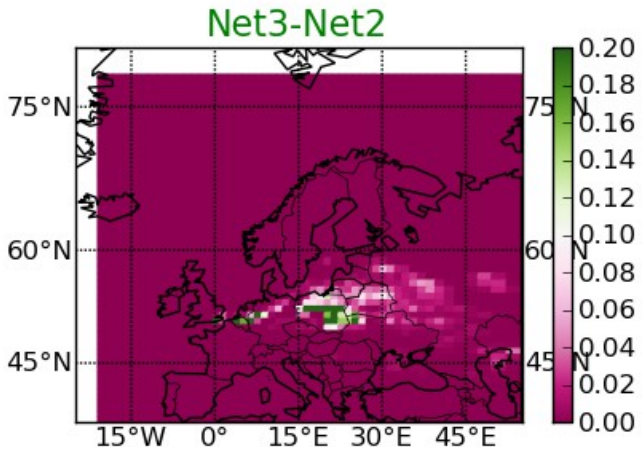






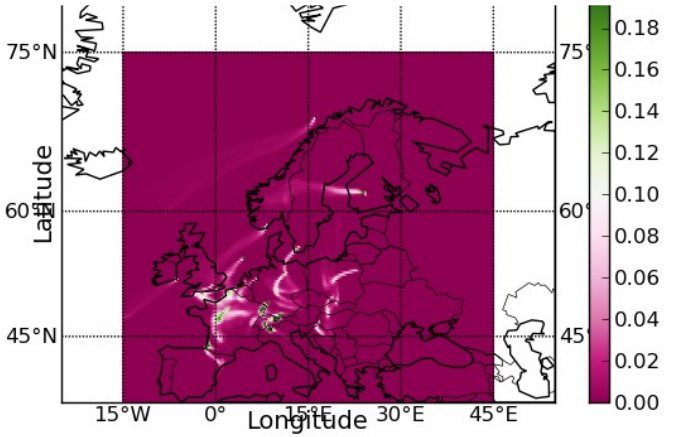


LMDZ

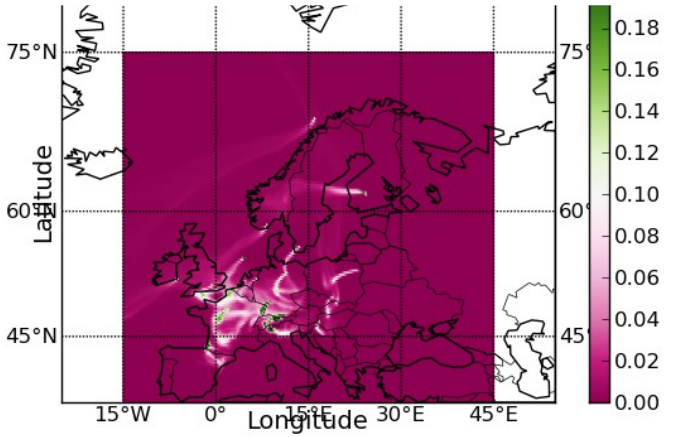
LMDZEU

Some preliminary results : 2 days and 6 days sensitivity (NET3 october 15th)

