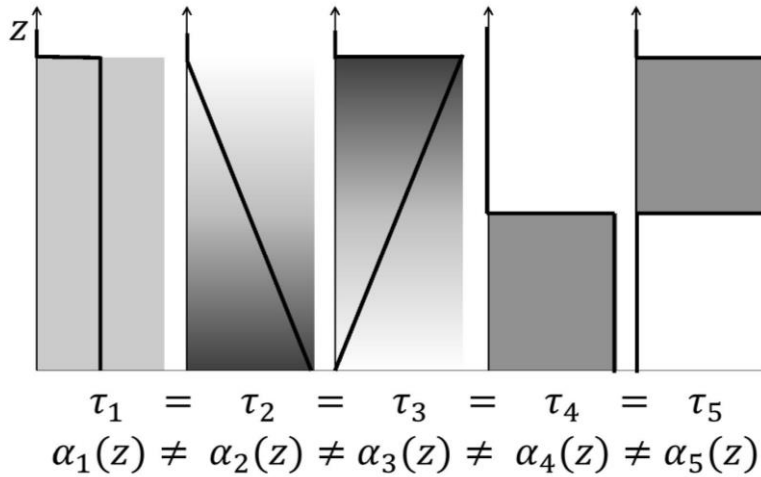


# Model evaluation for AeroCom 2019 vertical aerosol profiles

Motivation: vertical distribution of aerosols



## Motivation

- Aerosol vertical distribution impacts the transport of (shortwave and longwave) radiation through the atmosphere as well as the formation of clouds and precipitation patterns

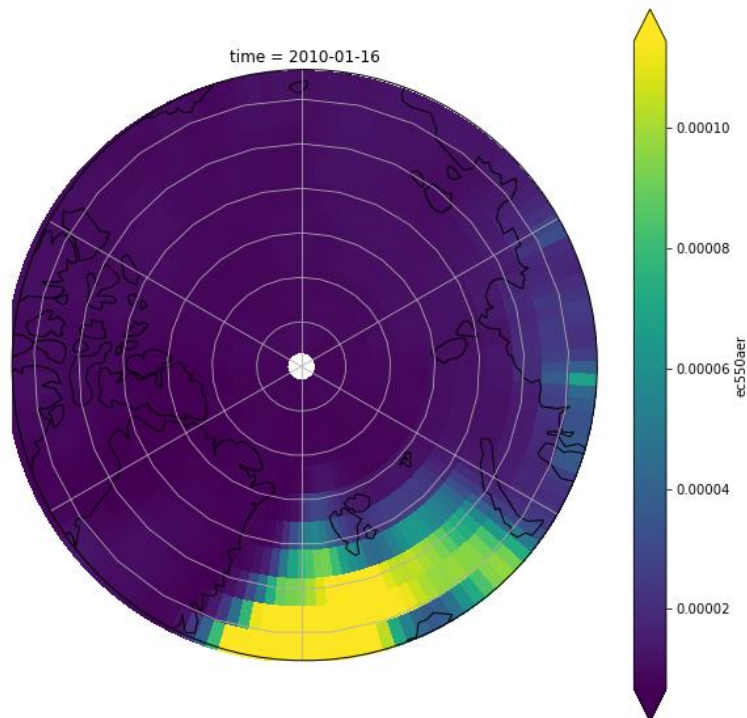
## Research Question:

- How well do models simulate the aerosol profile in the arctic ?

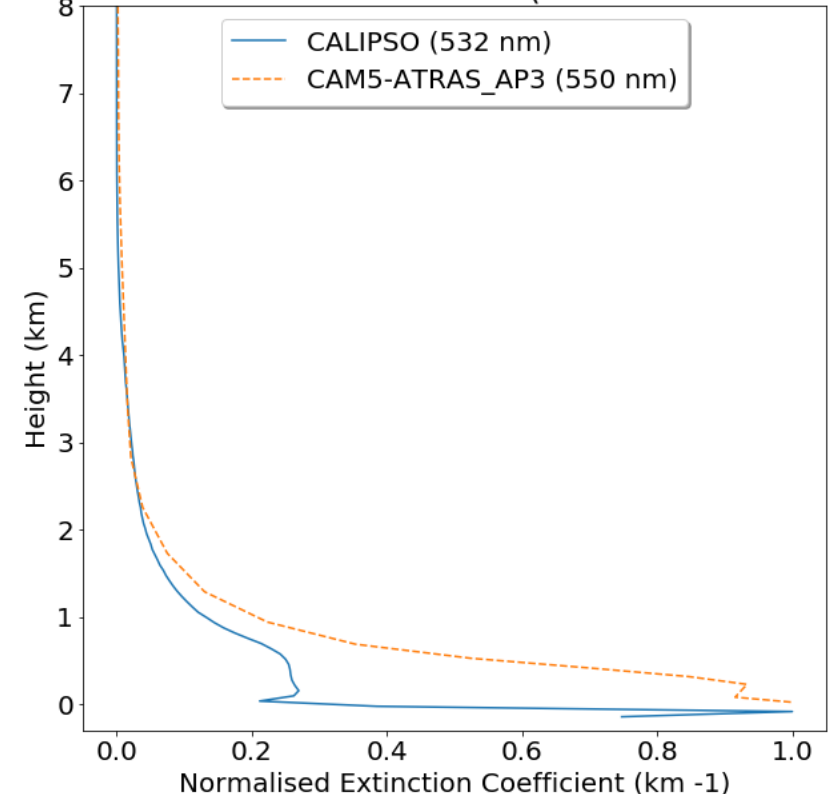
## Data:

