

Aerosol species

and their effect on climate model AOD bias

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Group 2

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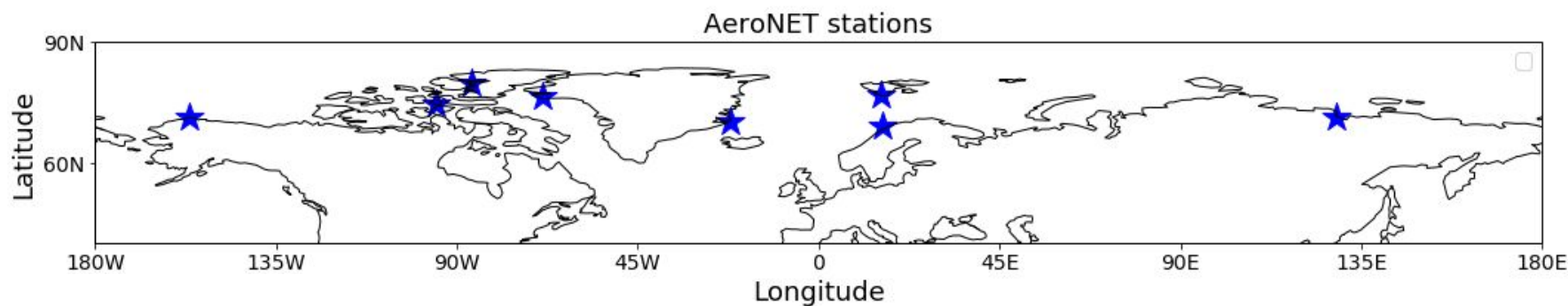
In collaboration with Marek Ratajczak.

Introduction

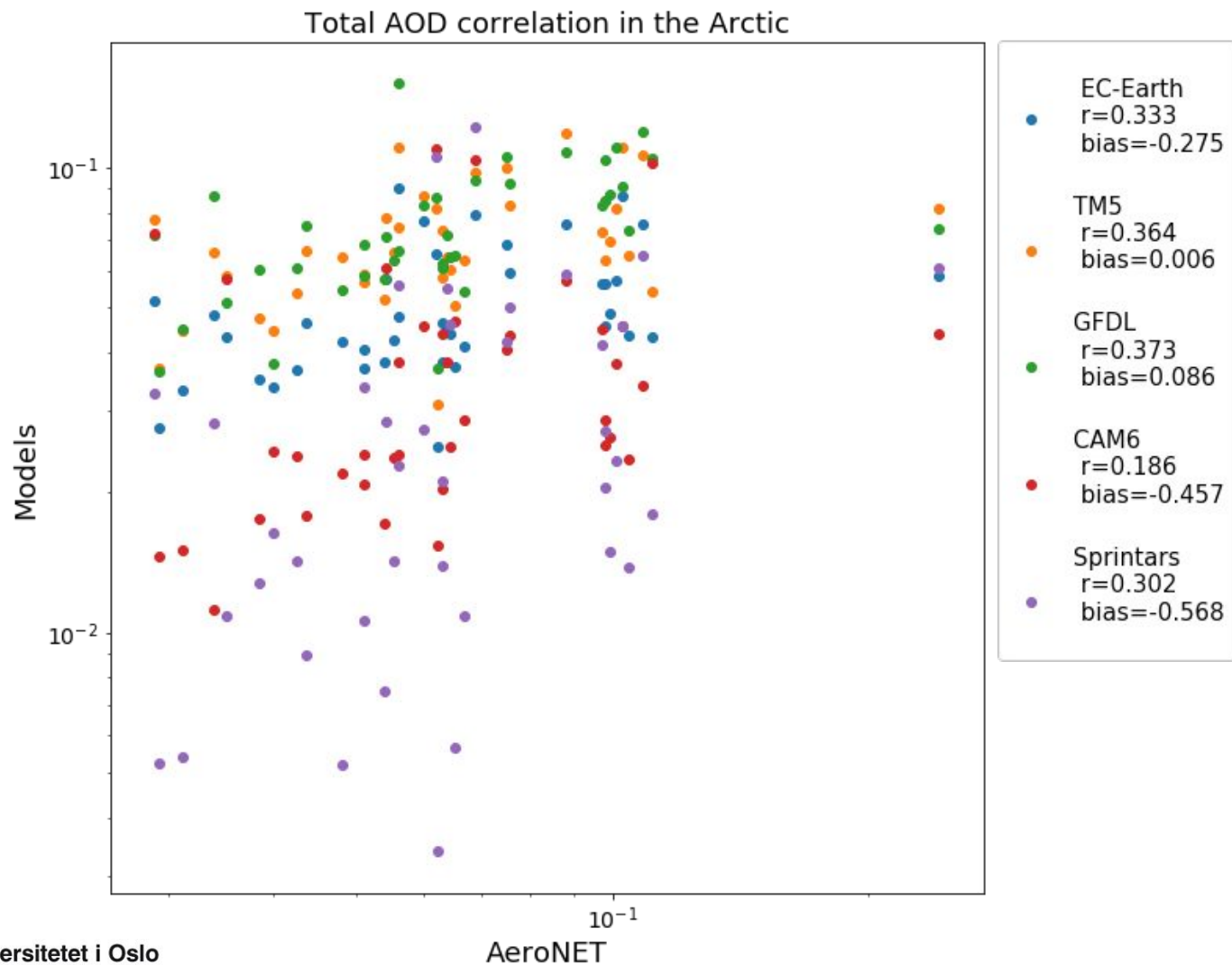
- Many models **underestimate** aerosol optical depth (AOD) in the Arctic.
- AOD depends on aerosol concentration and **aerosol optical properties**.
- Different species have **different** optical properties.
- Have investigated differences in aerosol species between models and compared to observations.