2 days sens

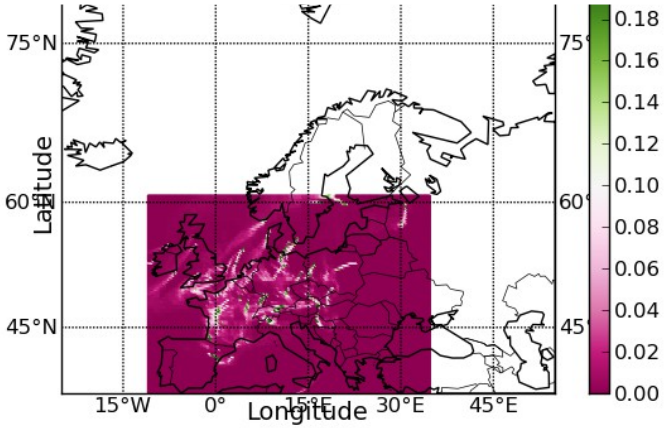


6 days sens

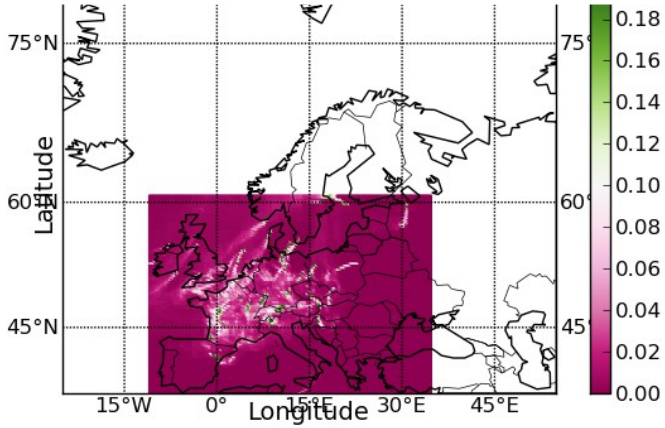


FLEXPART

2 days sens



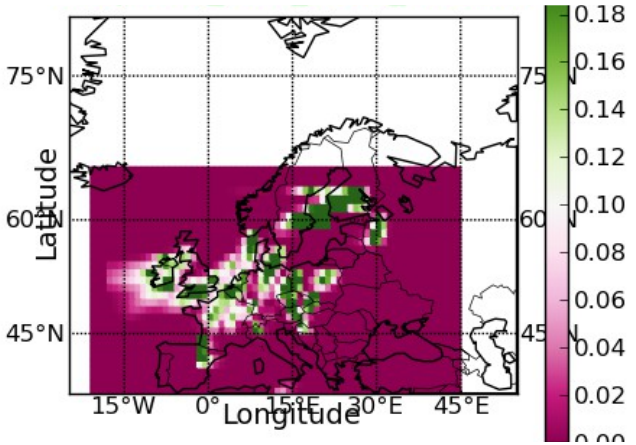
6 days sens



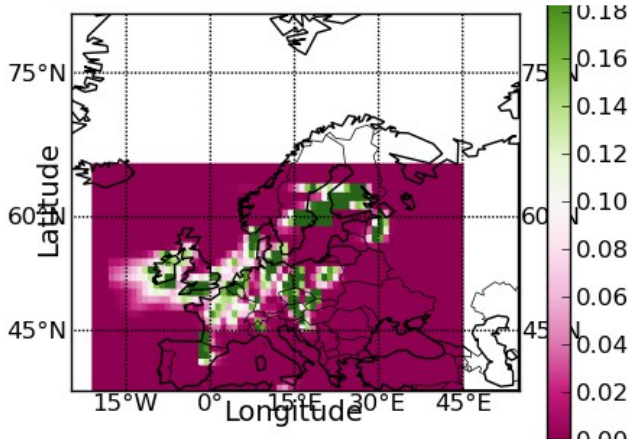
STILT

Some preliminary results : 2 days and 6 days sensitivity (NET3 october 15th)

