

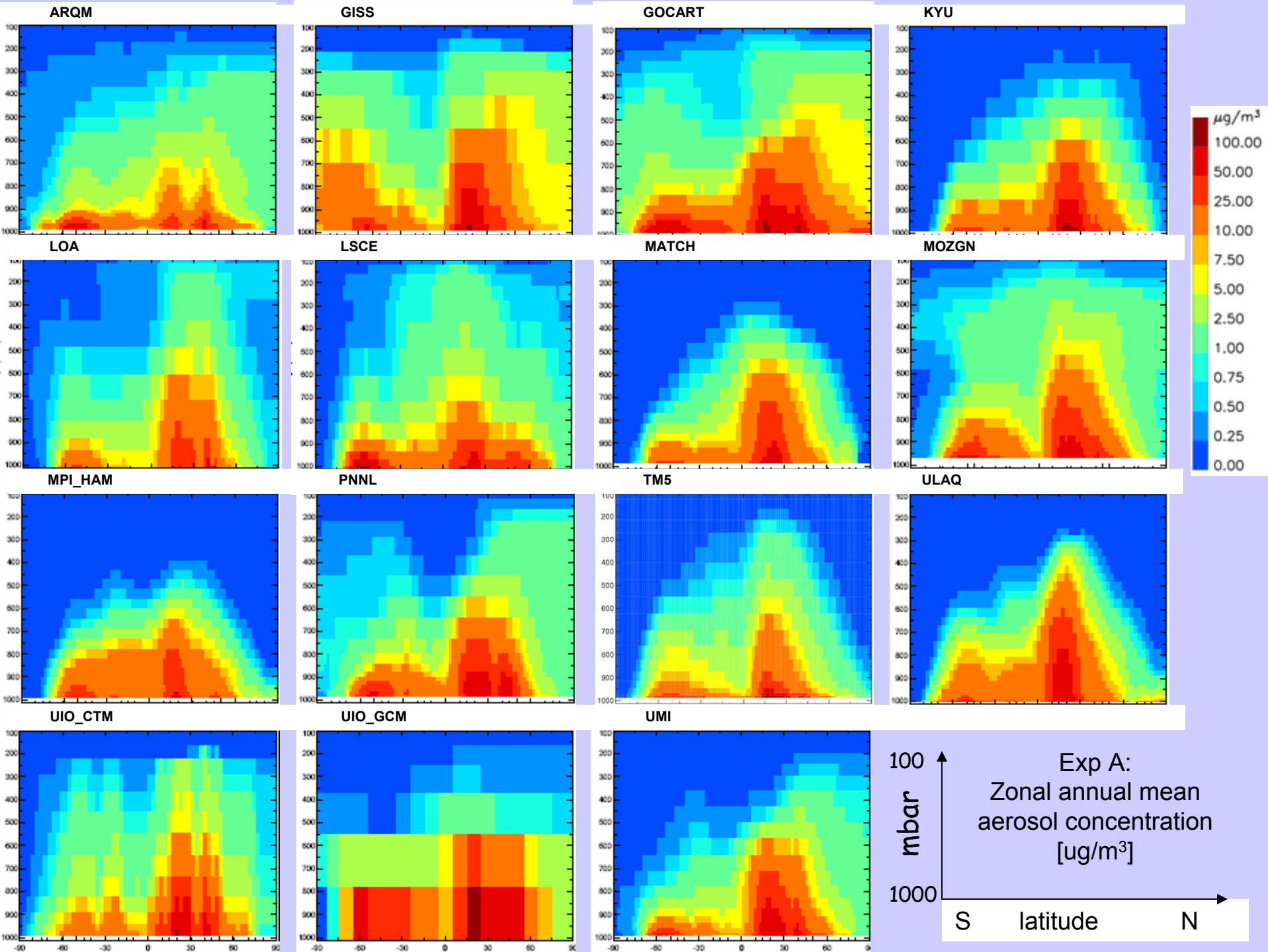
Vertical distribution differences in the AeroCom simulations