Methods

- Models: EC-Earth, TM5, CAM6-Oslo (NorESM), GFDL-AM4 and SPRINTARS
 - AOD variables: Total, coarse mode, fine mode, SO_4 , sea salt, organic aerosol, black carbon, dust AOD
- Year: 2010
- Observations: AeroNET
 - AOD variables: Total, coarse mode, fine mode

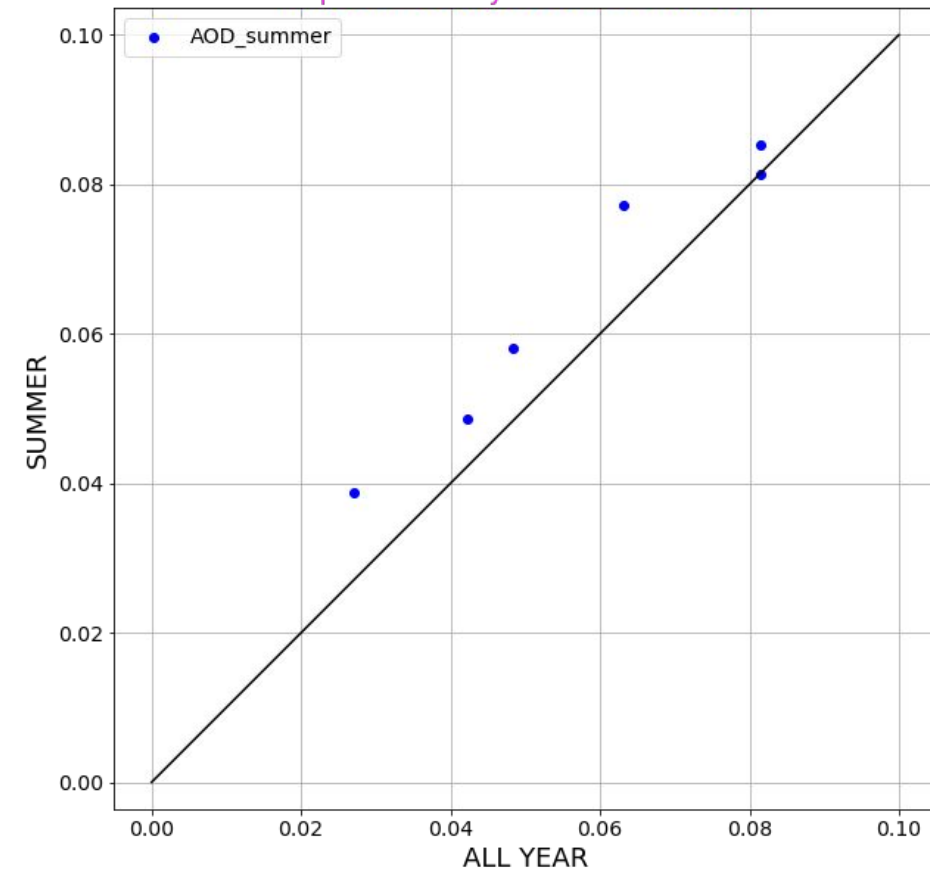


Results

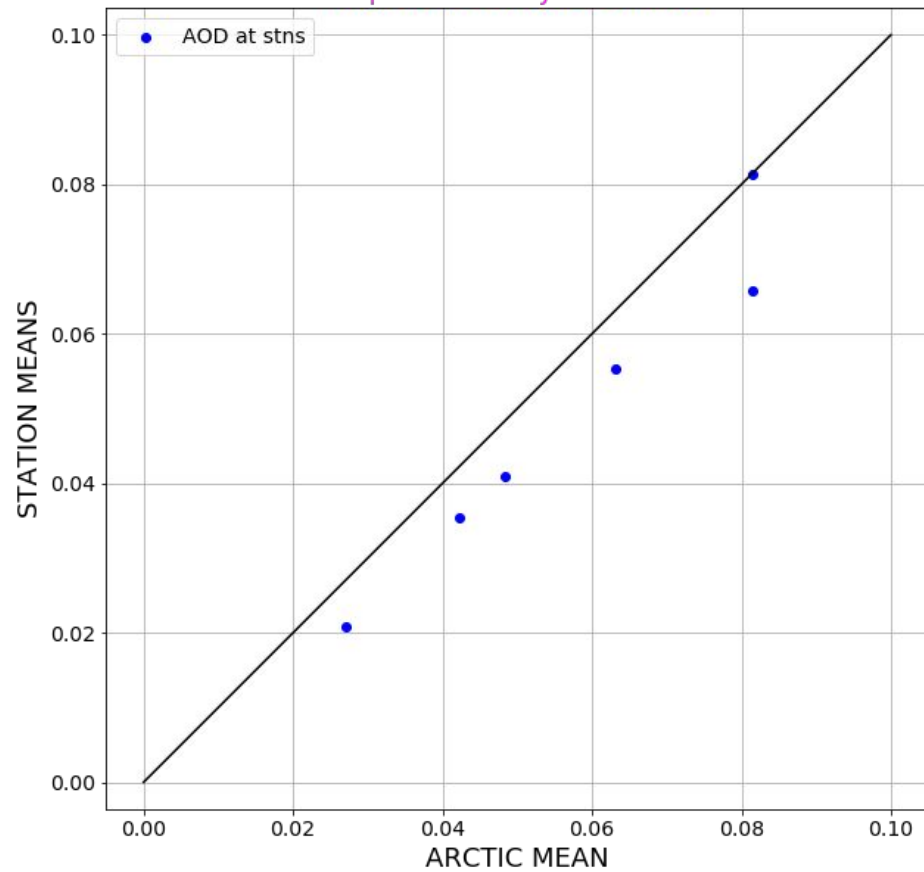


Results

Representativity of summer months

