

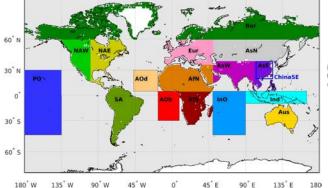
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## Can merged AOD L3 monthly product (1996-2017) be extended back to 1979 with TOMS AOD?

Larisa Sogacheva & AEROSAT team, Pekka Kolmonen, Antti Arola FMI

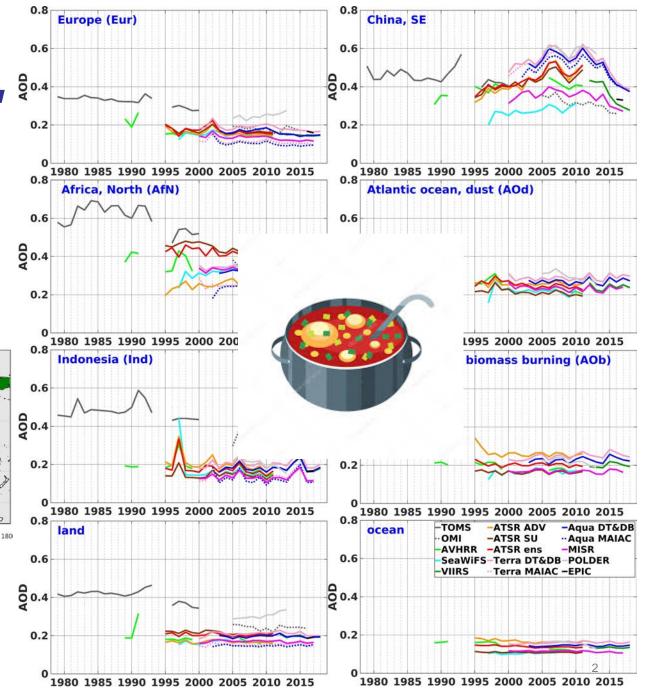


# Annual AOD, and all products •••



Sogacheva et al., 2019, ACPD



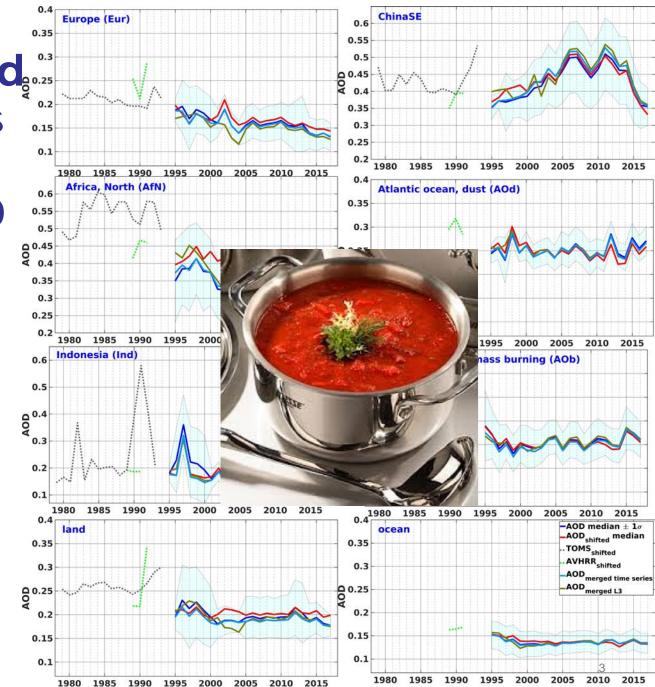


## TOMS shifted to ATSR\_ens (1979-1993), merged AOD (1995-2017)

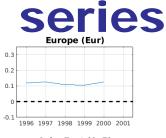


Sogacheva et al., 2019, ACPD





## **TOMS-merged AOD**, annual time

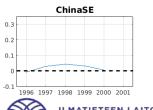




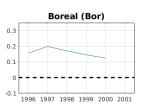


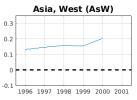


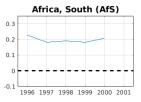




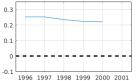
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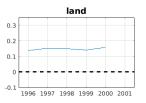






North America, West (NAW)









