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Supercomputing  
Center**

*Centro Nacional de Supercomputación*



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# Progress on the BSC user case study on data assimilation

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with the collaboration of Lieven Clarisse, Sophie Vandebussche,  
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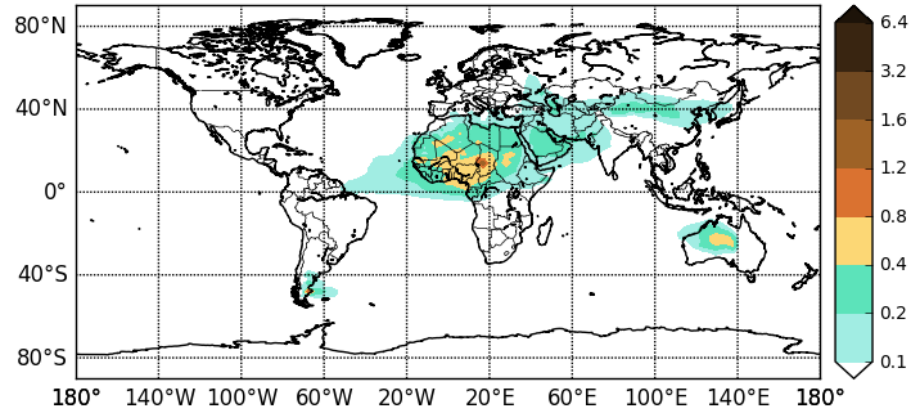


- **ULB v7**, Universite Libre de Bruxelles
- **MAPIR v3.5**, BIRA-IASB
- **LMD v2.1**, Laboratoire de meteorologie dynamique
- **IMARS v5.2**, DLR-DFD  
(re-processed in Feb 2017 and without including quality filtering)

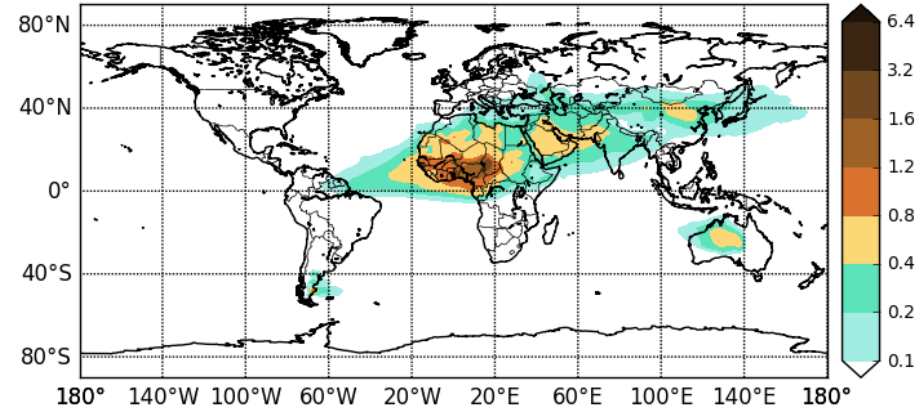
## **Level 3** mineral dust AOD datasets

- retrieved from MetOp-A IASI in the thermal IR
- uncertainty estimation
- converted to 550nm
- sub-daily set mineral dust retrievals (6h)
- spatially aggregated (1x1)
- screened for AOD (>0.15)

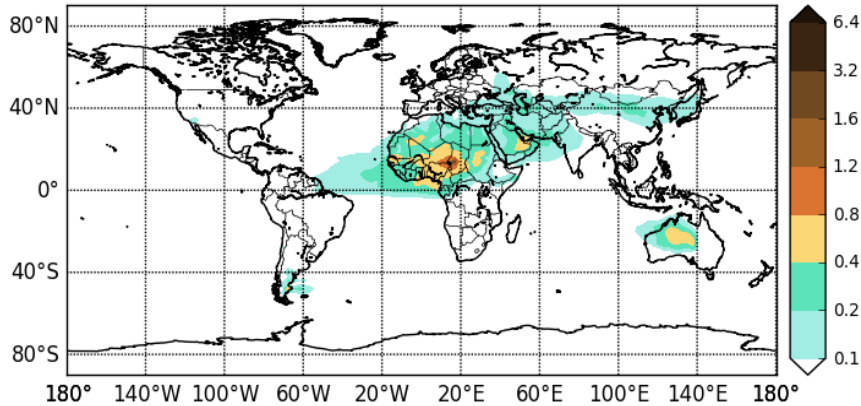
Dust AOD (550nm), DA Simulation (ULB)  
March 2015