2 days sens

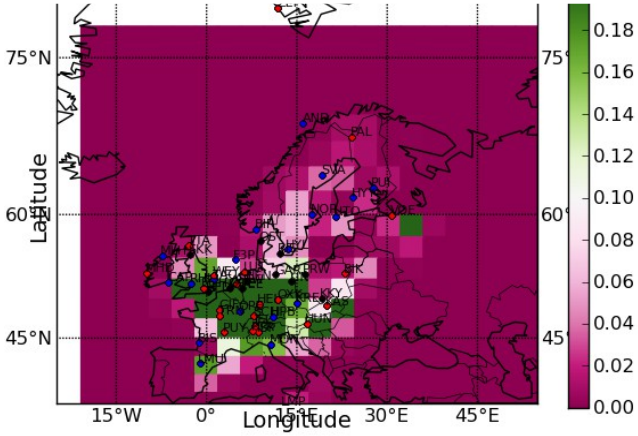


6 days sens

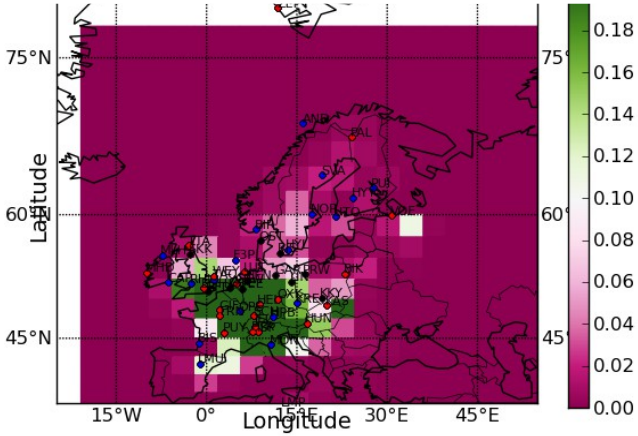


TM5 1x1

2 days sens



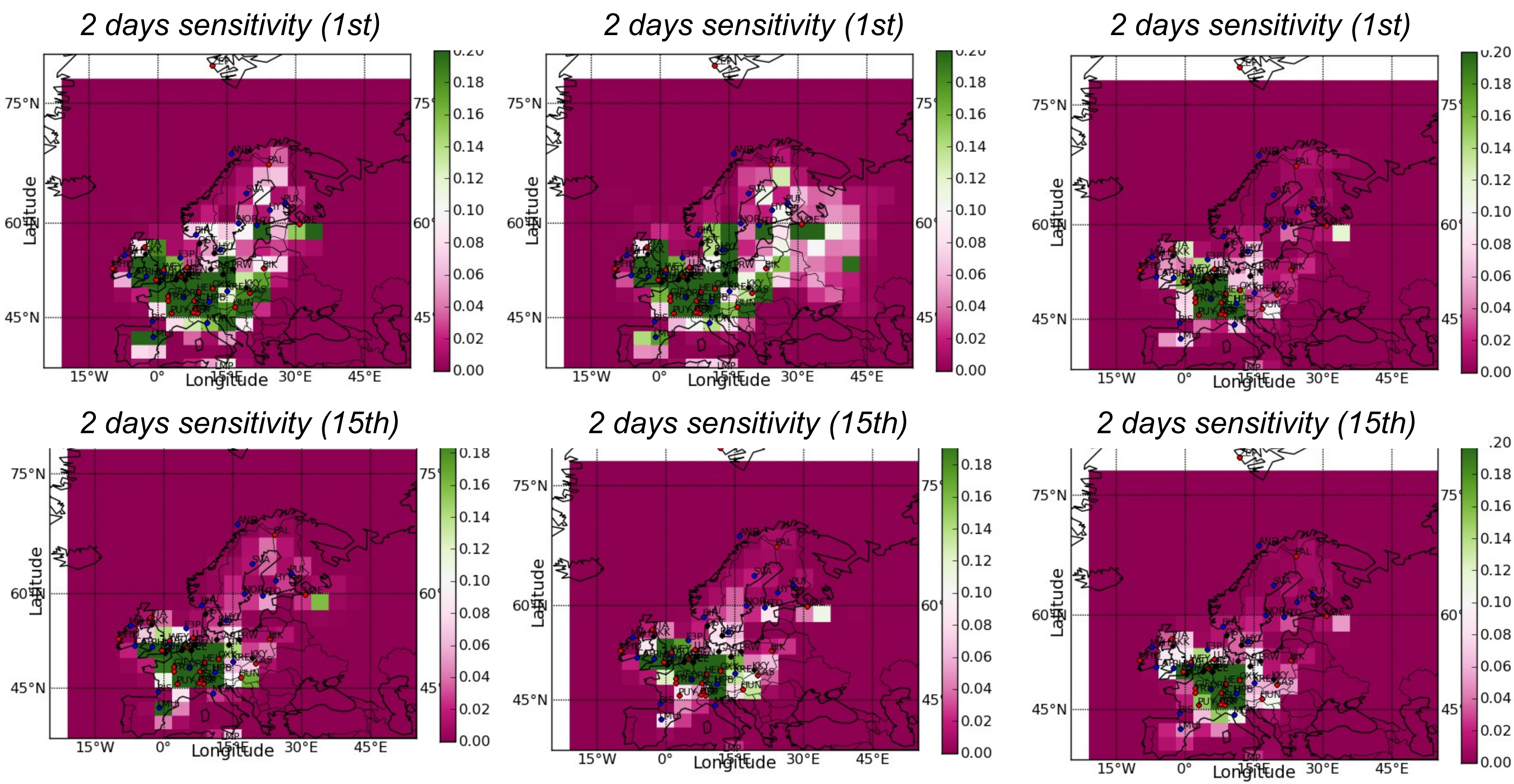
6 days sens



LMDZ

Some preliminary results : both cases in the month (NET3 LMDZ, 2 days sensitivity)

