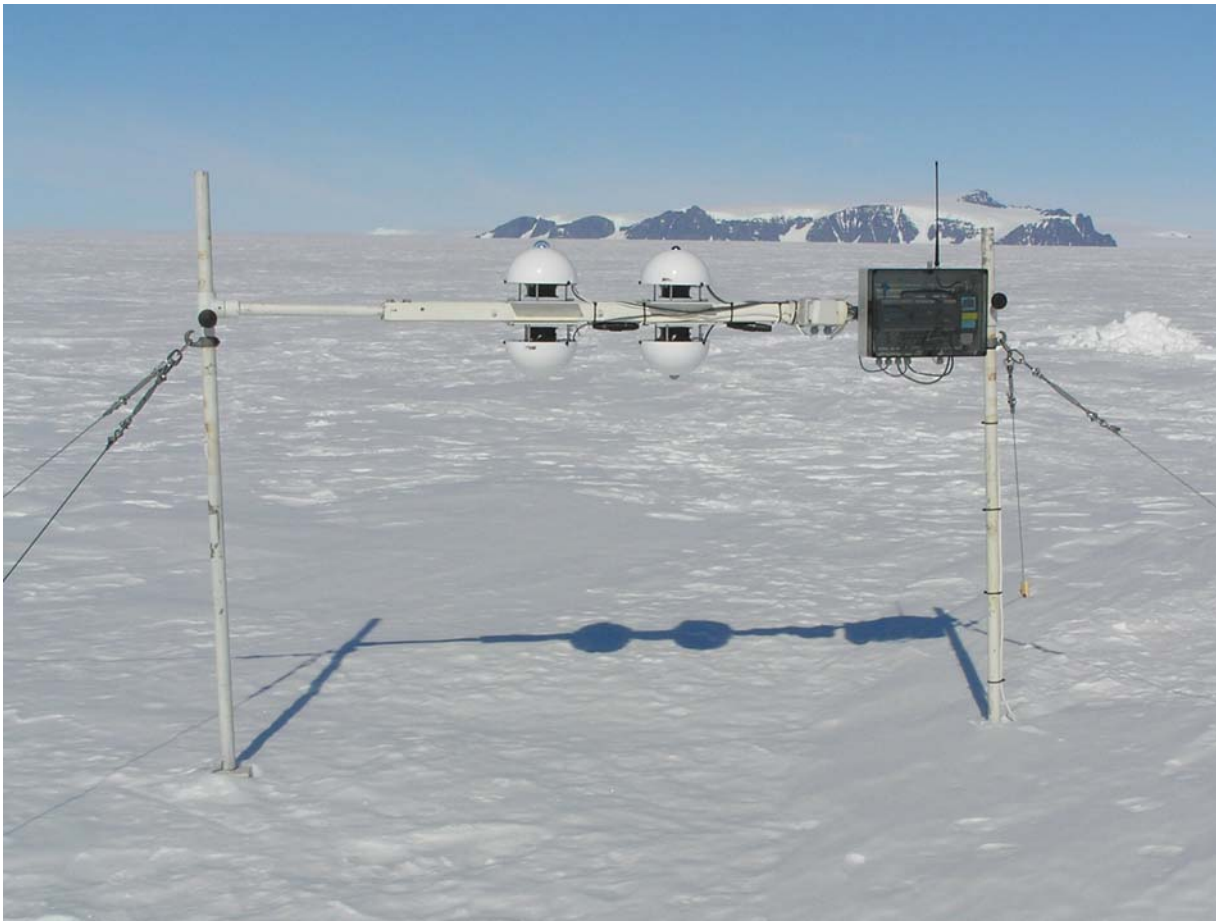


# Radiation studies over snow at the Numerical Weather Prediction Group

1. Broadband albedo
2. Radiative transfer over snow
3. Cloud radiative forcing over snow and ice

# 1. Broadband albedo: data analysis and development of parameterizations

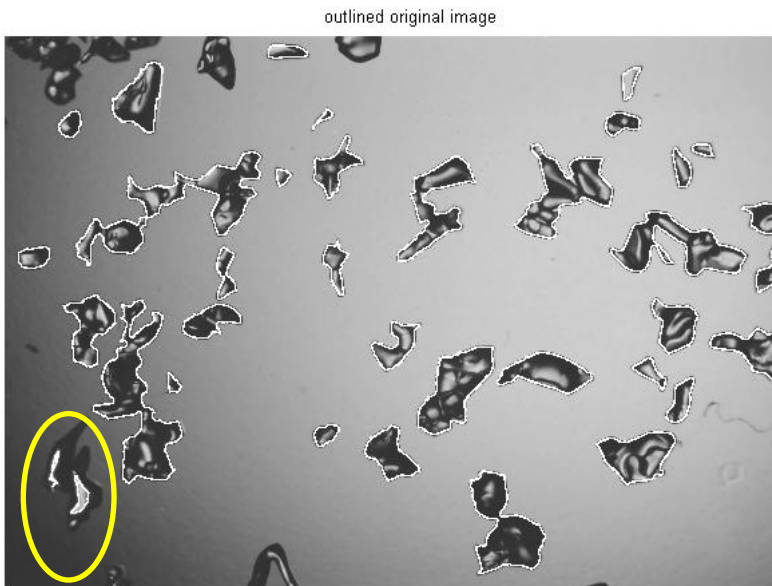
- Diurnal and seasonal albedo evolution over the Antarctic ice sheet (Pirazzini, 2004)
- Diurnal and seasonal albedo evolution over Sea ice in Bay of Bothnia, (in collaboration with MER) (Pirazzini et al., 2006)



# 1. Broadband albedo: data analysis and development of parameterizations

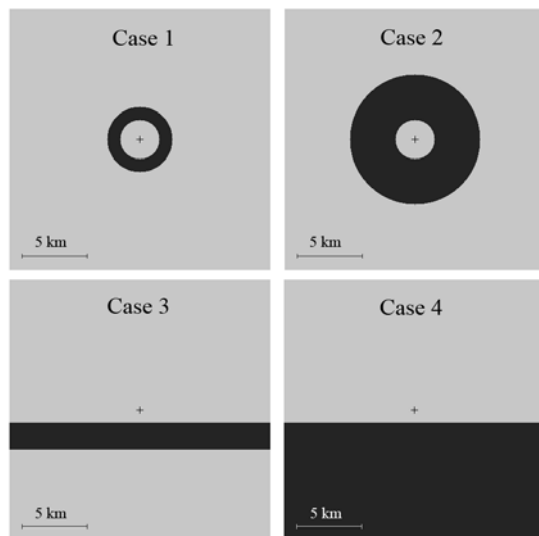
- Analysis of snow grain photos from two Antarctic expedition and from Sodankylä (in collaboration with UHA), in order to relate snow grain size and albedo evolutions: work in progress

Snow grains at 20cm depth on 24/01/07 at 10:45UTC

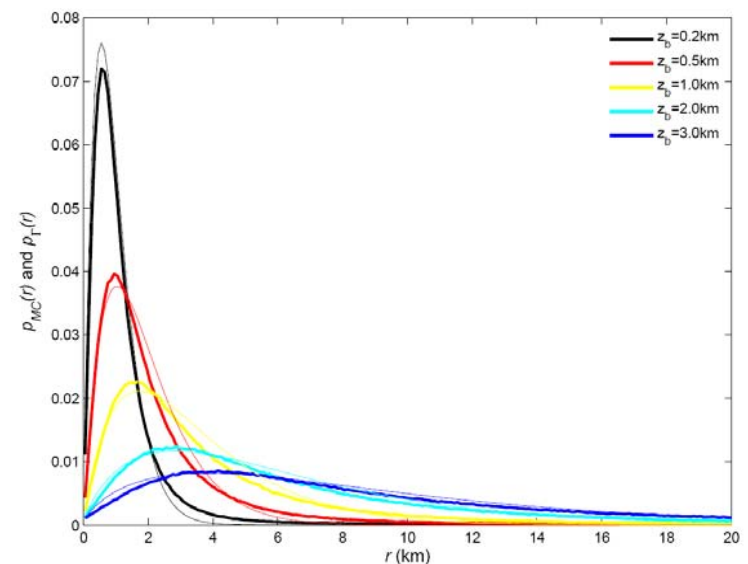


## 2. Radiative transfer over snow and ice:

- Modelling of LW and SW surface fluxes (in collaboration with HU): work in (slow) progress.
- Parameterization of the effect of albedo heterogeneity for single column radiative transfer applications (in collaboration with ILM) (Pirazzini and Räisänen, 2008)
- Impact of cloud heterogeneity and spectrally resolved albedo on the above parameterization (in collaboration with ILM): work in progress.
- Verification of single column radiative transfer schemes (ARMONIE and HIRLAM) over snow surfaces (Sodankylä, Cabauw): work planned for this year but not yet started.



Idealised surfaces (left) and modelled and parameterized probability density distribution of surface reflections contributing to the downwelling irradiance at the observation site (right).



### 3. Cloud radiative forcing over snow and ice:

- Over Sea ice in the Weddell Sea, based on data analysis (in collaboration with MER): work in progress.
- Over sea ice in Bay of Bothnia: work in progress.