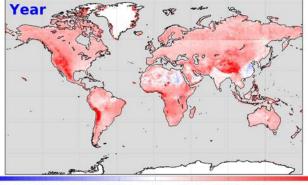




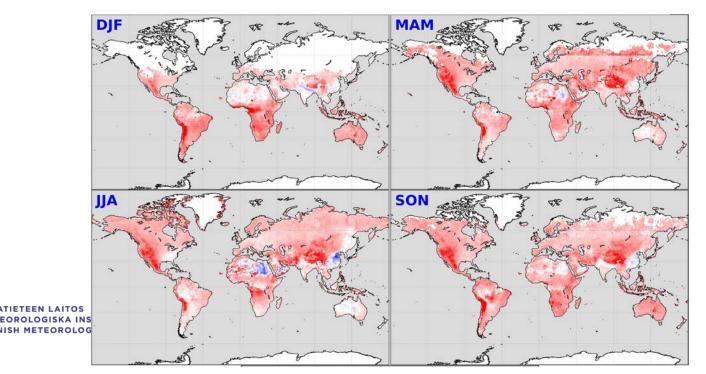


### **TOMS - L3 annual merged AOD**

## **TOMS-merged seasonal/annual AOD**



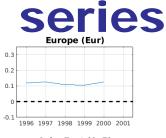
-0.5 -0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4 0.5





5

## **TOMS-merged AOD**, annual time

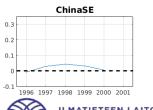




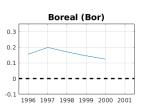


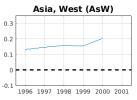


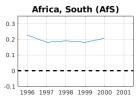




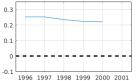
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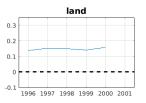






North America, West (NAW)



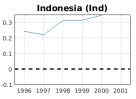












### **TOMS - L3 annual merged AOD**

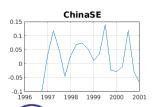
## **TOMS-merged AOD**, seasonal time







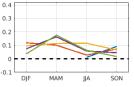


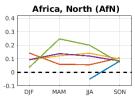


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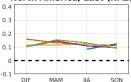


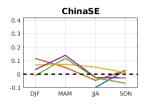


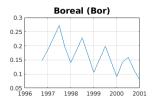




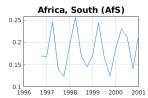
#### North America, East (NAE)





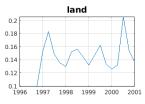


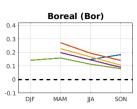




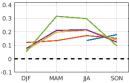
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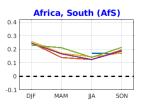




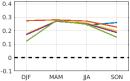


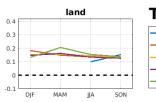
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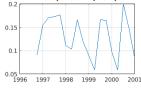


#### North America, West (NAW)

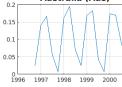












#### South America (SA) 0.2 0.15 0.1 0.05 1997 1998 1999 2000

0.4

0.3

0.2

0.1

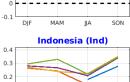
1996 1997 1998 1999

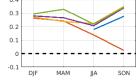
1997



2000 2001

2001



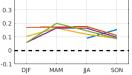


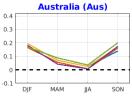
#### TOMS-L3 seasonaly merged AOD time series and annual cycles 1996

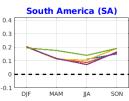


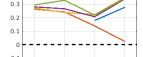
Asia, North (AsN)

0.4



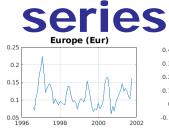


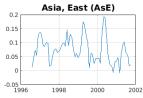




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## **TOMS-merged AOD**, monthly time

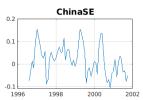




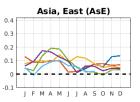


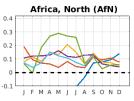




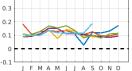


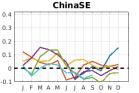


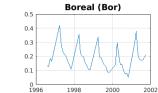


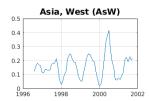










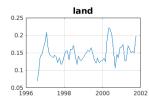


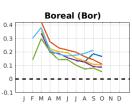




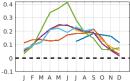


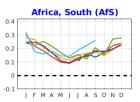


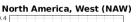


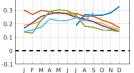




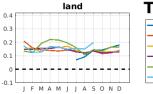




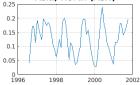




0.4







Australia (Aus)

South America (SA)

Indonesia (Ind)

2000

2000

2000

1998

1998

1998

0.2

0.15

0.1

0.05

0 3

0.2

0.

0.4

0.3

0.

