

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

General information:

- Group 2
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- Assistant: Paul G.

Motivation and aim :

- Investigate relationships between aerosol properties and surface wind speed.
- Investigate vertical distributions of sea-salt particles by comparing concentration of sea-salt with AOT and sea-salt AOT.

Methods and data:

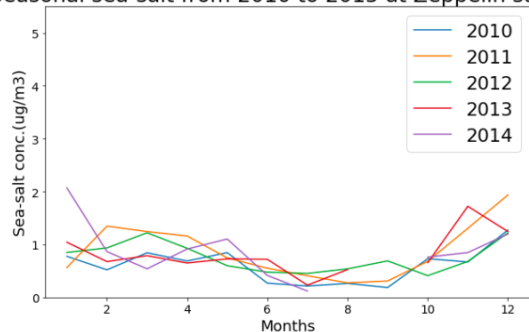
- **Reanalysis: MERRA2** from Giovanni (read data with pandas)
 - Area-averaged surface wind speed
 - Zeppelin (11E, 78N, 12E, 79N)
 - Ny-Ålesund
 - Area over the ocean(1E, 75N, 9.5E, 80N)
 - AOT 550 nm from
 - Zeppelin + ocean
- **Observations: EBAS** (read data with Pyaerocom)
 - Sea-salt concentration
 - Zeppelin
 - Nordpolhotellet- Ny-Ålesund
- **Model: NorESM** (read data with xarray)
 - Sea-salt component of AOT
 - Zeppelin + ocean

Time series data

Sea-salt conc. (EBAS)

Seasonal sea-salt from 2010 to 2015 at Zeppelin station

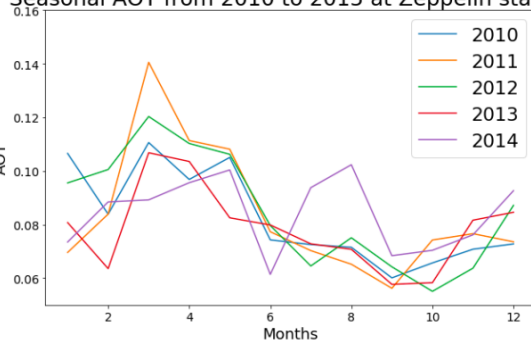
Mountain



AOT (MERRA2)

Seasonal AOT from 2010 to 2015 at Zeppelin station

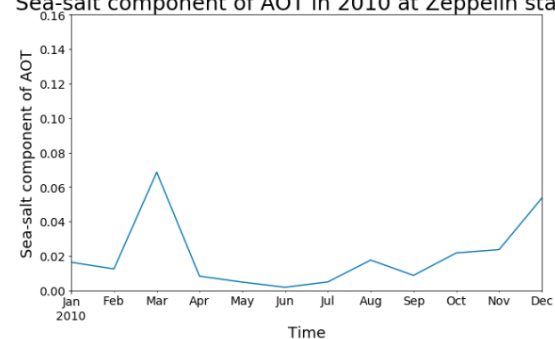
Mountain
AOT



SS comp. of AOT (NorESM)

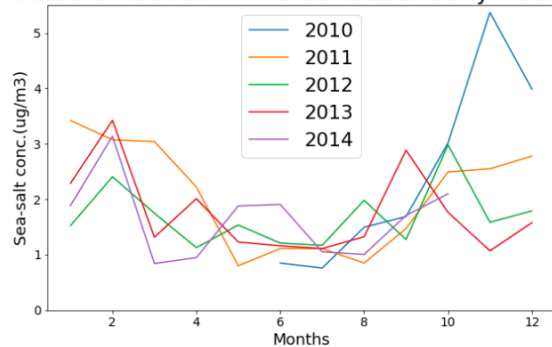
Sea-salt component of AOT in 2010 at Zeppelin station

Mountain



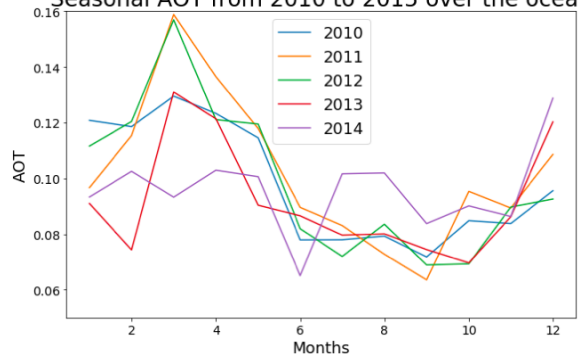
Seasonal sea-salt from 2010 to 2015 at Ny-Ålesund

Sea-level



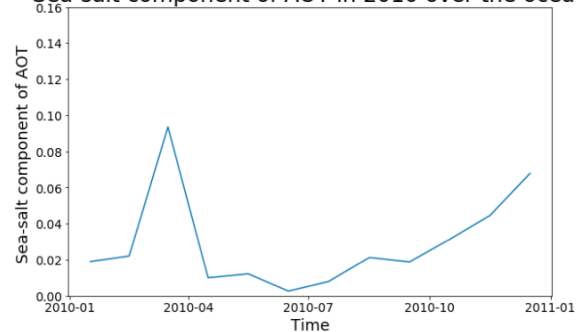
Seasonal AOT from 2010 to 2015 over the ocean