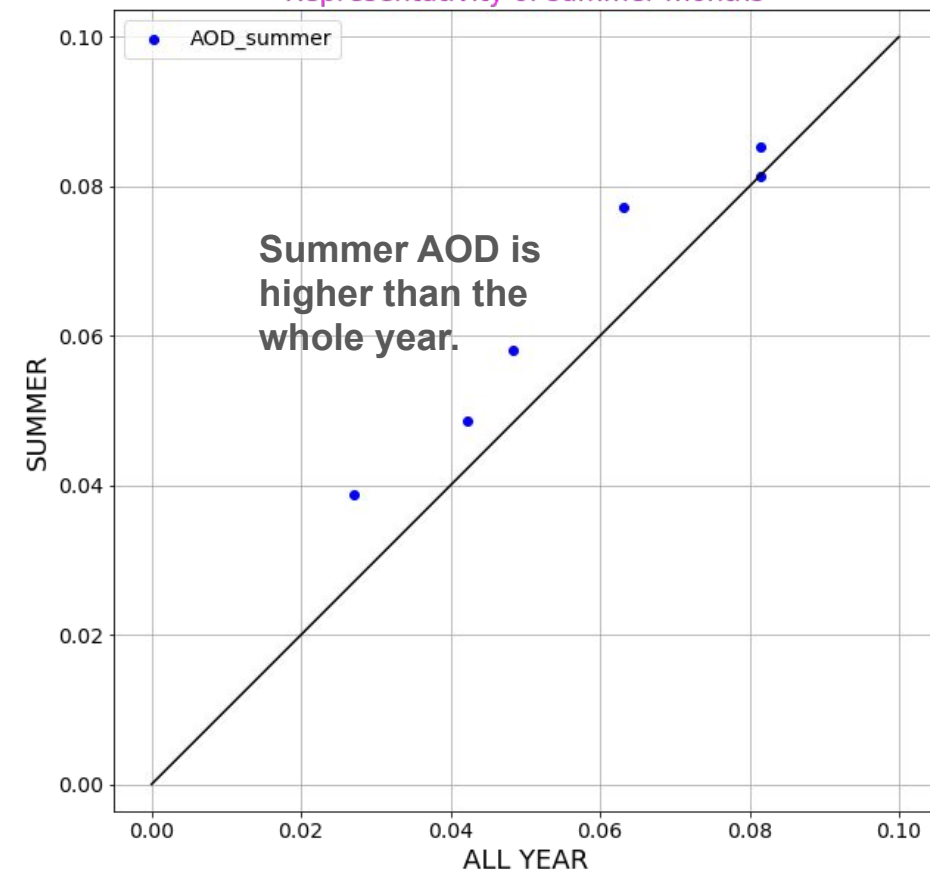


Representativity of stations

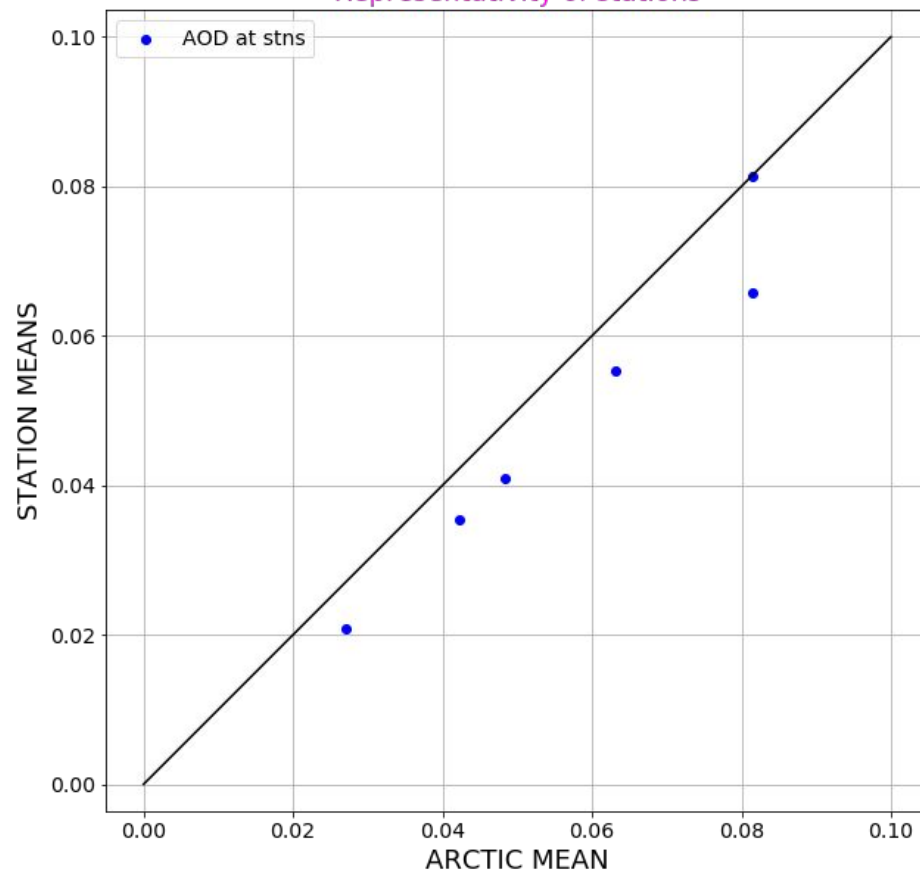


Results

Representativity of summer months

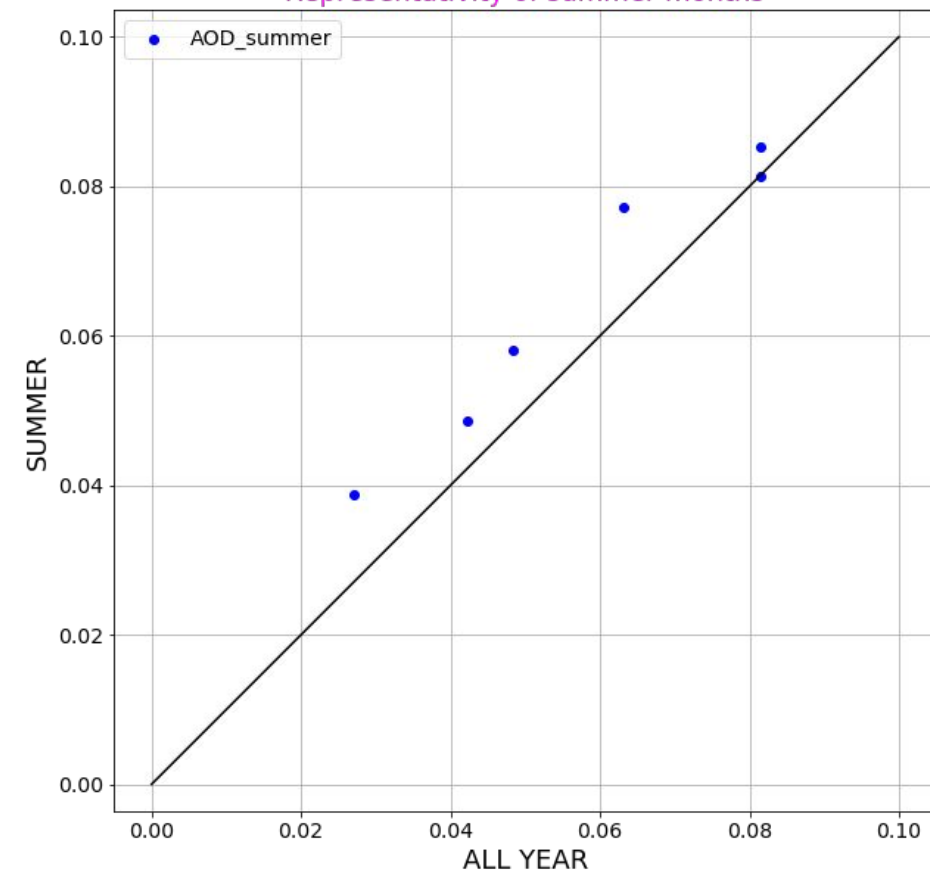