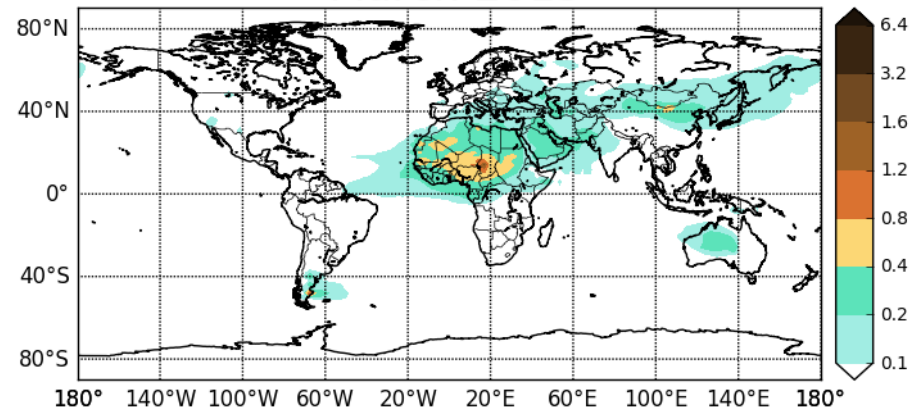
Dust AOD (550nm), DA Simulation (MAPIR)  
March 2015