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&

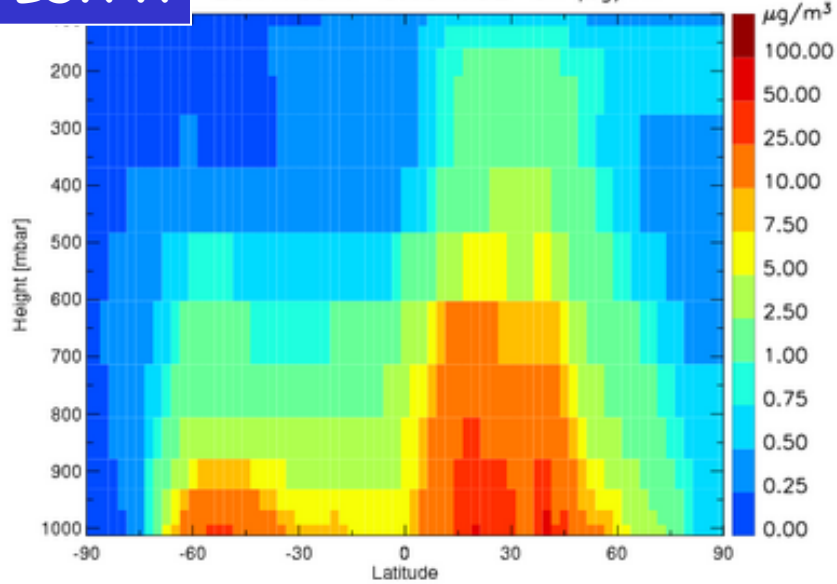
AeroCom participants



Spatial distributions of AER in Exp A and B

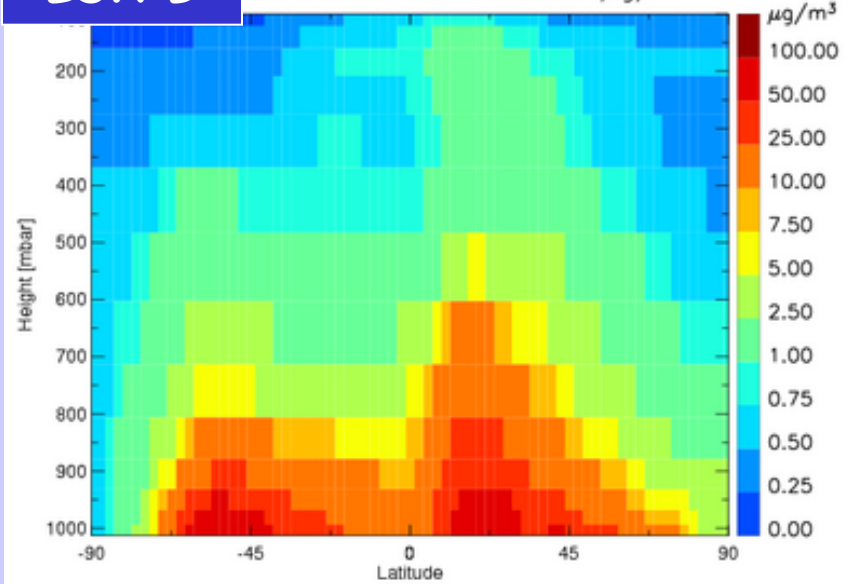
LOA A

LOA Mean: $8.63179\text{E}-01 \mu\text{g}/\text{m}^3$



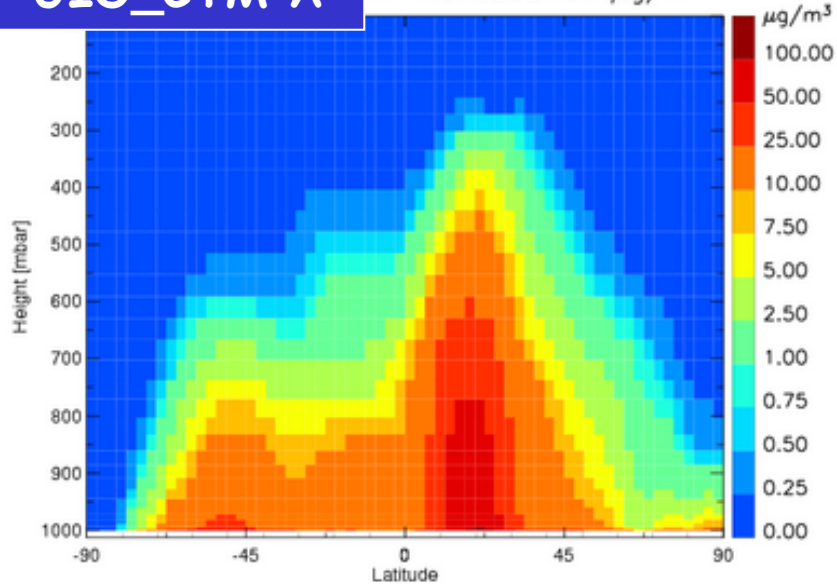
LOA B

LOA B Mean: $1.29712\text{E}+00 \mu\text{g}/\text{m}^3$



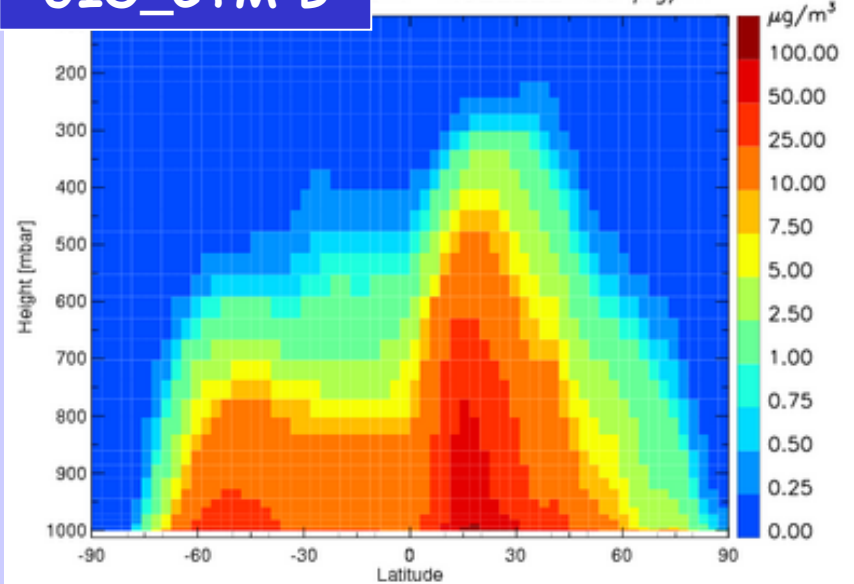
UIO_CTM A

UIO_CTM A Mean: $1.87828\text{E}+00 \mu\text{g}/\text{m}^3$



UIO_CTM B

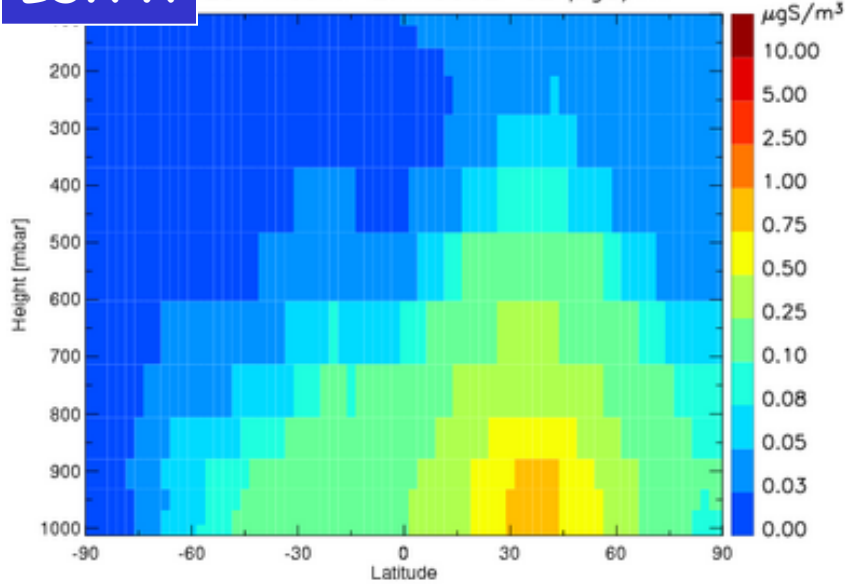
UIO_CTM B Mean: $1.92222\text{E}+00 \mu\text{g}/\text{m}^3$



