

Monthly report / April 2009

WP 3100: Raman scattering

As was mentioned in the Raman presentation during the ESASLight MTR Meeting, there is a problem with Raman scattering and clouds. To solve the radiative transfer equation including Raman scattering an internal source of Raman scattered photons is calculated. This source has been calculated at each level of the atmosphere. For clouds this is not sufficient and the code is currently being adopted to calculate the source at levels and in the middle between levels. It is expected that this development will solve the problem with clouds and Raman scattering.

Status: ongoing

WP 3200: Polarization in 3D atmosphere

The implementation of the algorithm (WP3210) is finished. The database of (polarized) single scattering properties of liquid water clouds (WP 3230) has not yet been generated since it was decided to modify the data structure (store phase function instead of Legendre coefficients). This modification requires a change in the DISORT code which is currently being implemented. The inclusion of a tool to calculate optical properties of ice clouds (WP 3220) also relies on the format of the optical properties data, so this work has also not been done yet.

Status: ongoing

WP 3300: Extension of surface properties

WP 3300 is almost complete. The only open issue is to extend the Cox and Munk BRDF for water surfaces to include polarization if possible.

Status: ongoing

WP 3500: Further extensions

A general test suite consisting of three parts should be set up for libRadtran: 1. Test of optical properties using all possible and reasonable combinations of input parameters, 2. tests of commonly used combinations of input options by comparison with pre-calculated data and 3. tests of randomly generated input files by comparison to reference version of libRadtran.

Work to setup part 1 of the test suite has been started. The task is not trivial because it requires a well defined structure for the input options and well defined dependencies among the options.

A python structure for libRadtran options is being set up. This structure should be used to generate the test files, the GUI, and the documentation.

Work on the GUI has included the addition of options that takes both numerical and literal input, for example zout.

Status: ongoing

WP 4100: Verification plan

Status: closed

WP 4210: Verification

MYSTIC with polarization has been compared to the benchmark results by Coulson for all test cases defined in the verification plan. The reciprocity principle has been tested for various atmospheric conditions. Also, the comparison among the libRadtran solvers has been performed for the test cases suggested in the verification plan. Efficiency tests and the comparison against polarized radiance measurements is ongoing work.

The Raman scattering within uvspec has been preliminary compared with published results for cloudless situations. This include comparisons of filling-in factors for various wavelength intervals, viewing geometries, surface albedos and solar zenith angles. This comparisons will be repeated for the final version.

Status: ongoing

WP 4220: Verification report

The verification report is currently being written.

Status: ongoing

WP 5100: Documentation

Writing of final ATBDs in progress.

A document describing the physics behind all libRadtran solvers is being prepared. This will be a self-contained document where specifically all the approximations and limitations of the various solvers within uvspec will be described and discussed.

Status: ongoing