Dust AOD (550nm), DA Simulation (IMARS)  
March 2015

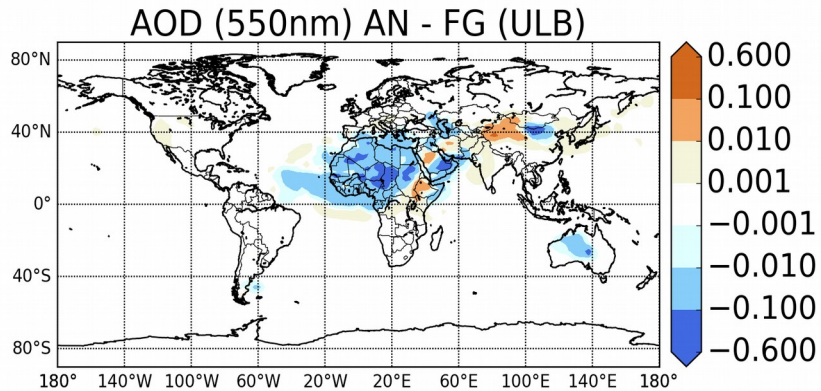


Dust AOD (550nm), DA Simulation (LMD)  
March 2015

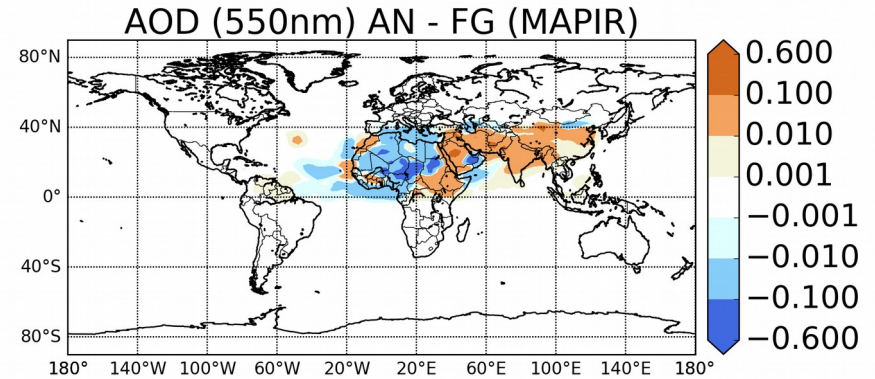


# Mean increments (AN-FG)

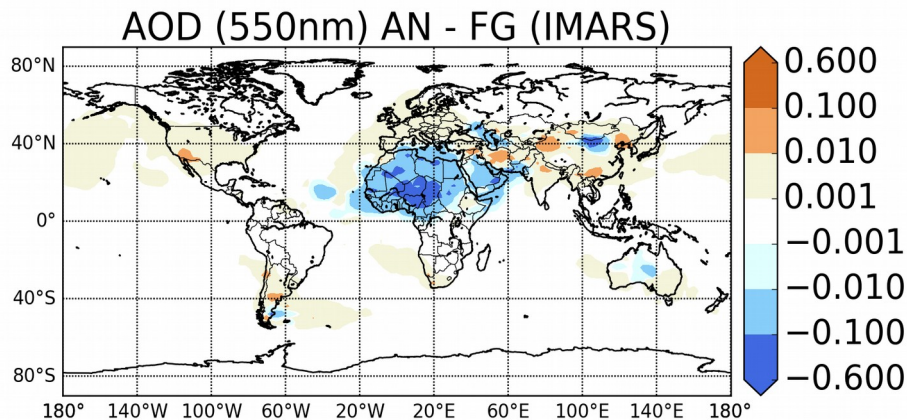
## ULB



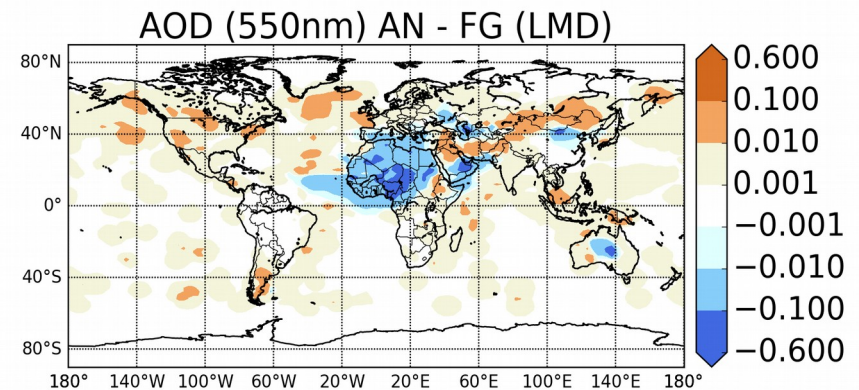