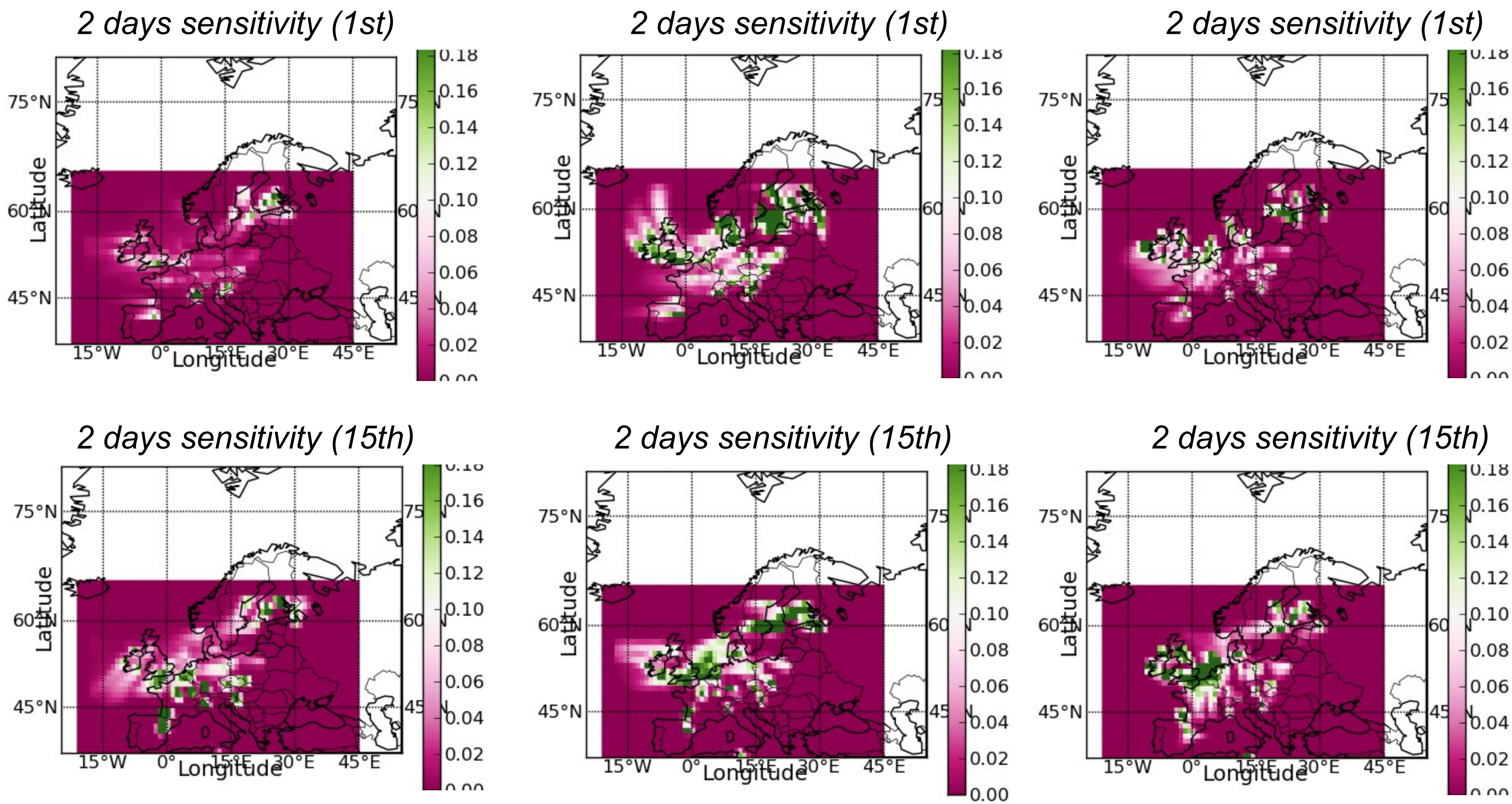
Jan | Mar | Jul



Synoptic variability between the 1st and 15th

Some preliminary results : both cases in the month **(NET3 TM5, 2 days sensitivity)**

Jan Mar Jul

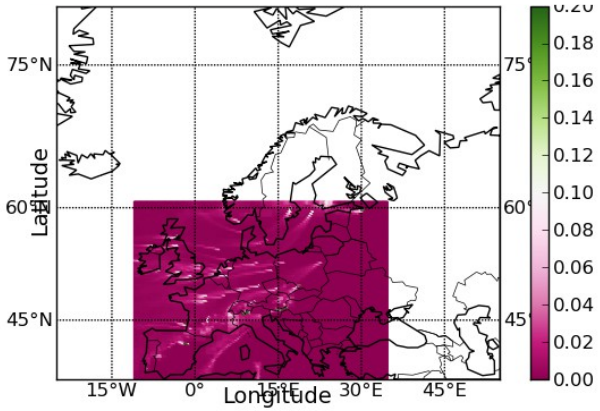


Synoptic variability between the 1st and 15th

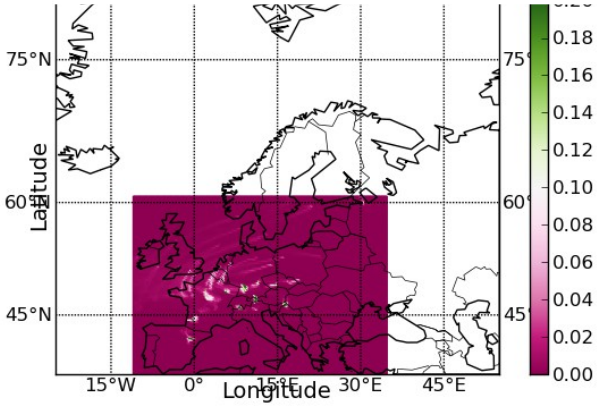
Some preliminary results : both cases in the month (NET3 STILT, 2 days sensitivity)

Jan

2 days sensitivity (1st)