Spatial distribution **SO4** in Exp A and B

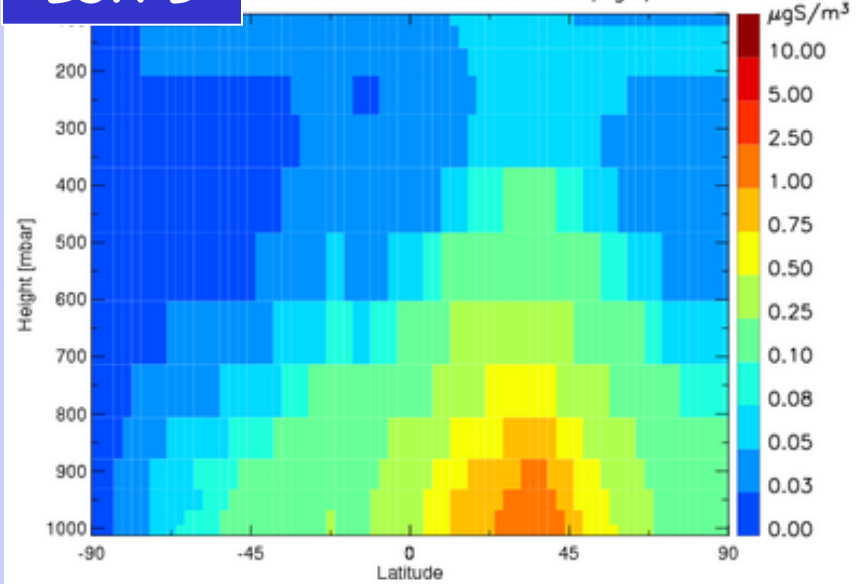
LOA A

LOA Mean: $2.77300E-02 \mu\text{gS}/\text{m}^3$



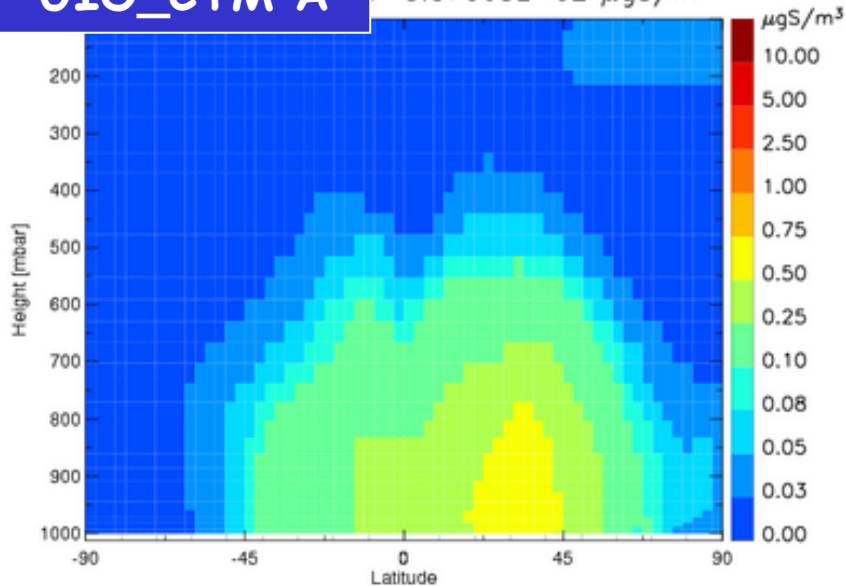
LOA B

LOA B Mean: $3.74225E-02 \mu\text{gS}/\text{m}^3$



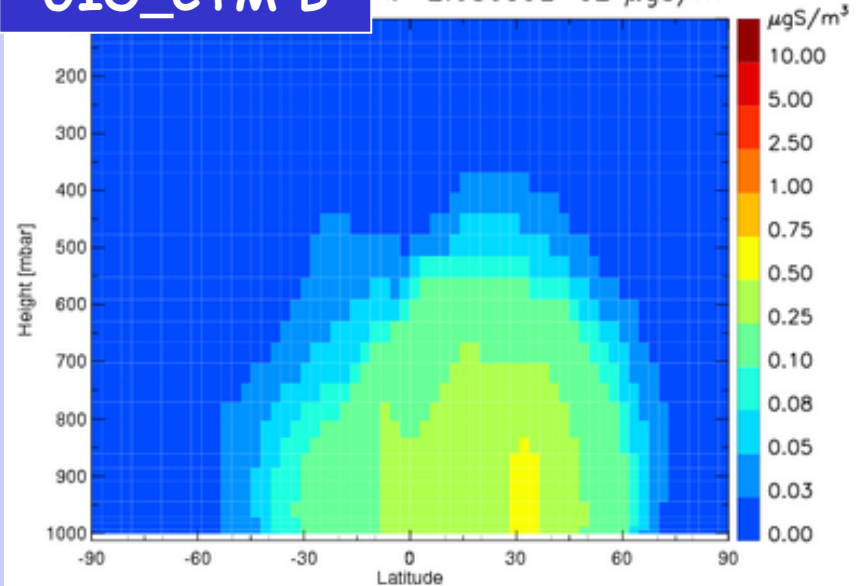
UIO_CTM A

UIO_CTM A Mean: $3.37068E-02 \mu\text{gS}/\text{m}^3$