## MAPIR



## IMARS



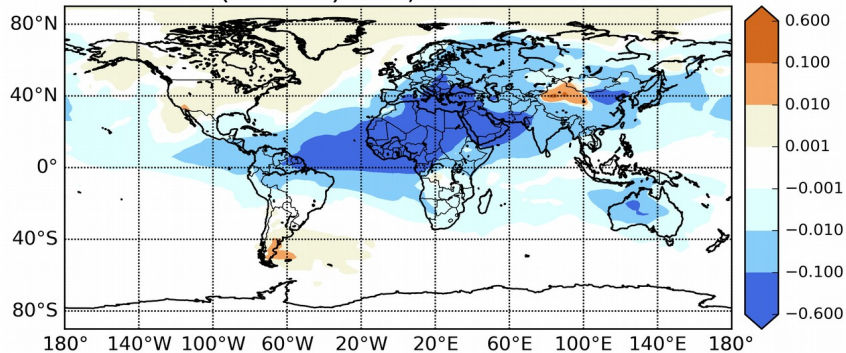
## LMD



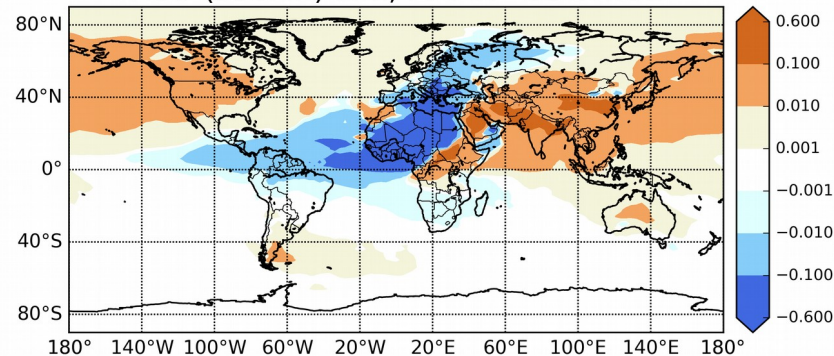
# Mean diff analysis-control



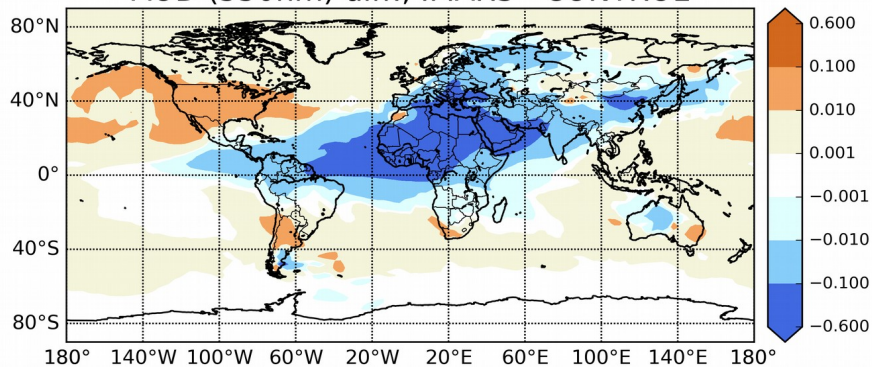
AOD (550nm) diff., ULB - CONTROL



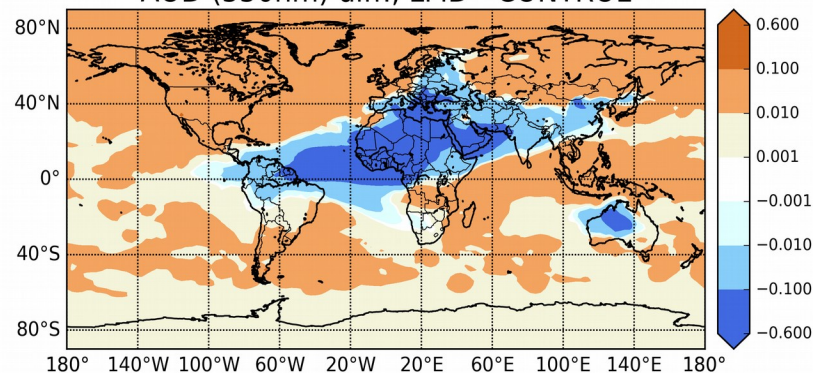
AOD (550nm) diff., MAPIR - CONTROL