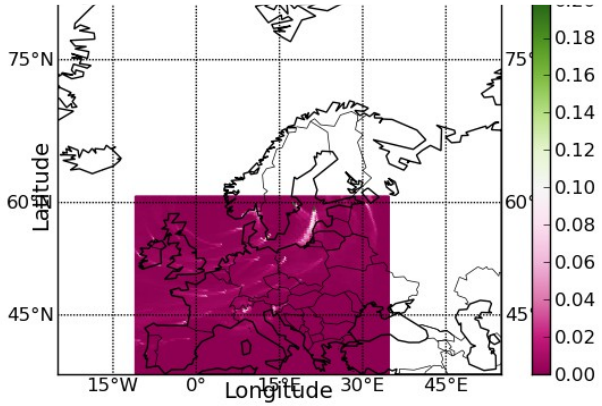


2 days sensitivity (15th)

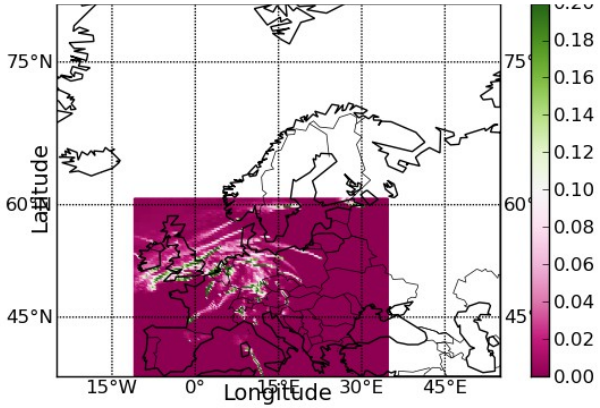


Mar

2 days sensitivity (1st)

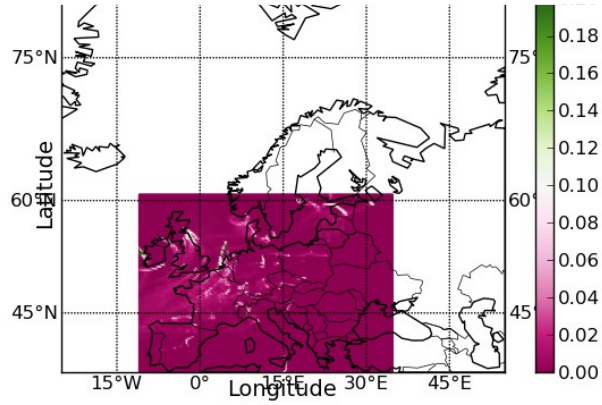


2 days sensitivity (15th)

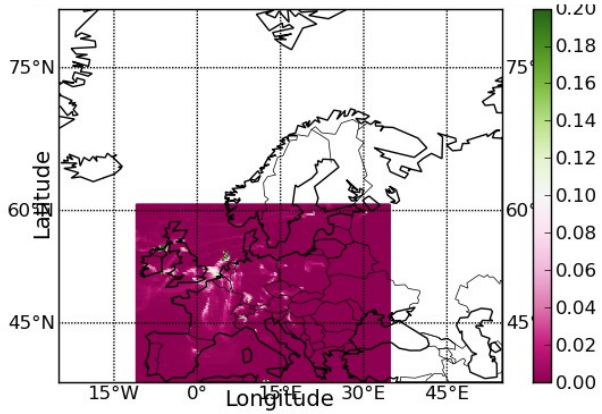


Jul

2 days sensitivity (1st)



2 days sensitivity (15th)

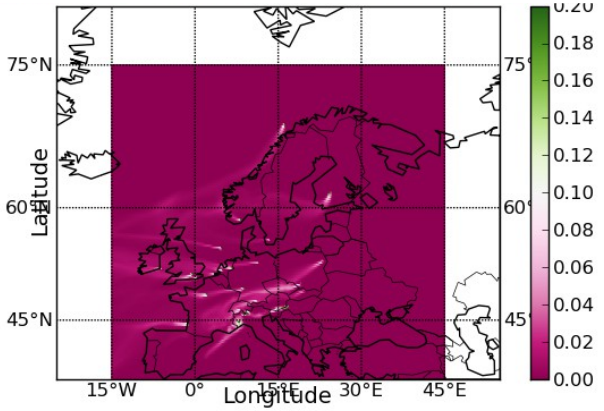


Synoptic variability between the 1st and 15th

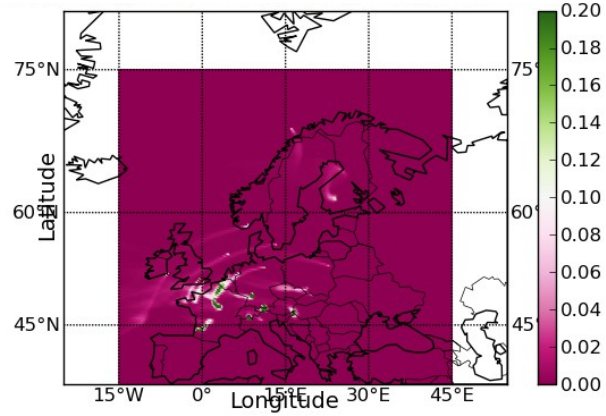
Some preliminary results : both cases in the month (NET3 FLEXPART, 2 days sens)

