

PX: Aerosol property retrieval using polarized space borne measurements

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“The principal difficulties in retrieving aerosol loading and microphysical properties using passive remote sensing measurements over land surfaces are the significant spectral and spatial variations in the observed intensities that are caused by the land surface” [Cairns et al].

It is assumed that polarization is generated at the surface interface and this hypothesis has been used to develop theoretical models [Bréon et. al. 1995] for the polarized reflectance of vegetation and of bare soils. Furthermore surface polarized reflectance is assumed to be spectrally neutral. If this is the case, then the use of a measurement at a sufficiently long wavelength that the aerosol load is negligible and could for instance be used to characterize and correct for surface polarization effects at the shorter wavelengths.

The spectral slope of polarized radiance measurements can be attributed to aerosol, clouds and molecular scattering. Aerosol, cloud and molecular scattering create also polarized radiation depending on the aerosol/droplet/molecular characteristics.

The M.Sc. project with the title “Aerosol property retrieval using polarized space borne measurements” aims in setting up a retrieval scheme using existing radiative transfer and retrieval code, all part of the suite SCIATRAN, and to perform sensitivity studies. Ideally, but not strictly required is the application of the findings from the sensitivity studies to measured data from POLDER/PARASOL.

Skills/Interest: Interest in aerosol science and radiative transfer as well as retrieval theory is needed. A strong mathematical background and good programming skills are important prerequisites.

For further information or questions please contact:

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Related links/Web: <http://www.iup.uni-bremen.de/aerosol>

Workplan:

- 1) Literature survey. Study previous M.Sc. theses. Getting acquainted to SCIATRAN RTM and retrieval suite.
- 2) Setting up SCIATRAN FW and retrieval suite for specific cases.
- 3) Sensitivity study wrt. surface (optical) properties and aerosol types.
- 4) Potentially: a study with real data from POLDER/PARASOL.