AOD (550nm) diff., IMARS - CONTROL



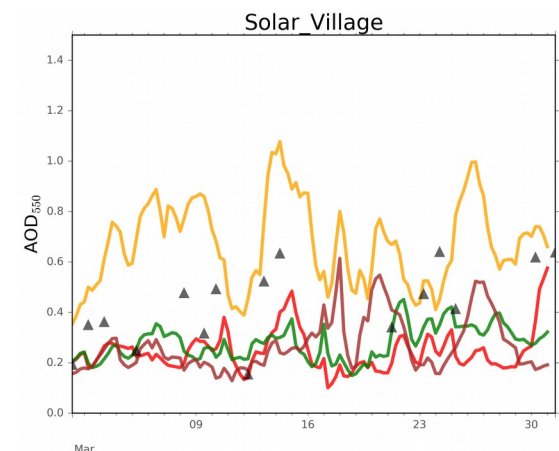
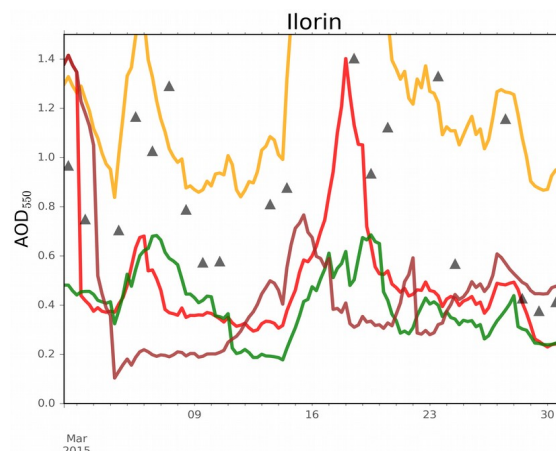
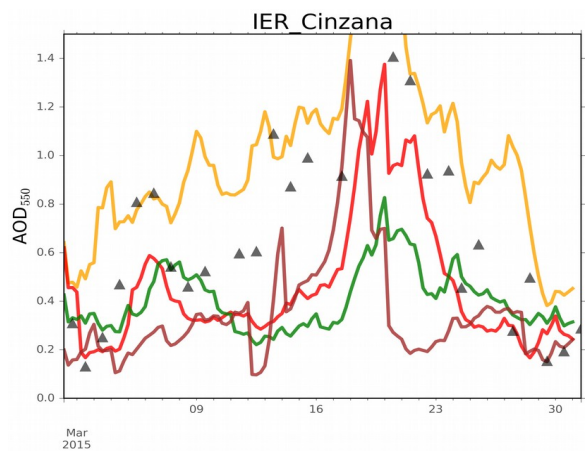
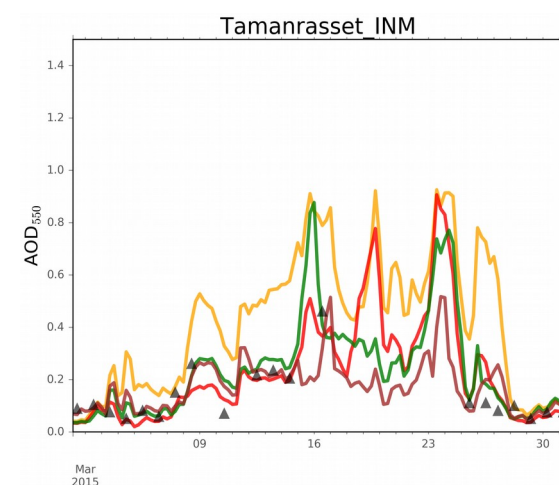
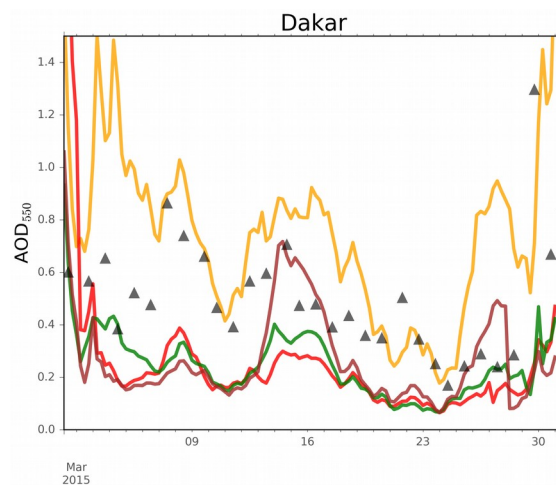
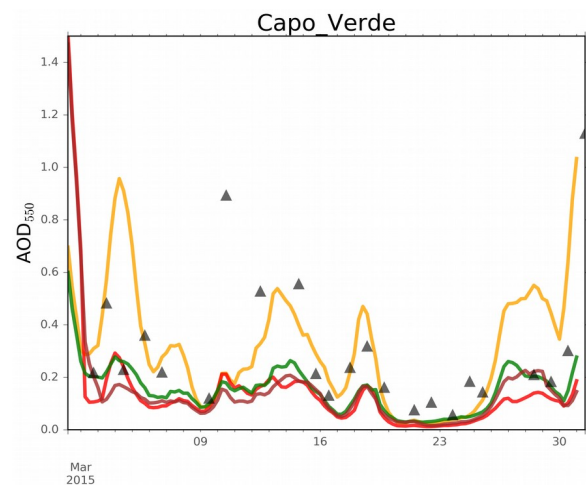
AOD (550nm) diff., LMD - CONTROL