Jan

2 days sensitivity (1st)

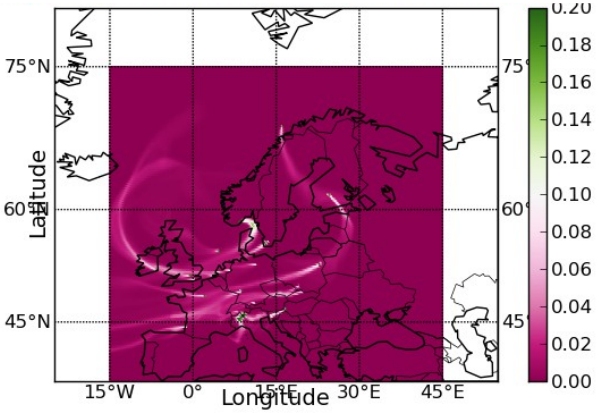


2 days sensitivity (15th)

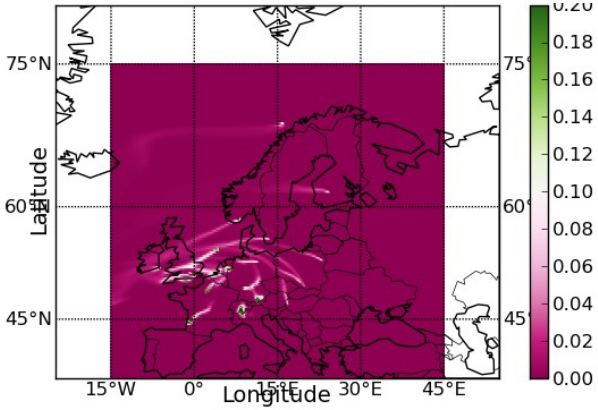


Mar

2 days sensitivity (1st)

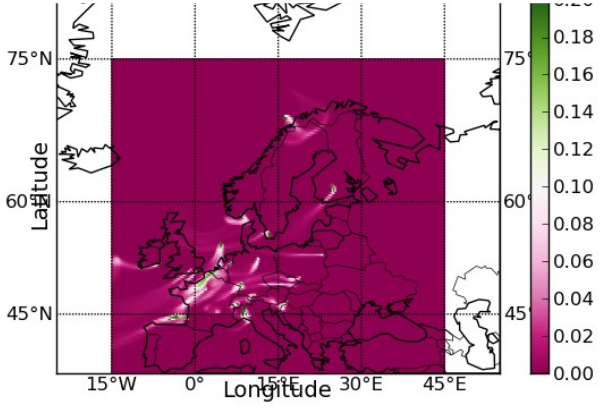


2 days sensitivity (15th)

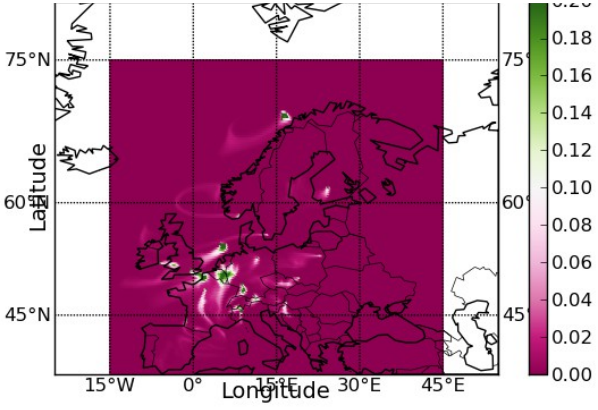


Jul

2 days sensitivity (1st)

