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Sensitivity of the global climate simulated by ECHAM5 to the annual surface albedo cycle as a function of vegetation phenology

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A new seasonal land surface background albedo (SBA) cycle for climate modelling has been derived by analysing remotely sensed data from MODIS/Terra. The seasonal variations of total surface albedo and fpar (fraction of absorbed photosynthetically active radiation) were analysed to derive SBA as a function of vegetation phenology. The sensitivity of the global climate simulated by the general circulation model ECHAM5 to the new SBA cycle is investigated. Three simulations were performed at T63 horizontal resolution using the AMIP2 SST as forcing for the period 1978-1999: 1. control simulation with the currently used time-invariant SBA, 2. experiment with the new mean time-invariant SBA field, 3. experiment with time-varying SBA as a function of the leaf area index. The sensitivity of ECHAM5 to changes in the mean SBA and the impact of seasonal SBA changes to the simulated climate are evaluated.