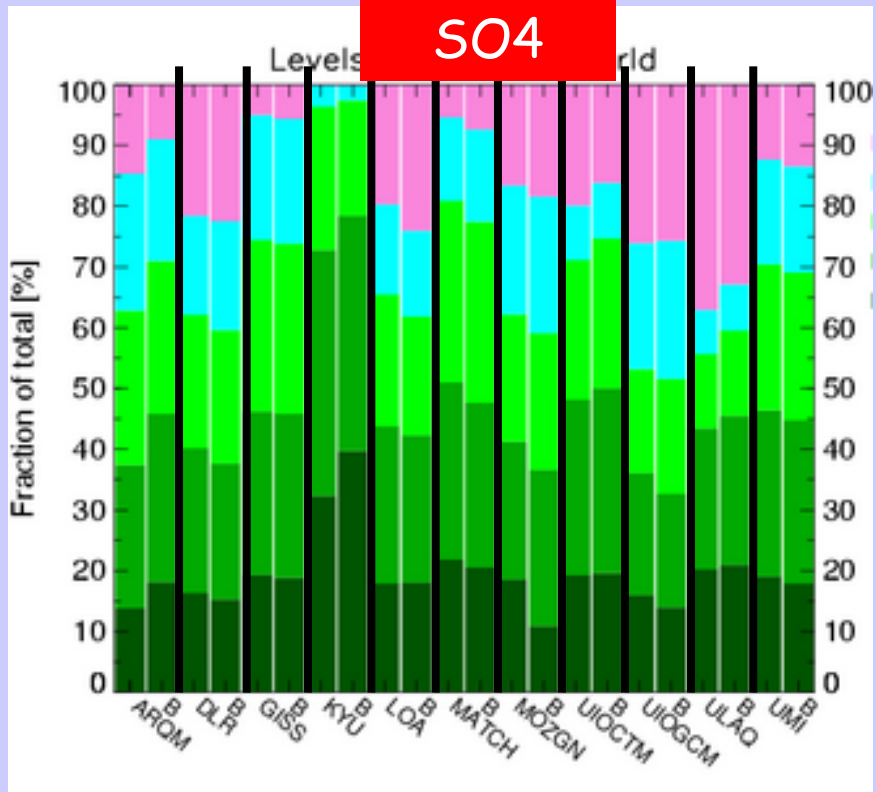
UIO_CTM B

UIO_CTM B Mean: $2.68639E-02 \mu\text{gS}/\text{m}^3$

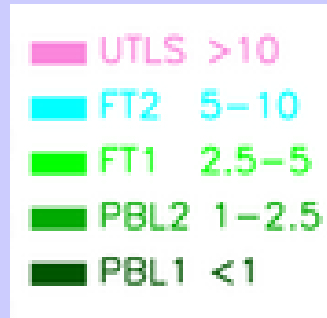


Vertical dispersal of aerosol components in Exp A and B

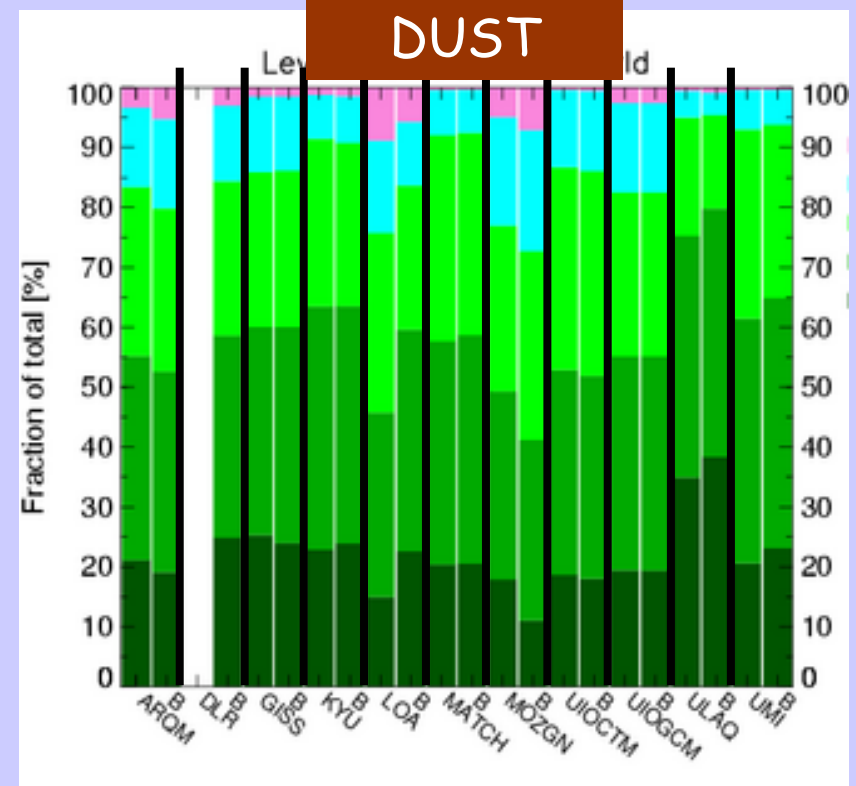
SO4



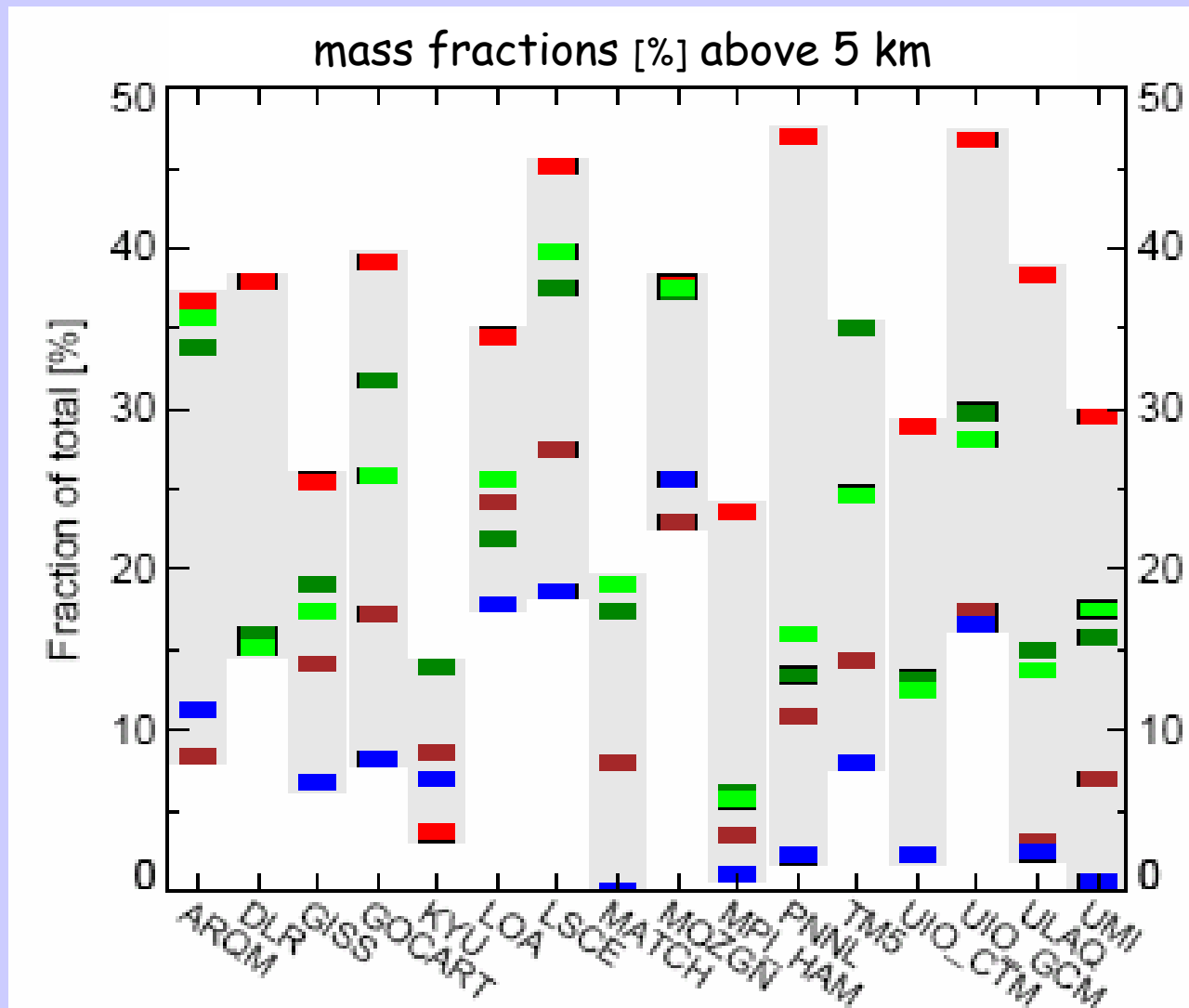
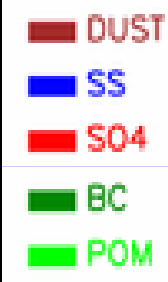
mass fraction
per height
level [%]