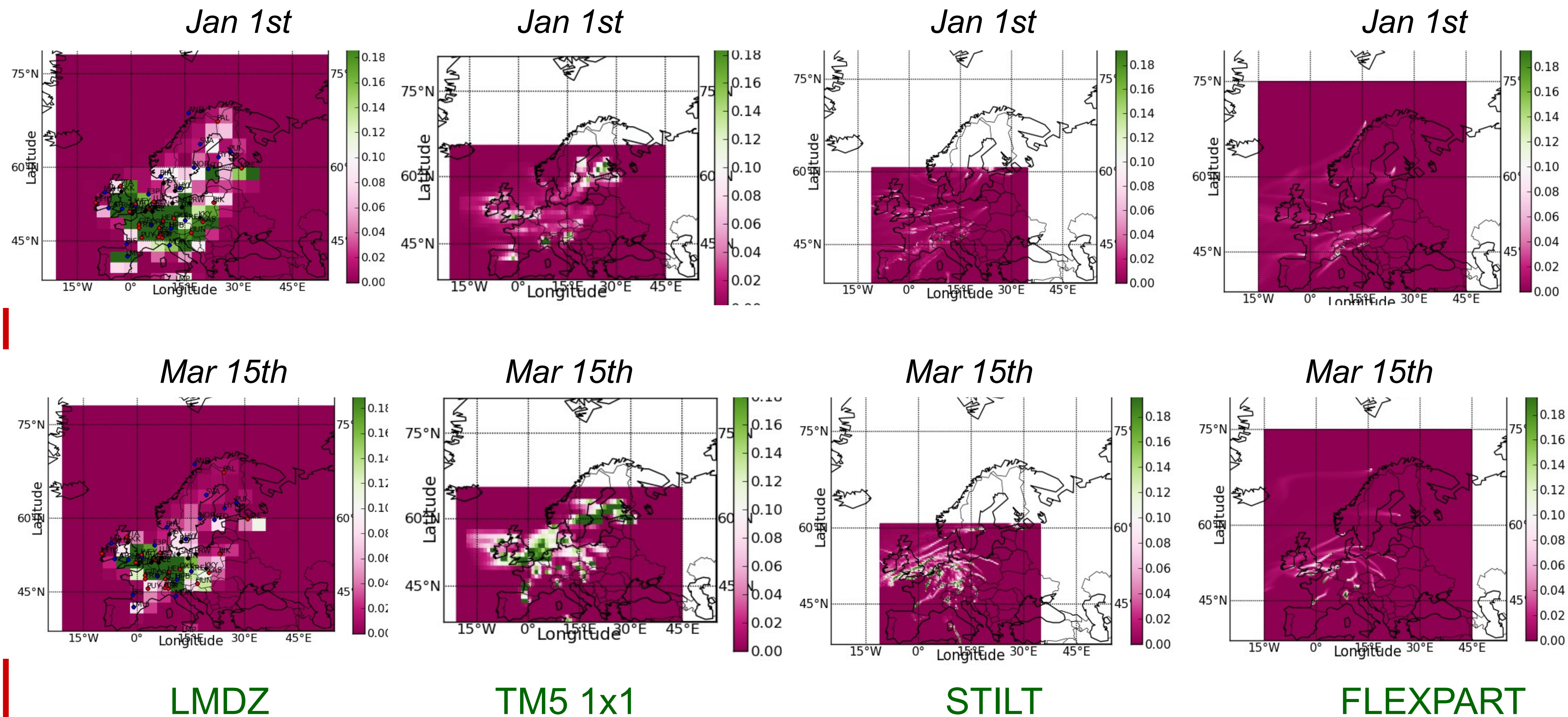


2 days sensitivity (15th)



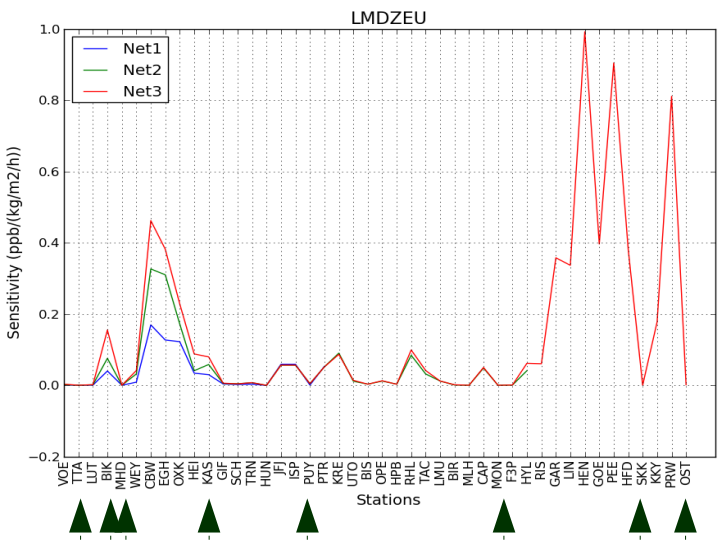
Variation of sensitivity depending to the months

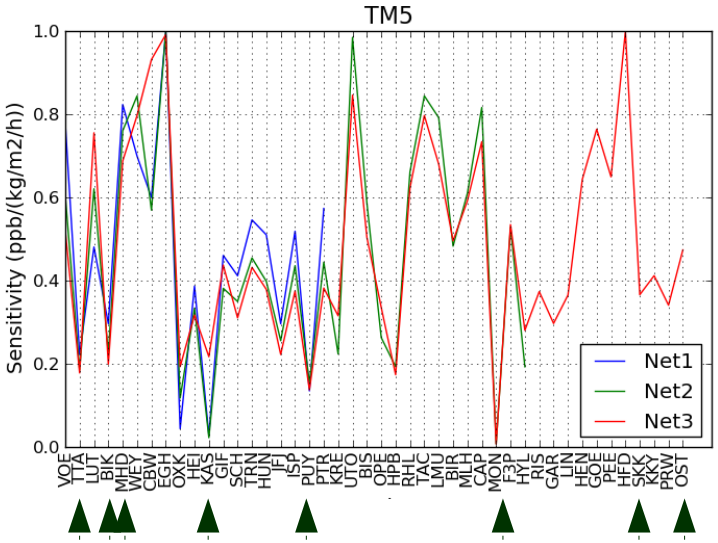
Some preliminary results : models comparison (Jan 1st, mar 15th 2 days sensitivity, NET3)