# Sites close to source regions



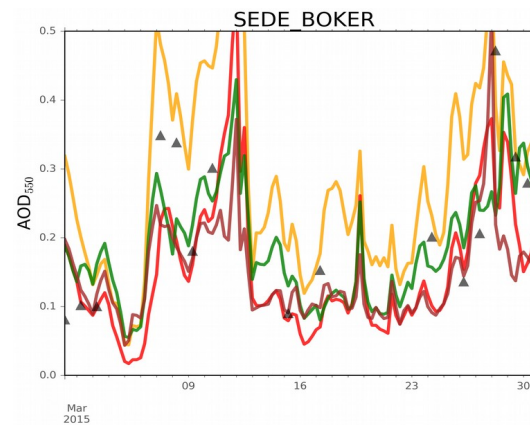
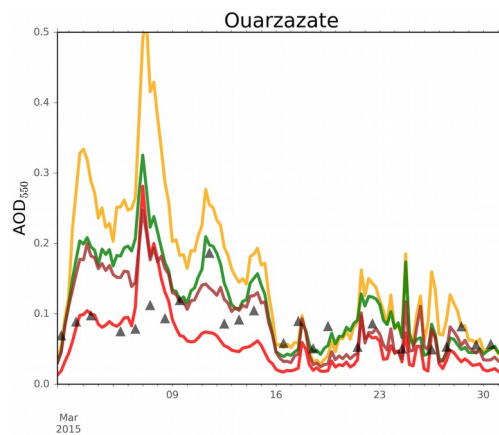
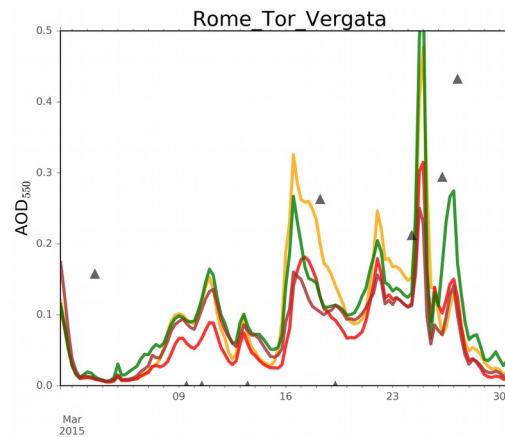
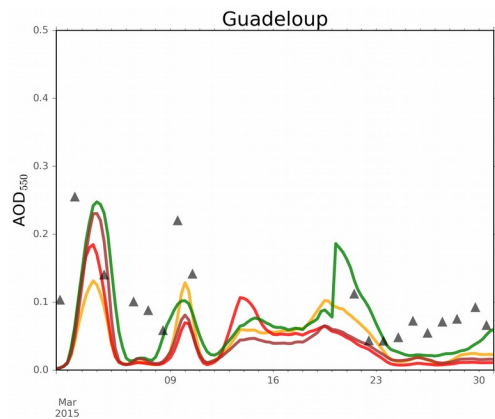
— DA MAPIR    — DA ULB    — DA LMD    — DA IMARS    ▲ AERONET

