

Validating Aerosol Optical Thickness retrievals from satellite observations over the polar regions

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Description:

Aerosols are small particles that are suspended in the air. They can exert direct radiative forcing, or affect clouds indirectly, which in turn generate radiative forcing. The radiative forcing caused by aerosols in the Arctic is not well characterised, but this can be improved by using satellite data. However, before this data can be used for this purpose, its quality must be assessed.

This master's thesis will evaluate aerosol data derived from the two satellite-based MODIS instruments [1,2] on the Terra and Aqua platforms over a period of more than 20 years, using Aeronet [3] data as a reference. Aeronet is a network of ground-based stations that systematically measure aerosols worldwide, including in the Arctic, and is typically considered an accurate reference measurement.

In the framework of this M.Sc. work, the implemented approach needs now to be improved where necessary, assessed in terms of quality and applied to a longer period of Arctic SLSTR data.

Skills/Interest: Interest in aerosol science and statistical methods. Good mathematical background and **very good programming skills (python, git/gitlab)** are required.

For further information or questions please contact:

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Related links/Web:

<https://www.iup.uni-bremen.de/aerosol>

References:

[1] Levy et al., 2002

[2] Sayer et al., 2017

[3] <https://aeronet.gsfc.nasa.gov/>

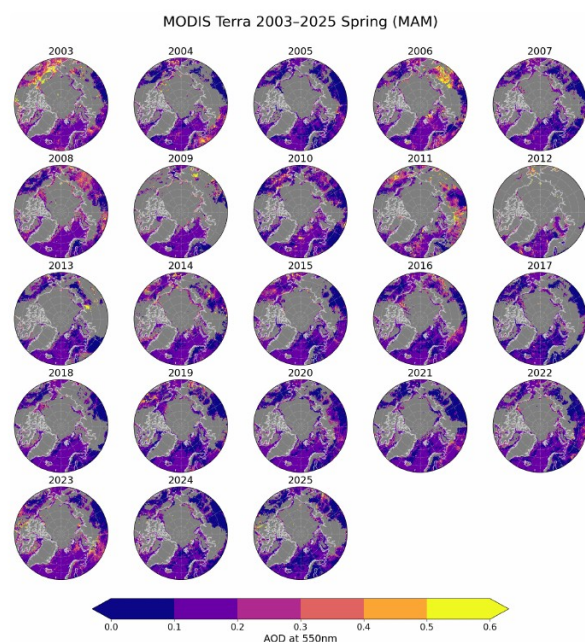


Fig. 1: Aerosol Optical Depth over the Arctic

Preliminary work plan:

- 1) Literature survey. Study the retrievals used for aerosol retrievals and the reference (AERONET).
- 2) Develop a colocation scheme.
- 3) Apply the colocation scheme and potentially vary colocation-parameters.
- 4) Validate/Analyze data