Model- CAM5-ATRAS, CAM6-OSLO, GOES, GFDL-AM4, OSLOCTM

Observation- CALIPSO LEV 3 satellite data

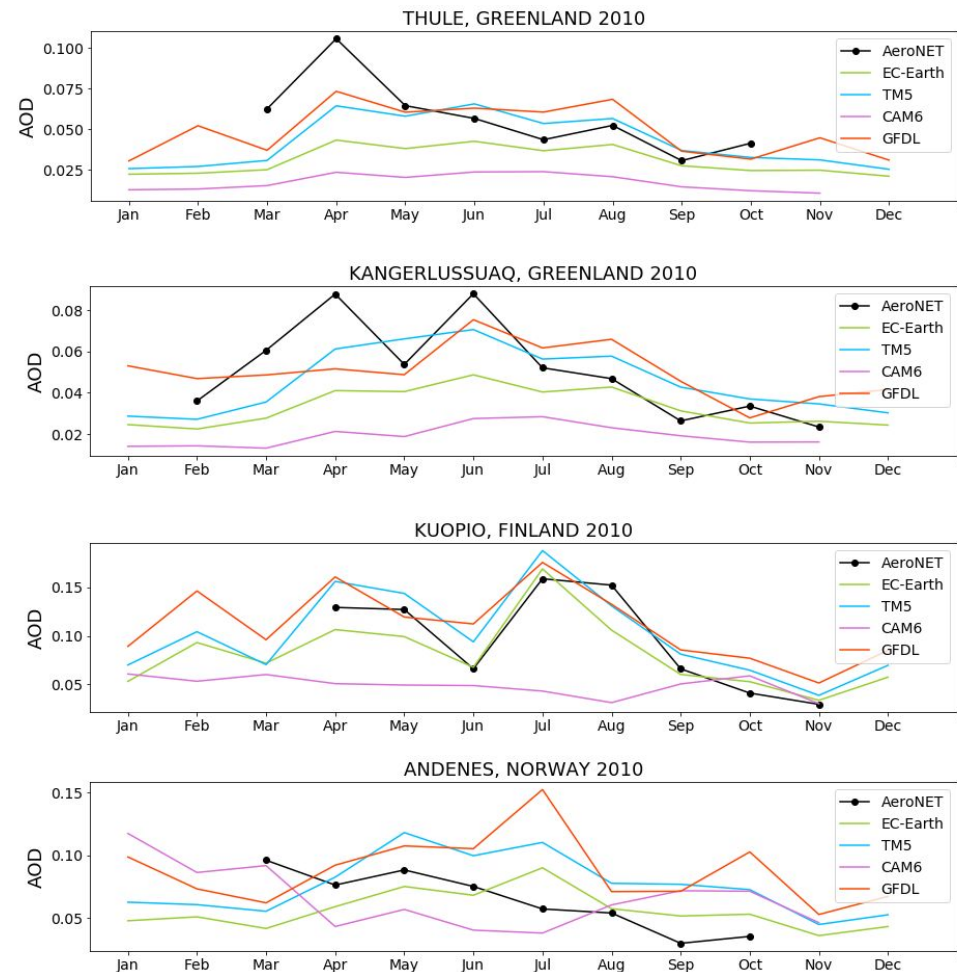


Profiles of Extinction Coefficient (Model vs Observation)



# Arctic AOD, diversity in aerosol species

- Many models underestimate aerosol optical depth in the Arctic.
- Will investigate differences in aerosol species between models, and compare to observations.
- Models: EC-Earth, TM5, CAM6-Oslo (NorESM), GFDL-AM4 and SPRINTARS
- Observations: AeroNET
- Marek will look at diversity in models' aerosol load.



