



Satellite-based Analysis of Clouds and Radiation Properties of Different Vegetation Types in the Brazilian Amazon Region

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Land-use changes impact the energy balance of the Earth system, and feedbacks in the Earth system can dampen or amplify this perturbation. We analyse here from satellite data the response of clouds and subsequently radiation to a change of land use for the example of deforestation in the Amazon Basin. In this region, the characteristics of different cloud types over two vegetation types (forest and grasslands) were calculated for a time period of five years by using satellite data from the instruments MODIS and CERES. The cloud types are defined according to height, optical thickness, and fraction for two cloud layers. For calculating the radiative forcing caused by deforestation, the dependency of spatial and temporal averages for the reflected shortwave and outgoing longwave radiation of the top of the atmosphere on vegetation types were determined as well. The results show distinct differences in cloud cover and radiative forcing over grasslands and forests for the two vegetation regimes, implying a potentially significant positive cloud feedback to deforestation.