



About UV Albedo of Seasonal Snow at Sodankylä

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Finland is especially advantageous for snow albedo studies, as it represents the European Arctic, the snow cover melts every year, we have five out of the six global snow classes, and the topography in Finland is flat, thus favorable to albedo studies. New continuous broadband measurements on Arctic snow UV albedo at Sodankylä (67°22'N, 26°39'E, 179 m asl) were started by the Finnish Meteorological Institute as part of the IPY activities in 2007. In addition, weekly snow samples have been collected for BC analyses at Sodankylä since 2009. More intensive studies on snow UV albedo have been made during the Snow Reflectance Transition Experiment (SNORTEX) at Sodankylä in 2008 - 2010. There the spectral albedo and water liquid content of intensively melting Arctic snow have been measured. In literature, albedo values for clean snow in UV-VIS are ~0.97-0.98, consistent with the extremely small absorption coefficient of ice in this spectral range. We have found that in case of intensively melting arctic snow, with melt water surrounding the several millimeter snow grains, containing possibly BC up to 40 ppb and organic carbon up to 1734 ppb, and confirmed by three independent ancillary snow albedo measurements, the UV-VIS albedo of snow measured at an open snow covered field (surrounded by distant trees not shadowing the field during the measurement) can be around 0.5-0.7. We have also studied the SZA asymmetry of albedo found in the Arctic and Antarctic albedo data, and Radiative Transfer (RT) model calculations have been used to study e.g. the effect of the measured local albedo on radiative forcing.