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Monthly report / October 2008

WP 3100: Raman scattering

The implementation of Raman scattering in uvspec has started. Originally uvspec is a monochromatic code. Raman scattering requires that the wavelength treatment of the code is restructured. This has been accomplished including the storing of Raman source components. Furthermore, the solution of the radiative transfer equation including Raman scattering, requires a solver that may handle a general source term. The general source term of this solver, qdisort, has been tested for a direct beam source against sdisort results with excellent agreement. Further work is to include the Raman scattering cross section in the calculation of the optical depth and single scattering albedo. These are needed to calculate the Raman scattering source term.

WP 3200: Polarization in 3D atmosphere

Started to implement polarization into the 3D model MYSTIC. The algorithm that has been proposed in the preliminary ATBDs needed a few corrections and modifications. The algorithm that is now being implemented has been tested for Rayleigh scattering and compared to the 1D solver polradtran. The comparison shows a very good agreement between the two solvers. Further work is to include aerosol and cloud optical properties (phase matrices) so that polarization due to cloud and aerosol scattering may be calculated.

WP 3300: Extension of surface properties

Mishchenko offers a code on his web page, which calculates the BRDF and reflectance matrices for polarized radiative transfer for rough surfaces and arbitrary reflective indices. The code was tested, it is written in Fortran 77 and suitable for implementation in libRadtran.

WP 3400: More flexible aerosol handling

OPAC aerosols have been included in libRadtran and arbitrary mixtures can be defined by the user. The OPAC aerosol database including optical properties of all OPAC types can be used with all solvers except MYSTIC. This aerosol database includes all required information for polarized radiative transfer. Further work is to allow the use of OPAC aerosols in combination with the MYSTIC solver.

WP 3500: Further extensions

- Work on the uvspec-GUI have focused on the reading of existing input files and subsequent filling in of the appropriate input variables in the GUI. The uvspec input file format is flexible, thus this is a challenging task that has been resolved.
- netcdf tools for input and output of data, for instance from climate of weather models, have been included
- The new libRadtran web-page (www.libradtran.org) has been launched. It includes a user area where users may share tips and tricks and where they can put interesting applications.

Status:

WP 3100: ongoing
WP 3200: ongoing
WP 3300: ongoing
WP 3400: ongoing
WP 3500: ongoing