Representativity of stations

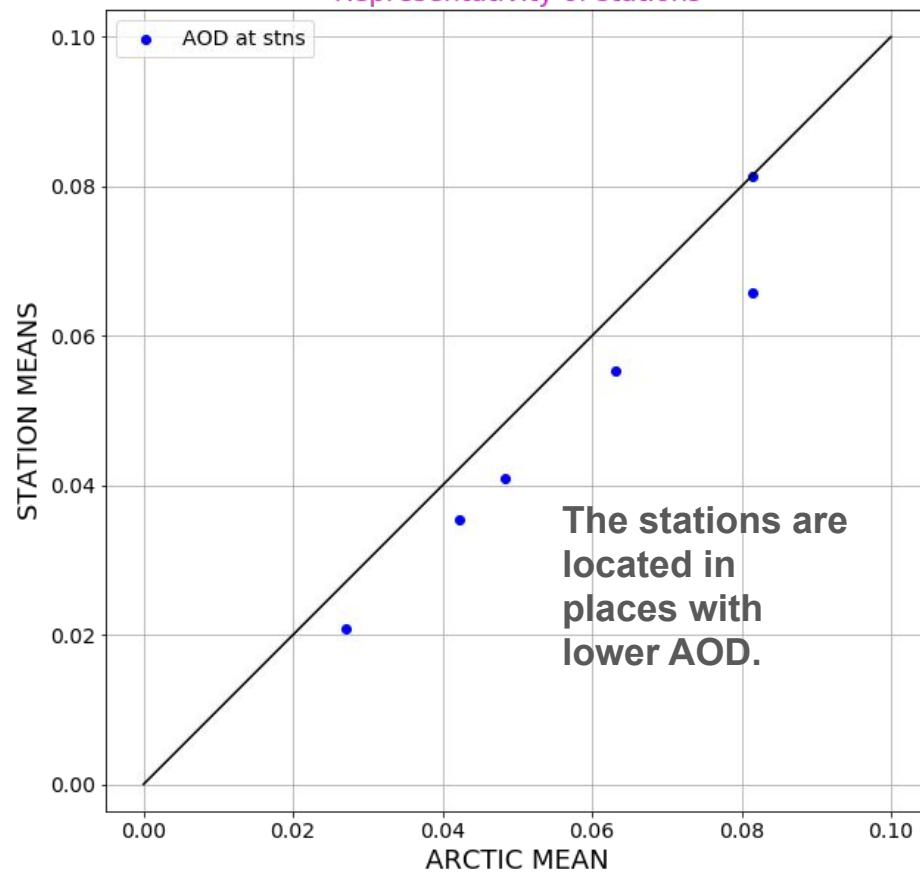


Results

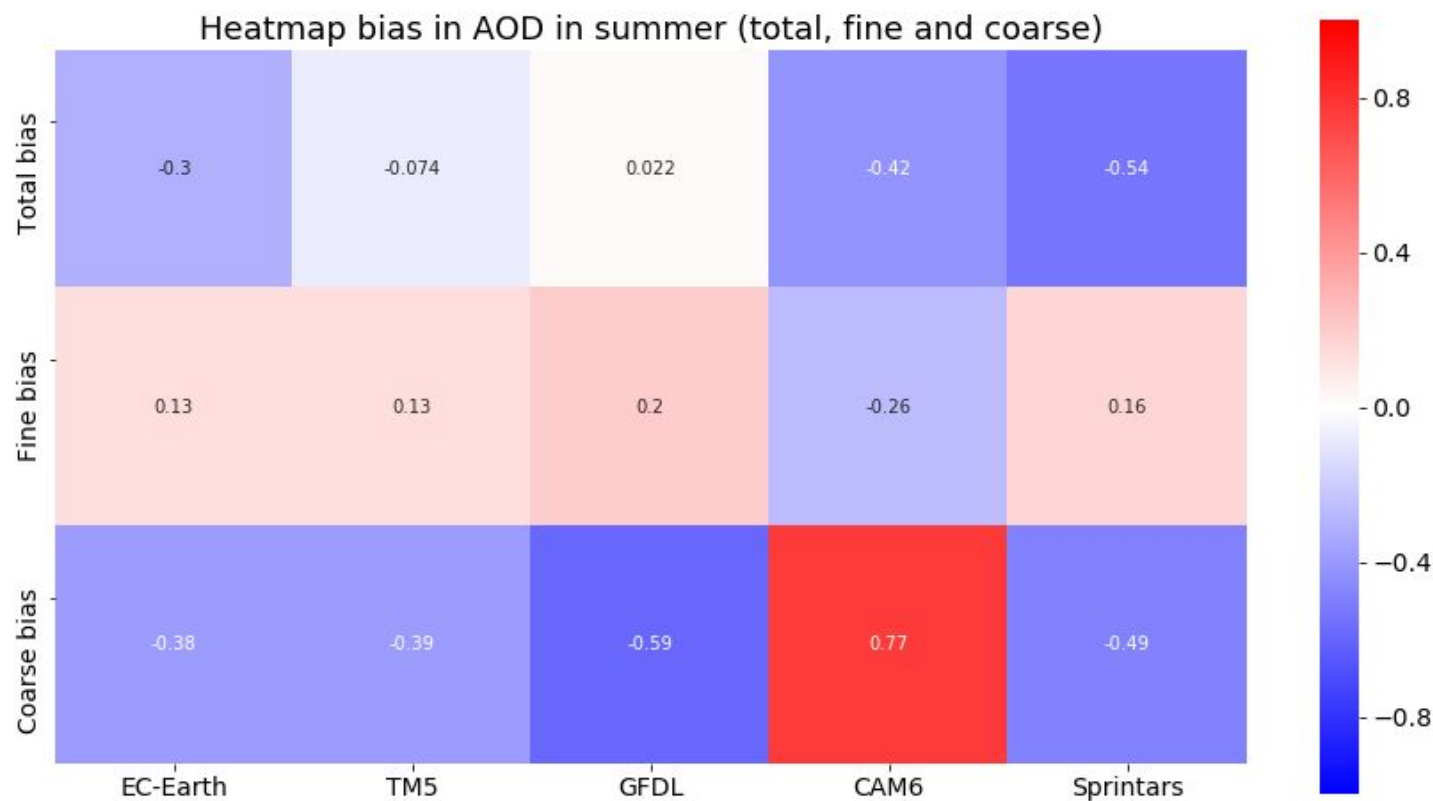
Representativity of summer months



Representativity of stations