Sea-level ocean
AOT



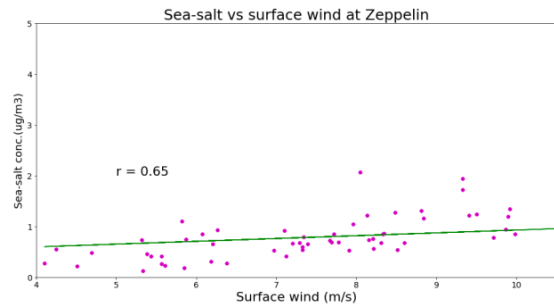
Sea-level ocean

Sea-salt component of AOT in 2010 over the ocean

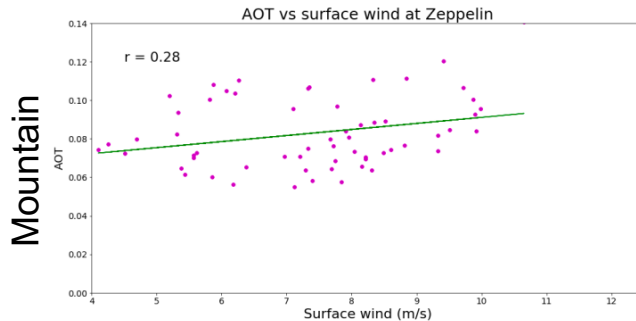


Results

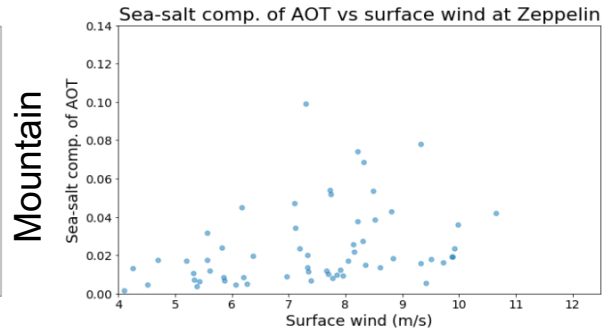
Sea-salt vs wind speed
(EBAS + MERRA2)



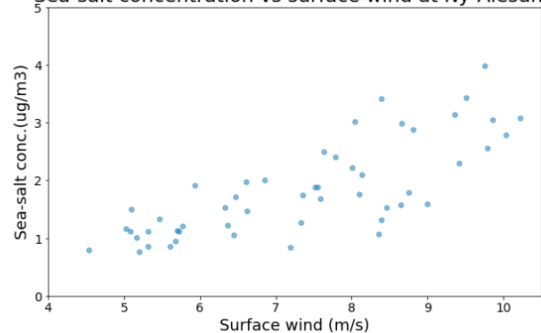
AOT vs wind-speed
(MERRA2)



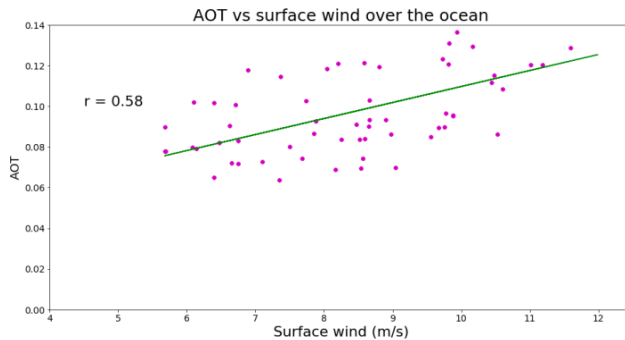
Sea-salt of AOT vs wind
(NorESM vs MERRA2)



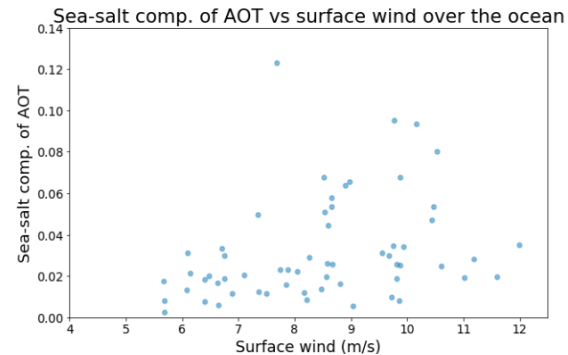
Sea-salt concentration vs surface wind at Ny-Ålesund



Sea-level ocean



Sea-level ocean



Conclusions

What have I learned?

- Some theory about sea-salt aerosols properties
- Understanding the relationships between sea-salt properties and wind speed for different regions
- Improved my programming skills

Outlook:

- Make a regression line on all of the scatterplots
- Make a quiver plot that shows wind direction and sea-salt concentration
- Add a colorbar with seasonal wind speed
- Plot the ratio of sea-salt AOT to total AOT
- Compare my results