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Vegetation effect on land surface albedo: method to separate vegetation albedo from the underlying surface using satellite data

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Land surface albedo is determined by the contrasts between vegetation properties and those of the underlying soil surface. In the case of light-coloured soils vegetation cover reduces the surface albedo whereas plants on dark soils increase the surface albedo. To separate the vegetation effect from the underlying surface MODIS/Terra satellite data of the time period 2001-2004 are used. The fraction of absorbed photosynthetically active radiation (fapar) and albedo are analysed to detect the seasonal variation in surface albedo caused by vegetation phenology. To describe this relation the total surface albedo is split into soil albedo and vegetation albedo. For both parameters global maps are constructed on a 0.5 degree regular grid. In the northern and mid-latitudes soils are mostly darker than vegetation. In these regions the absorbed energy is decreased by the presence of plants. In the lower latitudes, especially in semideserts, soil albedo is mostly higher than vegetation albedo. Here the absorbed energy is increased by vegetation cover. The computed values of pure vegetation albedo and pure soil albedo are applied to estimate the annual albedo cycle of the regional climate model REMO as a function of the models vegetation phenology