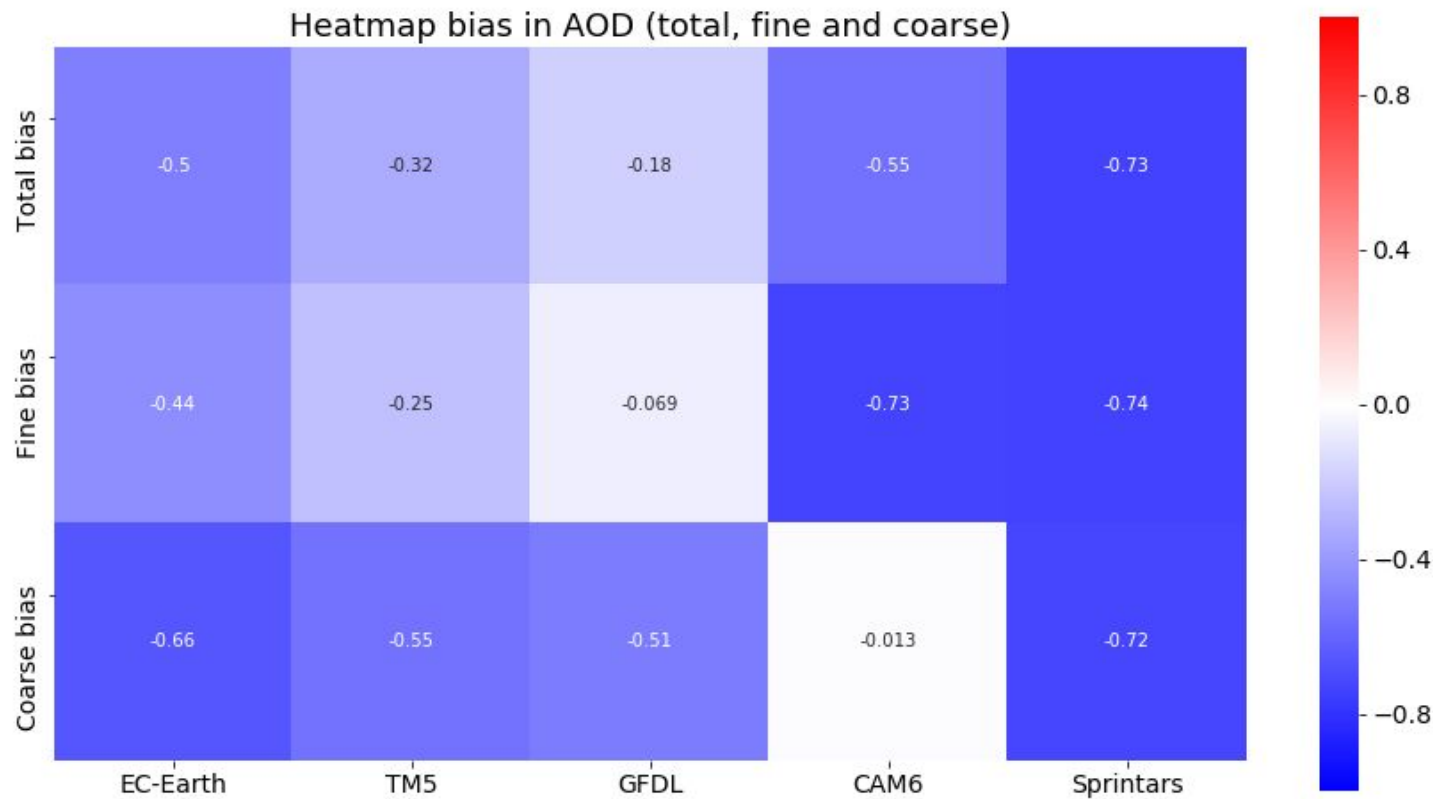
Model bias at the stations in summer



All models show total AOD underestimation in the Arctic.

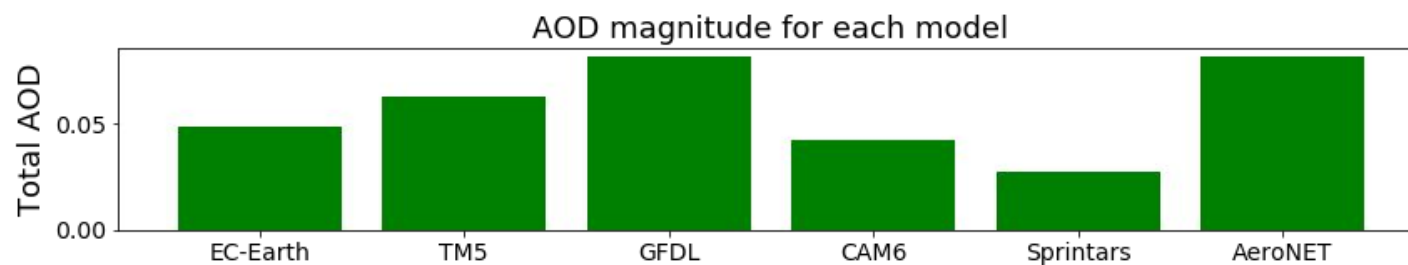
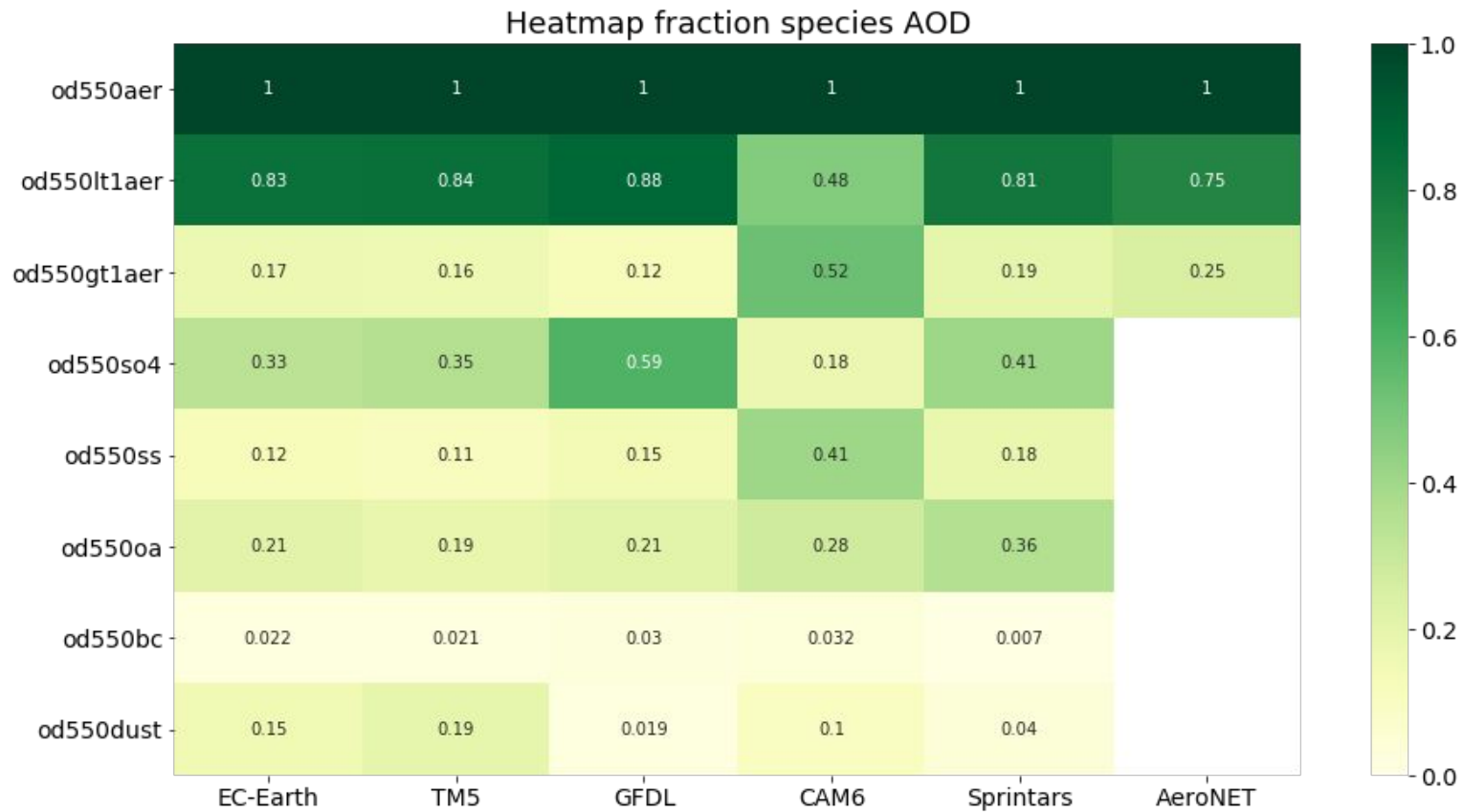