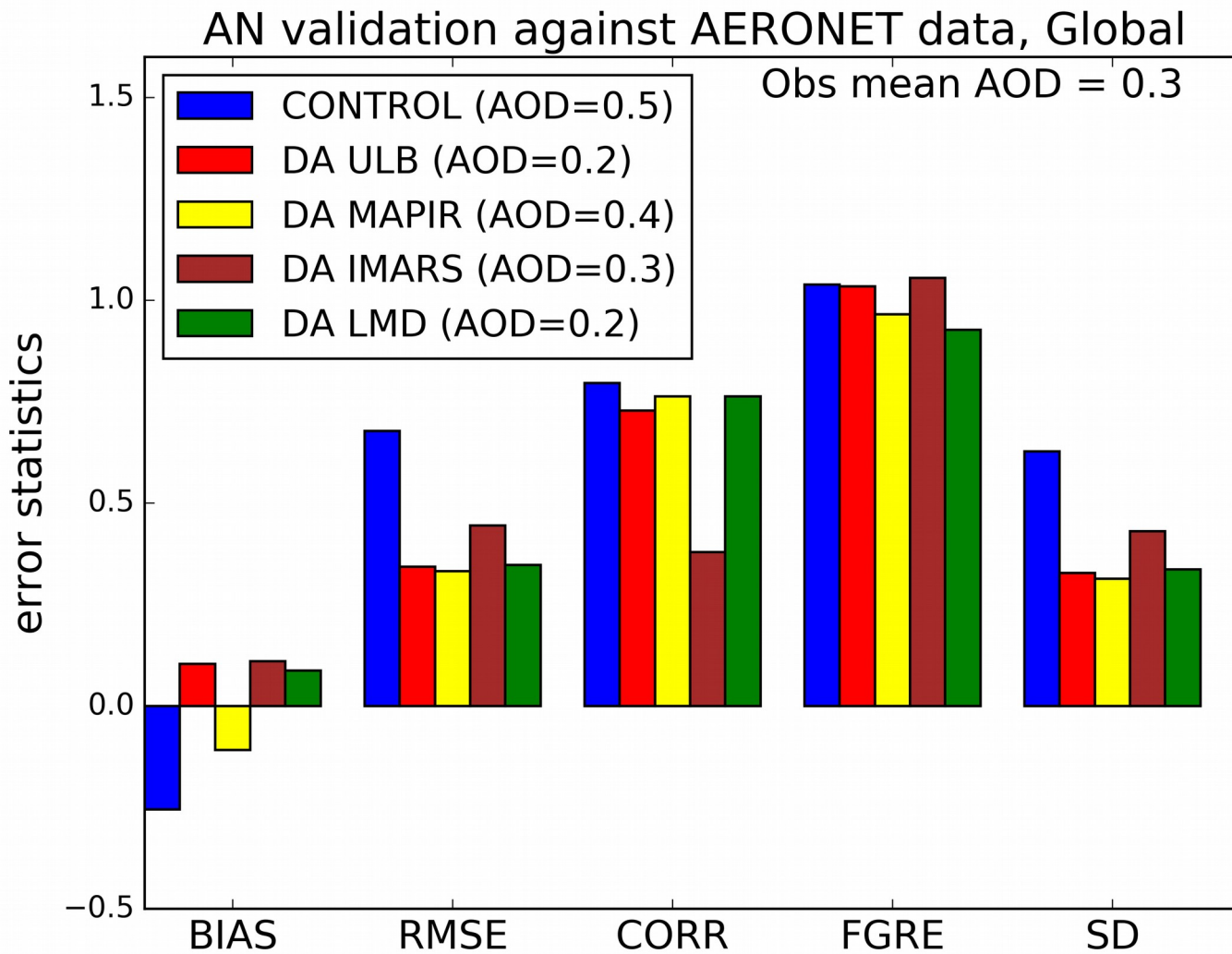


# Sites further away from source regions



— DA MAPIR    — DA ULB    — DA LMD    — DA IMARS    ▲ AERONET





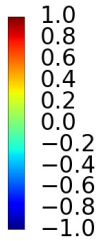
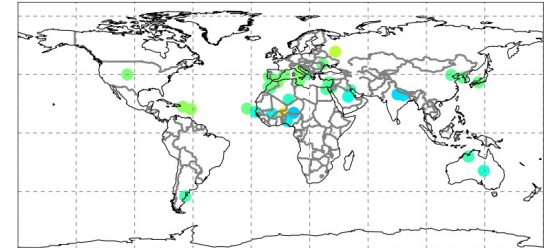
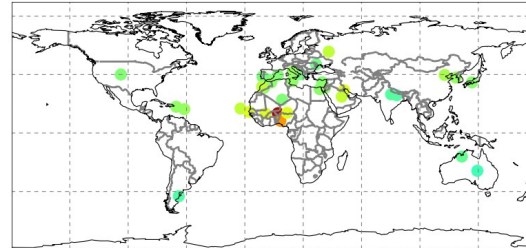
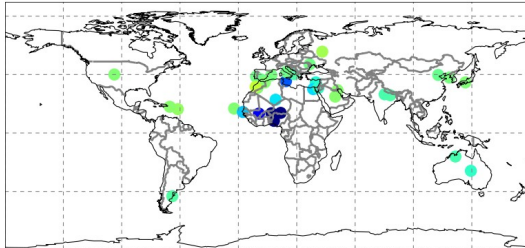


### CONTROL

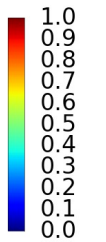
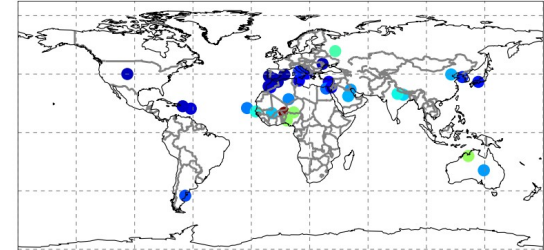
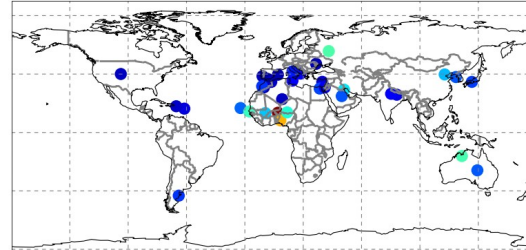
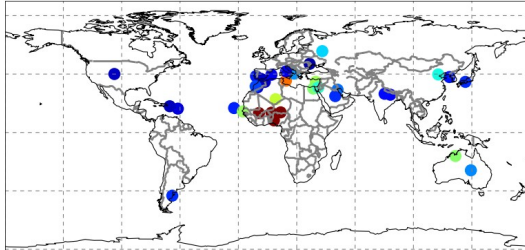
### DA ULB

### DA MAPIR

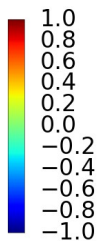
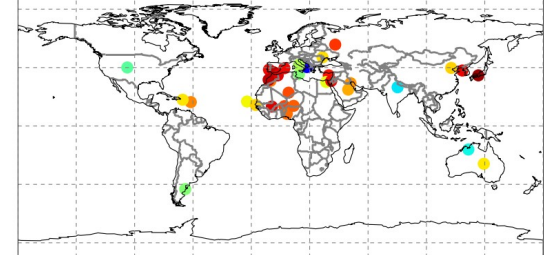
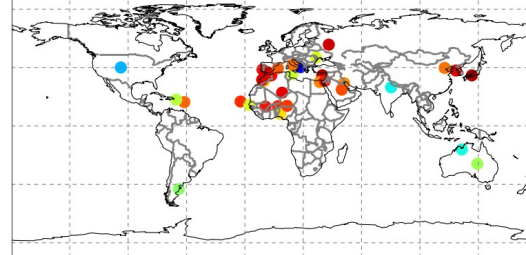
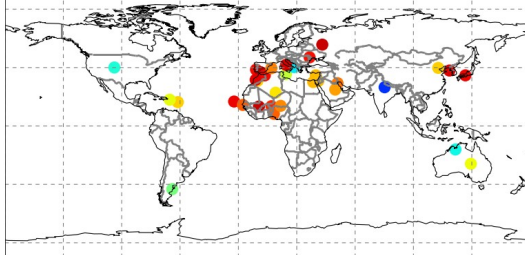
BIAS