DUST



Vertical dispersal of aerosol components in Exp A

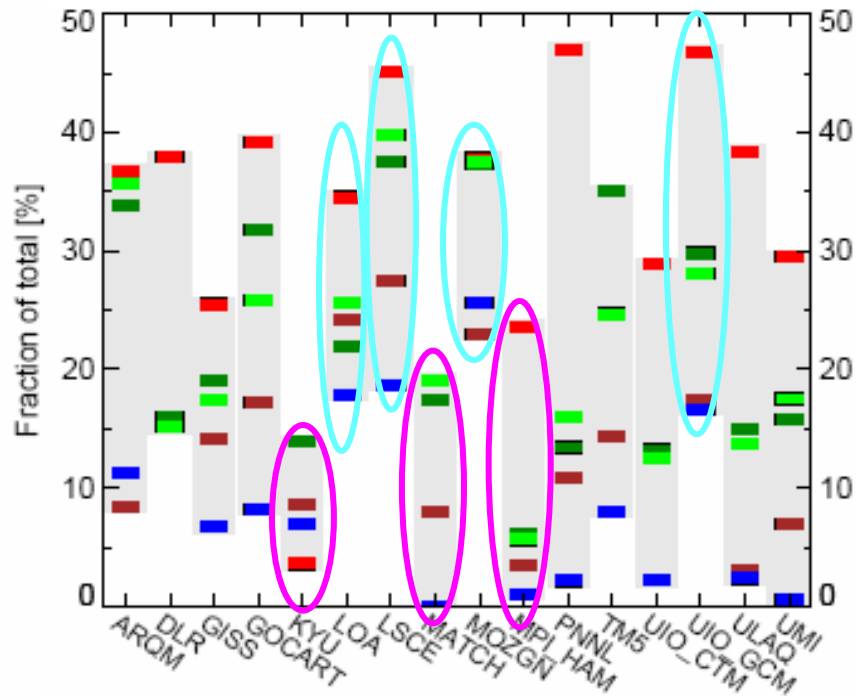


➤ Dispersal most effective for SO4 and BC and least for SS.