0.1

1996

1997

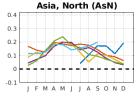
1998

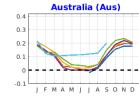
1999 2000 SH

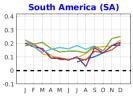
2001

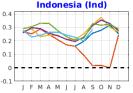
1996

1996









2002 TOMS-L3 monthly merged AOD time series and annual cycles 1996

2002

2002





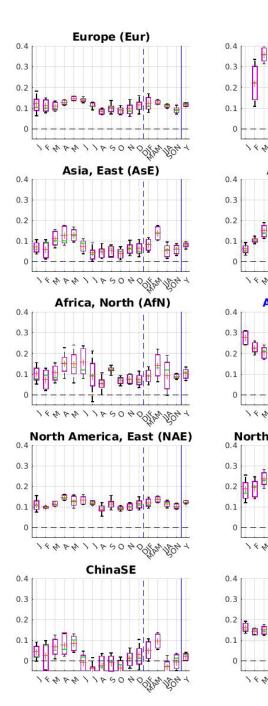


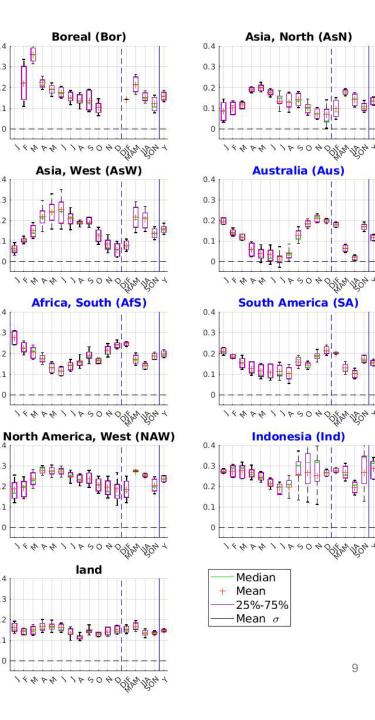
0.4

8

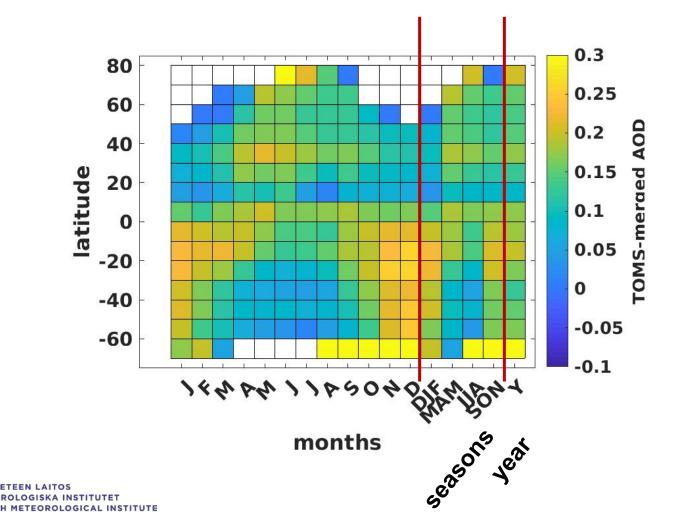
## Monthly/ Seasonal/ Annual variation of the offset