# Marek Ratajczak

- Reasons for AOD biases in climate models (Arctic)
- Models: EC-Earth, NorESM (CAM6-Oslo), SPRINTARS, GFDL-AM4, TM5
- Variables: optical depth 550 nm, total load in a column, surface mass mixing ratio (mmr), (relative humidity?)
- Species: dust, sea salt, organic aerosols, black carbon, sulfate
- Compare mmr with surface observations from EBAS
- Linked to Ingeborg's research

# Shift in winter air mass transport at Svalbard

## Project and motivation

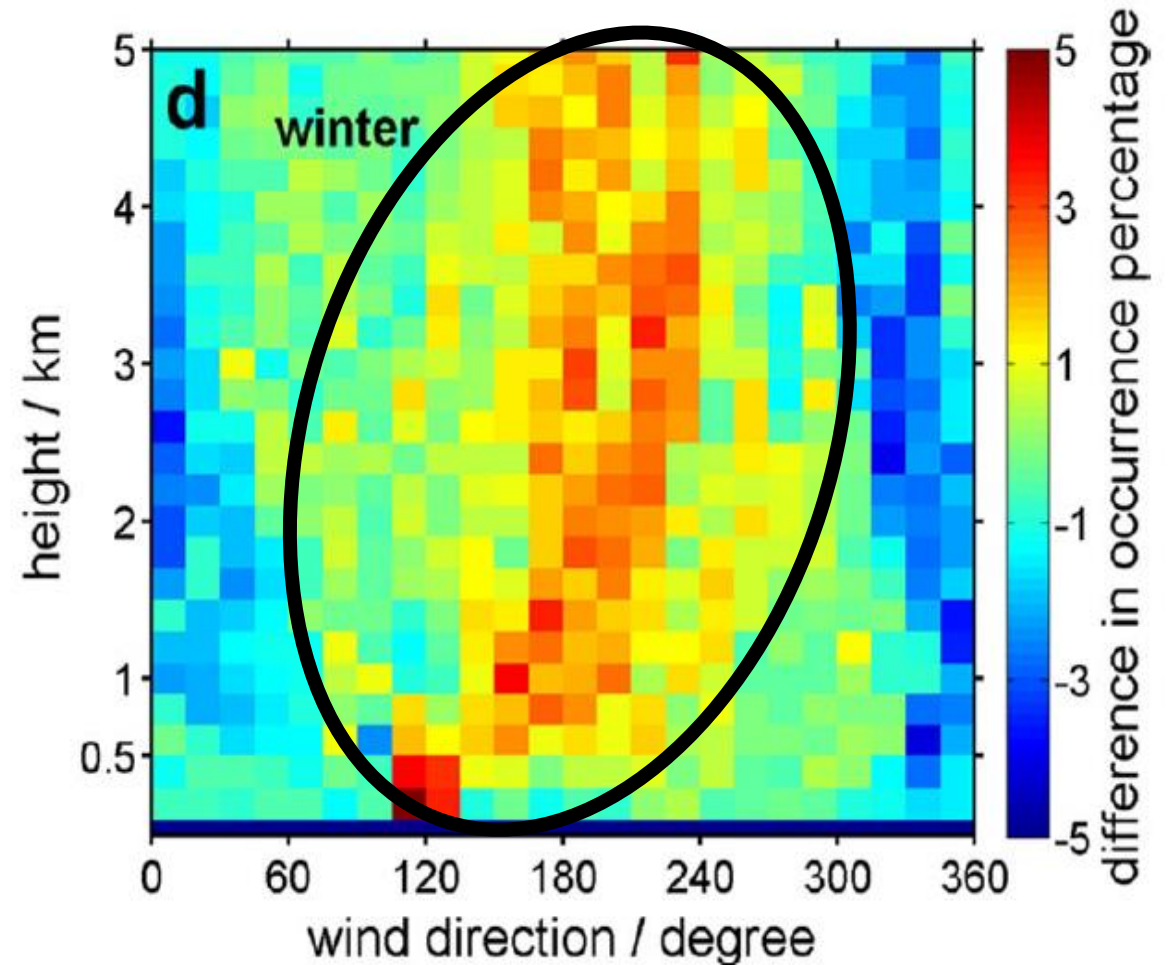
- Radiosondes showed changes in air mass transport patterns: more S-SE winds now

## Goals

- Can we see this shift with back-trajectories?
- Study effects on temperature and specific humidity.

## DATA

- Hypsilt back-trajectories (100, 500, 1500 m)
- ERA-5: temperature and specific humidity
- Observation data: Temperature, aerosols, wind speed and wind direction.



# Relationships between sea salt and surface wind speed in the Svalbard region

## Aim:

- 1) Investigate relationships between aerosol properties and surface wind speed.
- 2) Investigate vertical distributions of sea-salt particles
  - Compare in-situ measurements at the Zeppelin station with satellite derived AOT and sea-salt AOT from GCM simulations.

## Data:

- Surface wind from MERRA2
- AOT from MERRA2
- Sea-salt aerosols observations
- Sea-salt component of AOT from NorESM CAM6-Oslo

## Next step:

- Investigate the relationships in detail
- Compare observations, reanalysis and models

