

Laboratory of Atmospheric Physics, IF-USP

2018 summer course

LibRadtran by Dr. Arve Kylling

Day 1:

-History/timeline of libRadtran. Introduction to the radiative transfer equation (RTE). How libRadtran solves the RTE. What quantities are calculated. Basic usage
Exercises: calculate solar and thermal spectra for cloudless sky. Look at different spectral resolutions; use different RTE solvers to see differences.

Day 2:

-Water clouds, ice water clouds (mixed clouds)
Exercises: include water clouds. Look at different phase functions for ice clouds.

Day 3:

-Aerosols, simple and in full detail
Exercises: include aerosol, non-spherical aerosols, aerosol and clouds together.

Day 4:

-Surface properties, albedo, BRDF
Exercises: include wavelength dependent surface albedo, snow albedo, ocean albedo

Day 5:

-Monte Carlo, how, pros and cons
Exercises: use the Monte Carlo solver for various applications.

Day 6:

-3D RT, examples with topology, IR cameras, clouds.
Exercises: run a simple checkerboard 3D cloud.

Day 7:

-Applications: simulation of ground and satellite-based sensors (solar and thermal)
Students try to set up simulations for their own problems.

Day 8:

-Applications: Radiative forcing, look up tables for retrievals
Students try to set up simulations for their own problems.

For each day it is the aim that the students will be able to set up their own input file, run uvspec, understand the output and present it.