Report of the "International working group on Polarized Radiative Transfer" (IPRT)

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At the last business meeting on the 30$^{\text{th}}$ June 2011 in Melbourne, the IRC decided to initiate a new international working group on polarized radiative transfer. Such a working group is required because an increasing number of remote sensing instruments use polarization in order to gain additional information, in particular about aerosols and cloud particles. On the other hand, polarized radiative transfer codes and tools to exploit polarized radiance observations are far less established than their unpolarized counterparts. The goals of the new working group are the following:

- compare and improve polarized radiative transfer codes
- provide benchmark results
- develop publically available codes
- provide information about free codes
- provide input data (scattering matrices, BPDFs)
- bring community together (workshops, . . .)

A website has been created in order to collect all information relevant to polarized radiative transfer: www.meteo.physik.uni-muenchen.de/~iprt/. The website includes contact details of the working group members.

Two model intercomparison studies have been initiated: one is with focus on high spectral resolution simulations (as required e.g. for GOSAT), the other focuses on polarized radiance simulations in spherical geometry (as required e.g. for SCIAMACHY). Another intercomparison study is planned which will focus on polarized radiative transfer in 3D geometry. All intercomparison studies include models using different approaches, e.g. discrete ordinate and Monte Carlo methods.

The website currently provides published benchmark results as well as data from previous model intercomparison studies. It allows model developers to validate their codes. The working group will provide new benchmark results as outcome of the intercomparison studies.

IPRT also aims to provide publically available codes. The list of radiative transfer codes on the website includes information about the availability. So far there are only five codes. We are waiting for input from the community to complete the list.

Another important task of the working group is to provide input data for polarized radiative transfer simulations, in particular optical properties of water and ice clouds as well as aerosol, and surface reflectance. Within the first year of the working group, databases of optical properties including full polarization characteristics for aspherical aerosol particles as well as for ice crystals have become available to the scientific community. Surface polarization is described by the bi-directional polarized reflectance matrix (BPDF). BPDFs have been derived from POLDER measurements or calculated for ocean surfaces based on the Fresnel equations. Contacts where to obtain the data as well as more information are provided on the website.

At the IRS meeting in Berlin, the working group will be announced in a presentation, to increase the awareness of the community and to encourage people to contribute.