Model bias at the stations (all year)

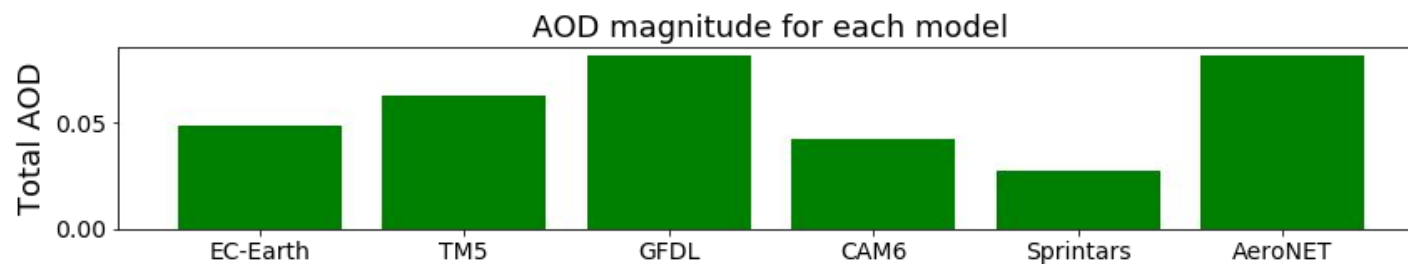
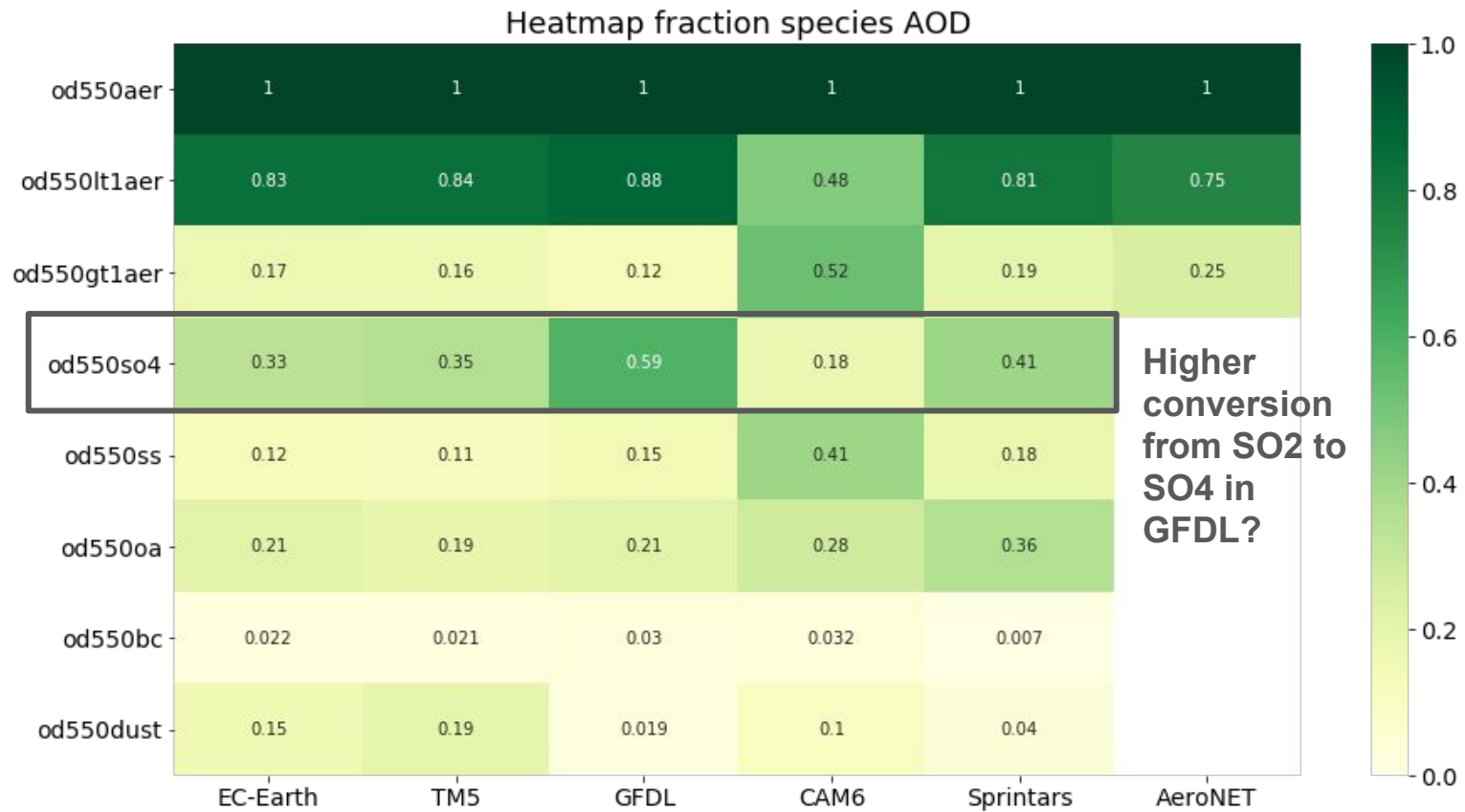


Models' AOD is higher for summer than yearly mean.

