



Sensitivity studies of Arctic Ice clouds

T. M. Svendby (1), C. Lund Myhre (1), M. Kahnert (2)

(1) Norwegian Institute for Air Research (NILU), Norway, (2) Swedish Meteorological and Hydrological Institute (SMHI), Sweden

(tms@nilu.no / Fax: +4763898050 / Phone: +4763898185)

The northern hemisphere climate of the 20th century has undergone major fluctuations, e.g. an ongoing warming in the Arctic region with a decrease in ice-extent. Through the Norwegian national project MACESIZ (MARine Climate and Ecosystems in the Seasonal Ice Zone) we aim to study to what degree the changes in the seasonal ice zone (SIZ) and the Arctic climate system can be ascribed to natural and anthropogenic forcing. The non-trivial problem of correctly modeling the ice melt will to a large extent depend on radiative properties of cirrus clouds. Within the MACESIZ project we have developed a new database with size and wavelength dependent extinction coefficients, single scattering albedo, and asymmetry parameters for several ice crystal shapes (e.g. bullet rosettes, Koch fractals, hexagonal columns and plates). The new parameters have been applied in radiative transfer calculations to study the sensitivity of Arctic heat flux and radiative forcing related to various compositions of cirrus clouds and surface conditions. Different observations of ice crystal size distributions have served as basis for the Arctic cloud parameterization.