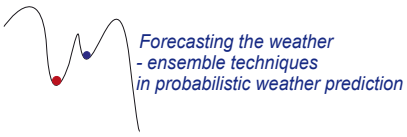
EMS Annual Meeting Abstracts
Vol. 8, EMS2011-82, 2011
11th EMS / 10th ECAM



The role of the effective cloud albedo in climate analysis

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The cloud albedo plays a dominant role in the Earth's radiation and energy budget. Without clouds the Earth's albedo would be halved. As a consequence, the reflected solar energy would drop from ∼100 to ∼50 W/m^2 and the absorbed solar energy would increase from ∼240 to ∼290 W/m^2. In a non-cloudy Earth this effect could only partly be compensated by an increase of the emitted thermal radiation.
The net cooling effect of clouds is more than 10 times higher than the decadel anthropogenic radiative forcing by increase of greenhouse gases. Trends and change in extremes of the effective cloud albedo would change the cooling effect of clouds and would therefore significantly affect the climate on a global and regional scale. The discussed number game illustrates that the effective cloud albedo plays a dominant role in climate monitroing and analysis. Furthermore, this quantity can be precisely observed from satellites without the need of any model or otherwise external data source.
The very nice feature of the effective cloud albedo is its clear and strong signal in the visible spectrum. The cloud albedo can therefore be retrieved in high accuracy also from the first generation of Meteosat satellites. This provides the opportunity to generate a long time series of the effective cloud albedo. Here, the climate version of the well established Heliosat method is applied in order to retrieve a 25 year time series of the cloud albedo and to ensure the homogeneity of the time series across different Meteosat satellites. The method for the retrieval of the long time series of cloud albedo will be briefly described. The main focus of the presentation will be the analysis and discussion of trends in the cloud albedo and their effect on the climate, including the role on global brightening and dimming. The observed significant differences in trends over ocean and land might require a rethinking of recent publications dealing with global dimming and brightening.