Dispersal of aerosol components in Exp A

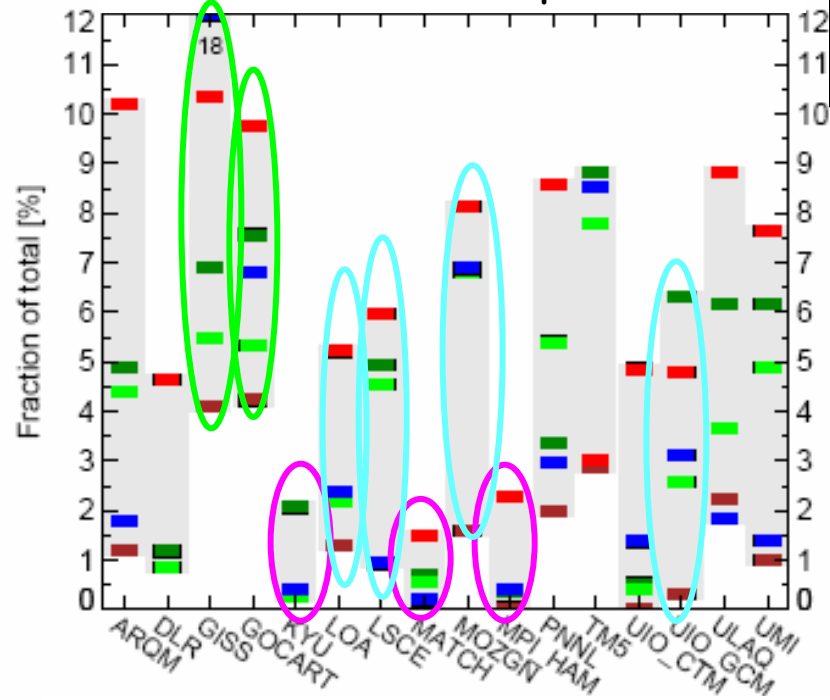


vertical dispersal



Mass fractions [%] above 5 km

meridional dispersal

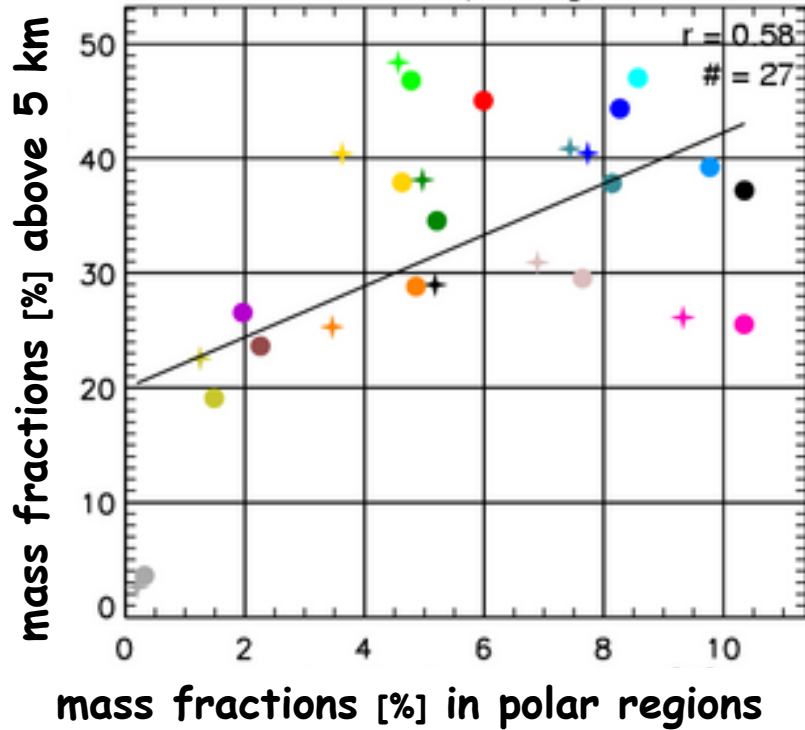


Mass fractions [%] in polar regions

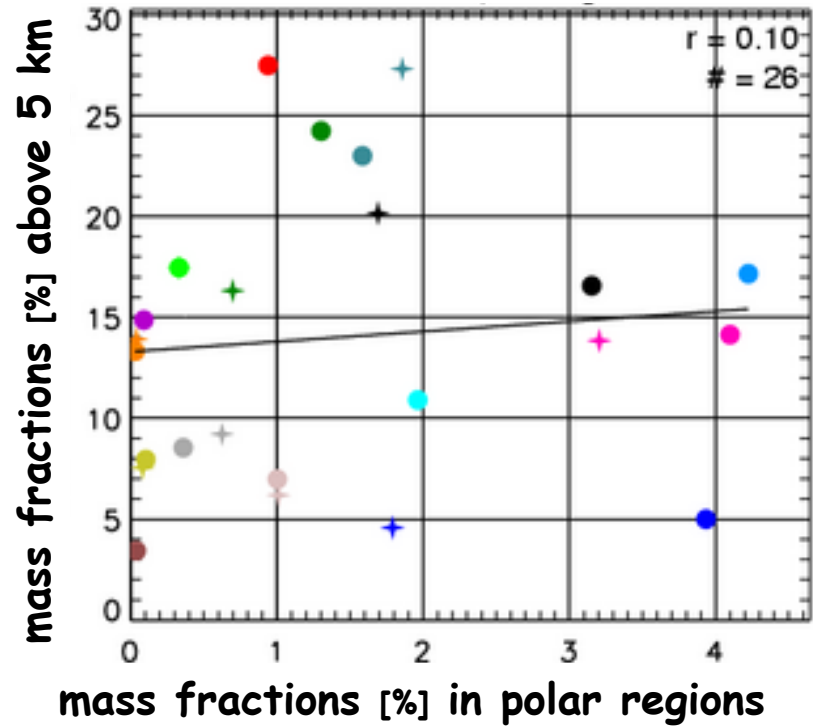
- Dispersal is species-dependent.
