

## PARAMETERIZING THE EFFECT OF CLOUD VARIABILITY IN A GCM RADIATION TRANSFER SCHEME

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Currently most general circulation models use the plane parallel homogeneous (PPH) approximation for radiative transfer calculations in the cloudy atmosphere. By neglecting horizontal variabilities a systematic error is introduced in the way that solar albedo is always overestimated. The independent column approximation (ICA) is used in order to quantify this error for clouds simulated by several cloud resolving models. The applicability of two parameterizations is tested: a scaling approach and the gamma weighted two stream approximation (GWTSA). In the former the optical thickness of the clouds is scaled by a factor, extracted from the cloud model data. The factor strongly depends on cloud type. Basic assumption for the GWTSA is that the liquid water path and therefore the optical thickness in cloud layers can be described by a Gamma distribution, which is reasonably well fulfilled in most of the investigated cloud model data. Furthermore the importance of the correlation assumption, i.e. how the distributions in adjacent layers are correlated, is highlighted. Finally an attempt to parameterize the width parameter using GCM output is presented.