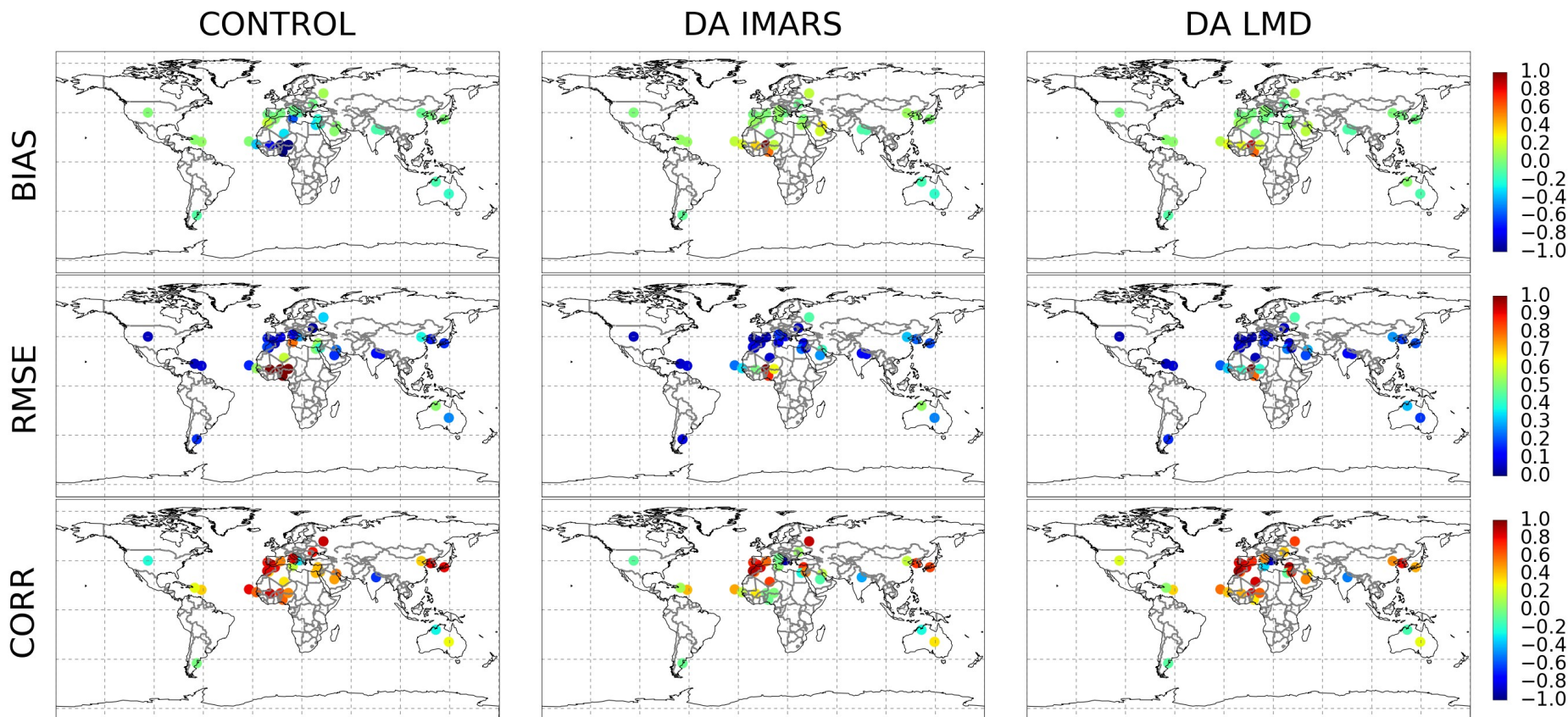


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- **ULB analysis performs best**
- **MLD analysis is comparable, but noisier**
- **MAPIR analysis overestimates**
- **IMARS analysis from 2007 performed much better**

## Outlook

- Observation treatment (uncertainty, density, QC...)
- Impact on the short-term forecast



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Thank you!