1. Introduction

Goals of the project:
- Airborne, spectral measurement of the surface albedo which is needed:
  - as input parameter for modelling
  - as boundary condition for satellite retrievals of aerosol properties
- Assessment of the radiative forcing of Saharan dust at the surface
- Improve satellite retrievals of aerosol optical properties

Realisation:
- SAMUM experiment in South-East Morocco from May 19 to June 6, 2006
- Airborne measurement of upwelling and downwelling spectral irradiances and actinic flux density aboard the Partenavia aircraft D-GERY
- Ground-based measurement of spectral downwelling irradiance, radiance, actinic flux density, and thermal infrared (IR) radiation at Ouarzazate airport

2. Instruments

<table>
<thead>
<tr>
<th>Tot.</th>
<th>Measured quantity</th>
<th>Spectral range</th>
<th>Resolution</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Irradiance $F_\lambda$</td>
<td>280-970 nm</td>
<td>2-3 nm</td>
<td>Temperature-controlled housing, optical-inlets horizontally stabilised [1,2]</td>
</tr>
<tr>
<td>2</td>
<td>Irradiance $F_\lambda$</td>
<td>970-2200 nm</td>
<td>9-16 nm</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Actinic flux density $F_{act}$</td>
<td>280-790 nm</td>
<td>2-3 nm</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Irradiance/Radiance, Actinic Flux Density</td>
<td>280-1050 nm</td>
<td>2-3 nm</td>
<td>Switch for 2 inlets, depends on 2nd optical inlet</td>
</tr>
<tr>
<td>2</td>
<td>Thermal broadband radiation $F_{B}$</td>
<td>4-42 µm</td>
<td>n/a</td>
<td>Ground emission and atmospheric reflection</td>
</tr>
</tbody>
</table>

3. Data processing

- Raw data: Standard calibration, Instrument corrections, Upwelling and downwelling irradiances
- Classification and Parametrisation: Raw data, Surface albedo, Albedo at flight level
- Albedo: Albedo at flight level, PARTIALLY FINISHED

4. Preliminary results

Exemplarily, results for May 19 are presented here. There were moderate dust conditions ($\tau_{aer,500 nm} = 0.4$), no clouds, and both satellites (MISR, MERIS) overpassing.

5. Outlook

- Surface-albedo maps: Geolocated characterisation of albedo types; spectral classification of typical surface types
- Interpolation to satellite grid cells and comparison to satellite-retrieved surface albedos, in cooperation with the MISR team at NASA Jet Propulsion Laboratory.
- Evaluate the accuracy of the satellite-retrieved surface albedo
- Use the detailed surface-albedo measurement from SAMUM for improvement of satellite aerosol retrievals (e.g., MERIS data) in collaboration with the Institute of Environmental Physics at Bremen University (SAMUM Project #7)
- Estimate top-of-atmosphere forcing due to surface albedo and aerosol optical parameters encountered during SAMUM