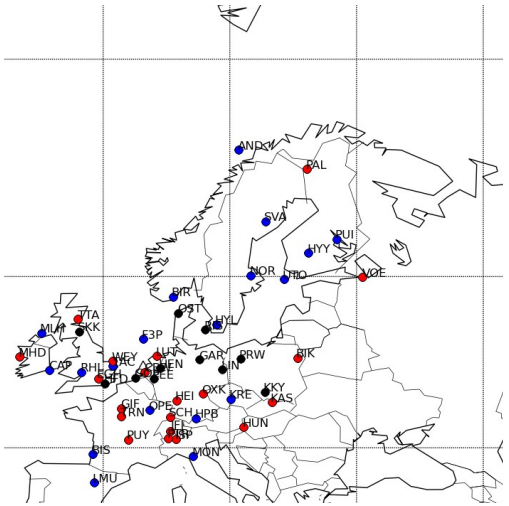


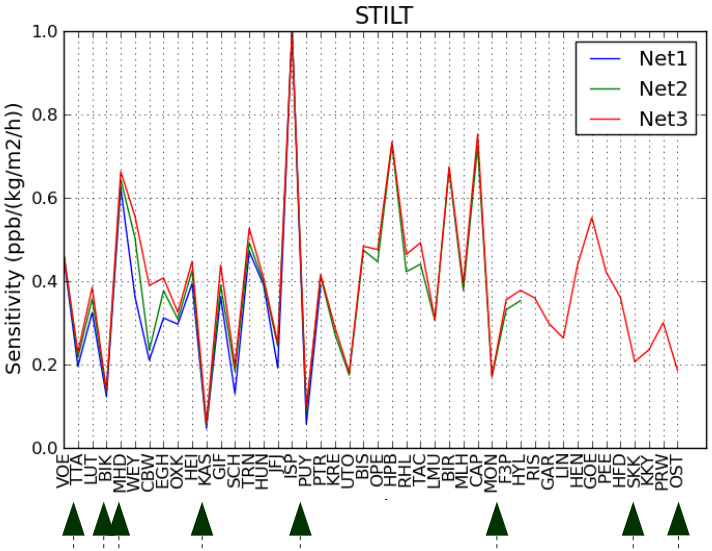
Globally, models seems to be in agreement, the difference of resolution doesn't allow a perfect comparison
STILT and FLEXPART with the same resolution seem more coherents

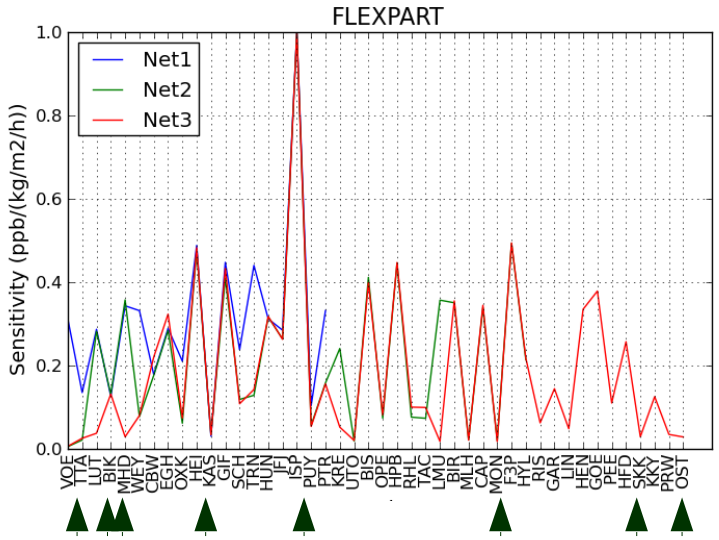
Comparison of global footprint around stations (average of all the 6 days sensitivity)











Globally lower footprint for some stations (OST, MON, SKK, HAS, TTA, MHD, BIK, PUY)

Summary

- Difference of units and scale => need some harmonization
- LMDZEU presents some incoherent values and patterns
- Improvement of the spatial coverage from Net1 to Net3
- Synoptic variability can be distinguished
- Some stations with a « weak » footprint

Perspectives :

- Harmonization of the units and scale
- Overall footprint (seasonally, annually?)
- Part 2 : some contributions received / to be analyzed