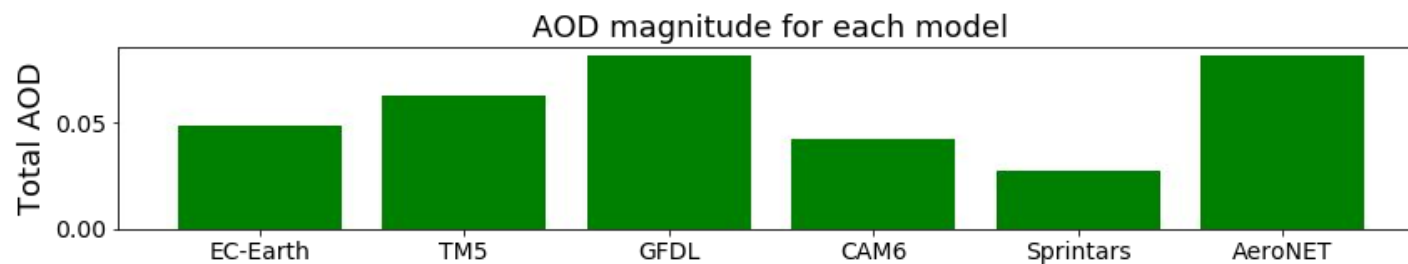
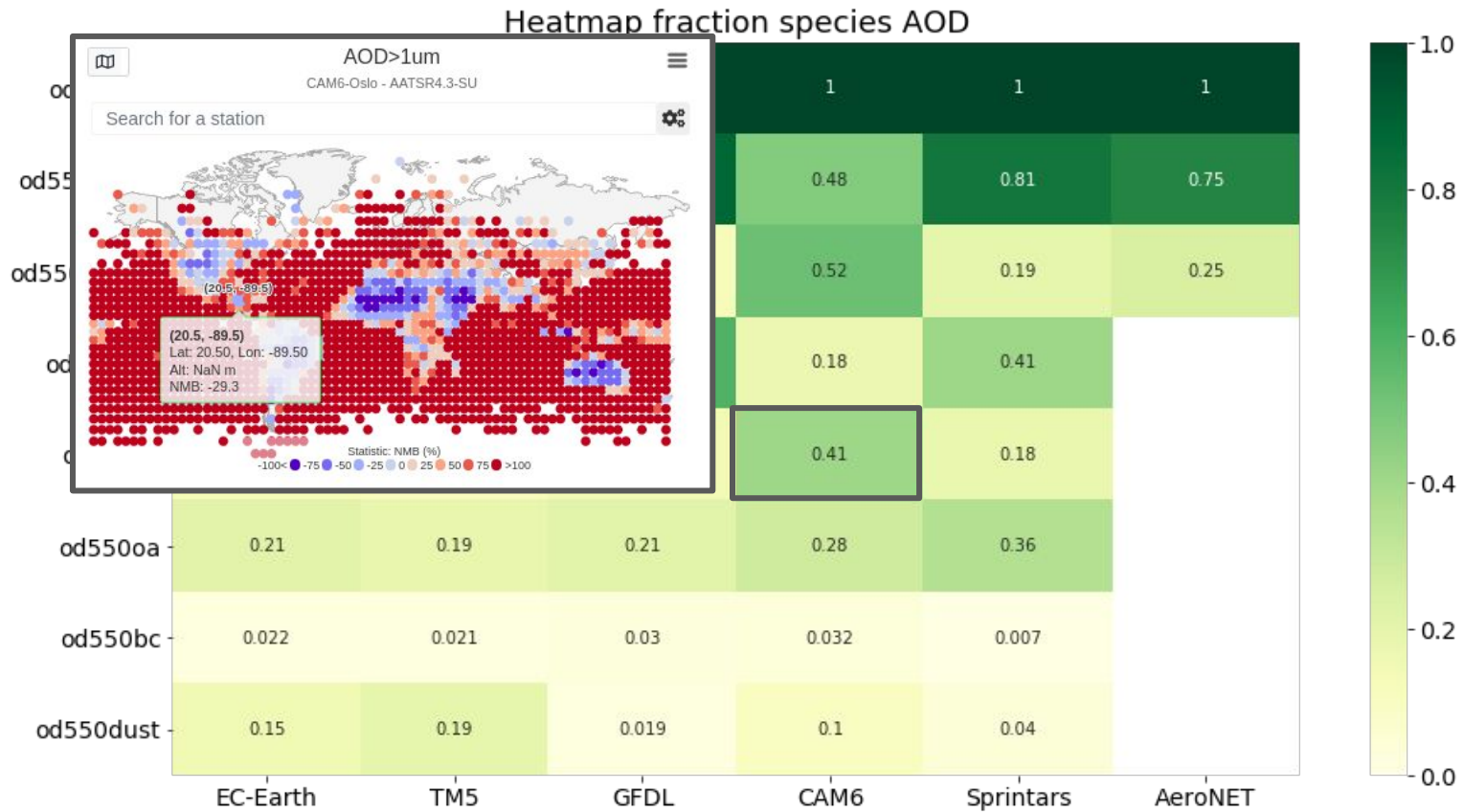
Results



Results



Results



Conclusions

- Models underestimate total AOD in the Arctic.
- GFDL has the lowest bias.
 - More SO_4 : Stronger/better conversion from precursor SO_2 ?
- CAM6 (NorESM) has too much coarse mode.
- Sprintars underestimates AOD the most.