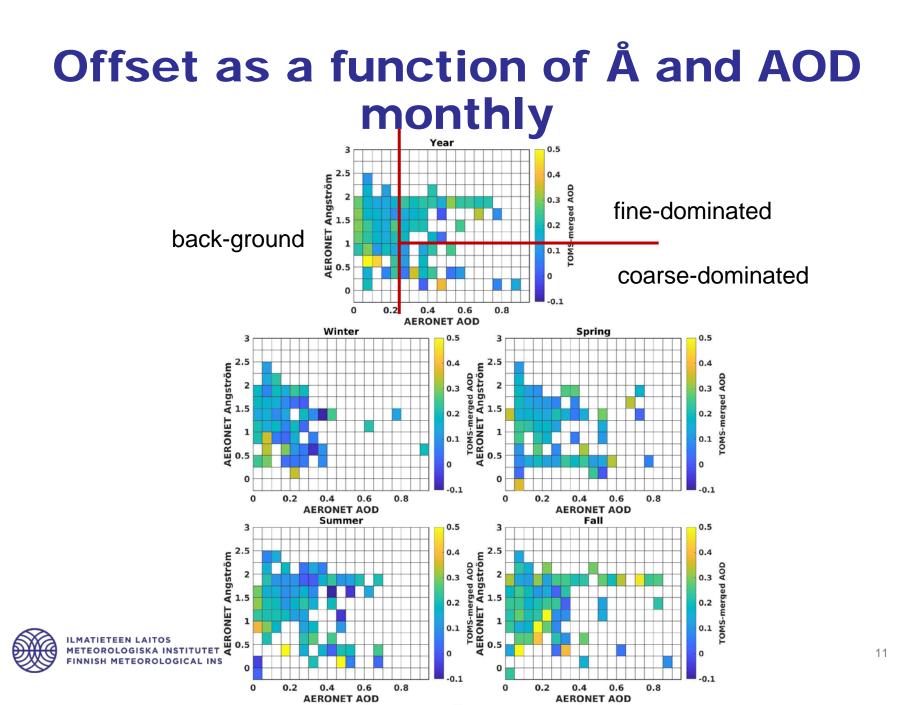




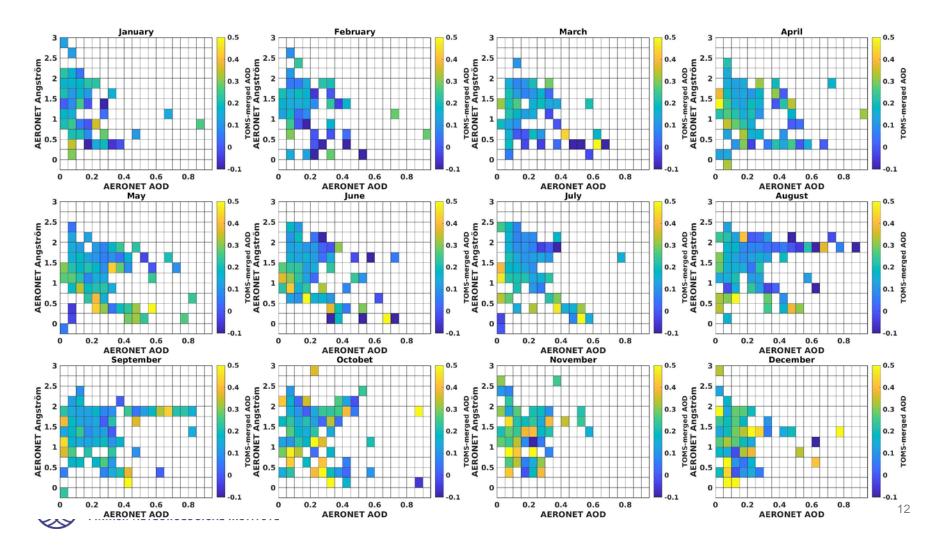


# Monthly/seasonal/annual offset as a function of Å and AOD





# Offset as a function of Å and AOD monthly



## Conclusions

- Seasonal/monthly regional (incl. NH vs SH) offsets exist between TOMS and merged AOD product
- First reason seasonality in cloudiness
- OMAR : seasonality in the offset might be explained by the fact that the retrieved SSA is used in the TOMS retrieval but not the climatology
- TOMS should not be used for merging
- Keep TOMS and merged products separately for AOD trends estimation
- Offset correction for annual AOD ?,
- For all: please, keep clear flag in the product for the data of lower quality









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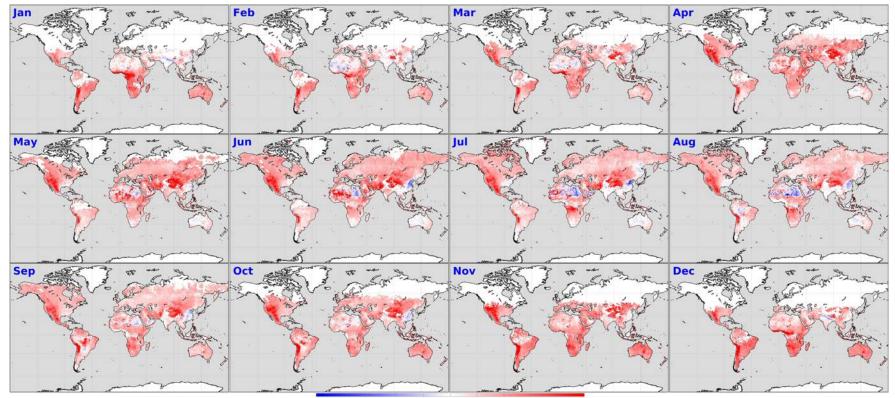
## Thank you for your attention!

## ??? Questions ??? Discussion



30.9.2019

## **TOMS-merged monthly AOD, monthly AOD**



-0.5 -0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4 0.5