- Some models are less dispersive than others (KYU, MATCH, MPI).
- Passive tracer needed to distinguish aerosol from transport processes.

Vertical vs. meridional aerosol dispersal

SO₄



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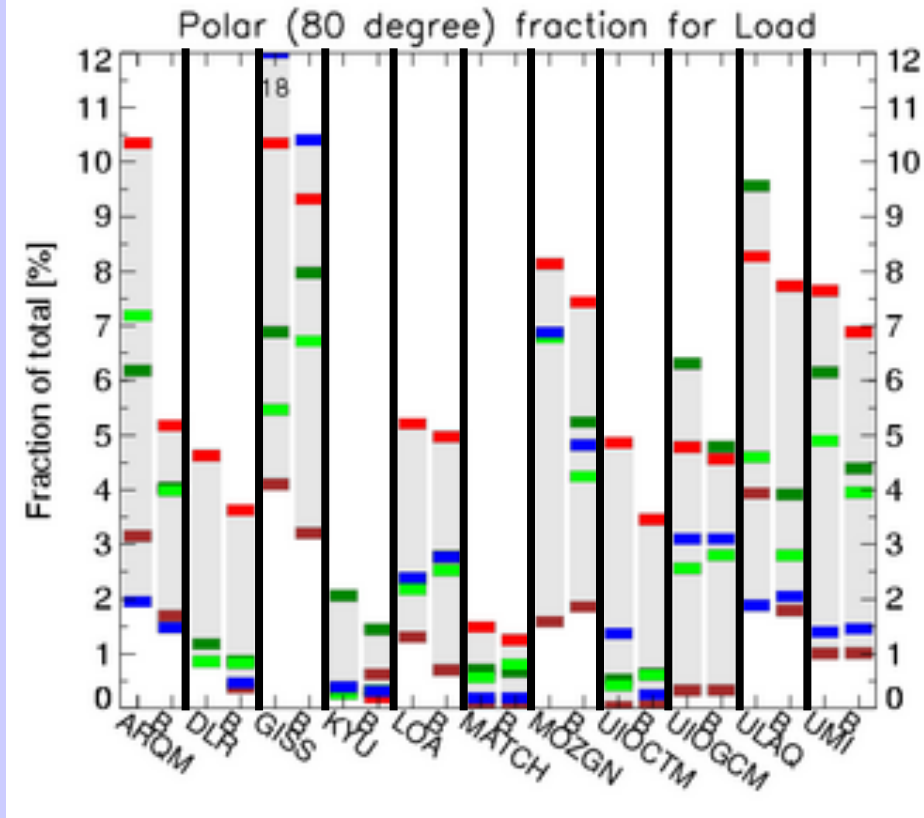
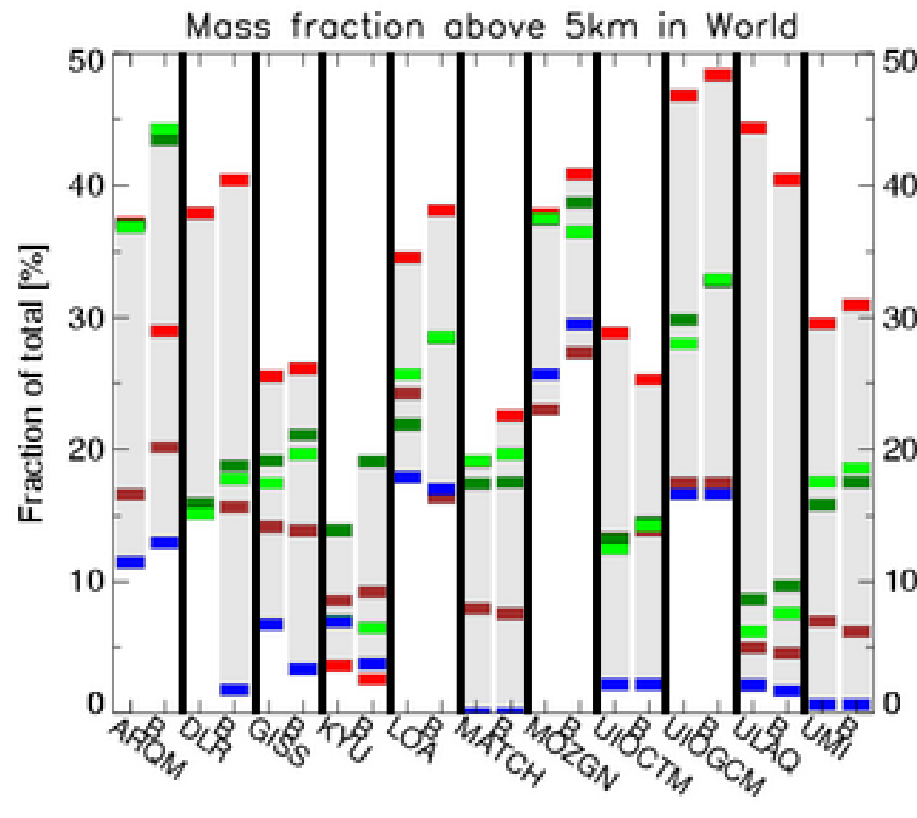


