Author(s): W. Debruyn, F. Veroustraete and J. Van Rensbergen
Speaker: Walter Debruyn

The following title was submitted:
Evaluation of the bi-directional modelling tool AIRCO using airborne imaging spectroscopy: the DAIS 7915 campaign at Brasschaat, Belgium.

Abstract (295 words):
Most natural surfaces reflect incoming radiation with a different intensity according to the geometrical position of the observer and of the source of illumination. This wavelength dependent and surface-intrinsic optical property, called anisotropy or bi-directionality, also affects Remote Sensing (RS) observations.

At Vito, SATCO (sensitivity analysis tool for compositing optimisation) (Brems et al., 1999) and AIRCO (AIRborne version of satCO, this study) were developed, for spaceborne and airborne sensors respectively, to calculate top-of-atmosphere (TOA) and top-of-canopy (TOC) bi-directional reflectances. The bi-directionality of surfaces can in principle be modelled following a number of approaches. AIRCO and SATCO calculate BRF spectra by coupling an atmospheric radiative transfer model (6S, second simulation of the satellite signal in the solar spectrum) (Tanré et al., 1992) and a surface-specific bi-directional reflectance model (CSAR, coupled surface-atmosphere reflectance) (Rahman et al., 1993).

To assess the performance of 6S/CSAR in the context of the AIRCO development, a measurement campaign at an experimental site (51°18'N, 4°31'E), near Brasschaat in Belgium, was organized in the frame of the EC's training and mobility of researchers (TMR) program. During this campaign, which took place on June 20th, 1998, radiance was measured with DLR's DAIS 7915 hyperspectral spectrometer onboard a Dornier 228 aircraft. With this imaging spectrometer, the radiance of different types of land cover was monitored with a ground resolution of 5x5 m2 as a function of wavelength and view angle.

Within the framework of this study, 6S/CSAR was tuned to the spectral response of the DAIS 7915 sensor, to the flight pattern of the Dornier 228 aircraft and to the exact atmospheric conditions, as measured at the time of the overflights. This paper mainly describes the 6S/CSAR-calculations of the DAIS at-sensor reflectances for grassland and compares these simulations with the actual DAIS measurements over grassland parcels.