● ARQM
● DLR
● GISS
● GOCART
● KYU
● LOA
● LSCE
● MATCH
● MOZGN
● MPIHAM
● PNNL
● TM5B2
● UIOCTM
● UIOGCM
● ULAQ
● UMI

● EXP A
+ EXP B

- fine fraction: meridional dispersal ~ vertical dispersal
- coarse fraction: no such relationship

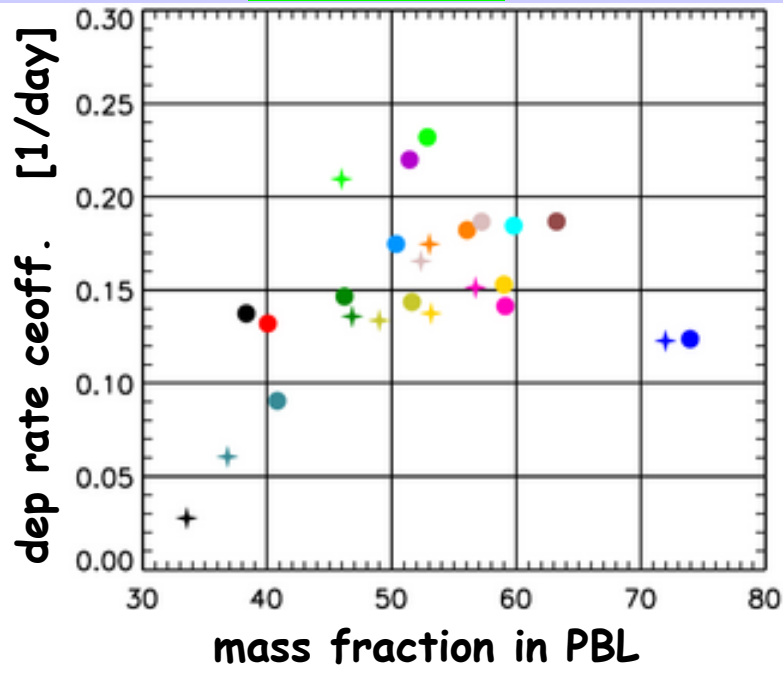
Dispersal of aerosol components in Exp A and B



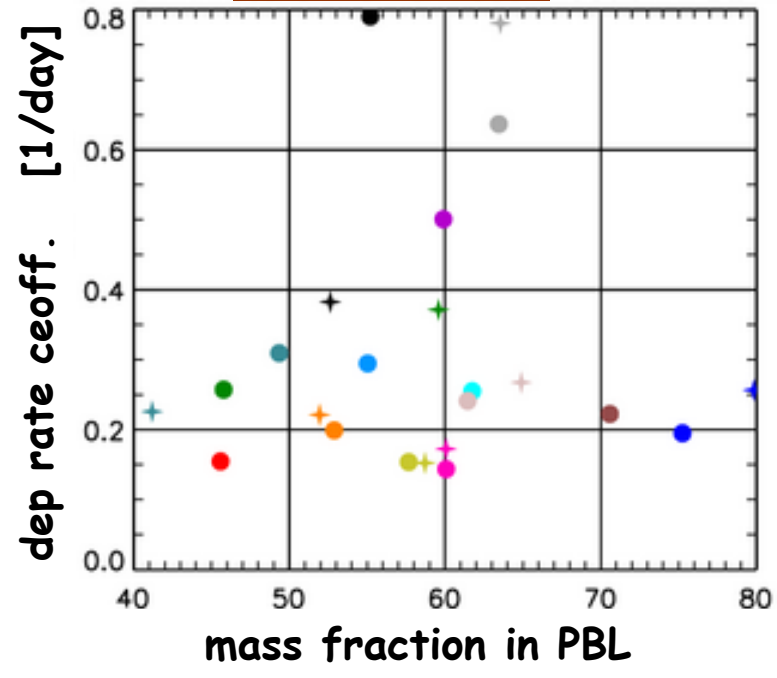
Dispersivity does not significantly change between Exp A and B!

Removal rate vs vertical dispersal

POM



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- Fine fraction: sink rate larger the higher the mass fraction in the PBL (below 2.5 km).
- Coarse fraction: sink rate independent of vert. dispersal.



Conclusions

- Vertical distributions are highly different among models.
- Minor effects of harmonized emissions and particle sizes.
- Aerosol dispersal is model- specific.
- The degree of aerosol dispersal is species-dependent.
- Fine fraction: Meridional \sim vertical dispersal
wet dep rate \sim vertical dispersal