Assimilation of short and long wavelength satellite observations in a natural vegetation growth model coupled with a soil-vegetation-atmosphee transfer scheme

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The synergy between a vegetation growth and water budget model and satellite observations is investigated. This work has been performed on semiarid grassland within the framework of the HAPEX-SAHEL experiment. The model incorporates both a description of the seasonal functioning of natural vegetation as well as a soil-vegetation-atmosphere transfer (SVAT) model. The SVAT model describes energy and water exchanges between surface and atmosphere. The SVAT model runs with an hourly time step while the vegetation growth model has a daily time step. From the model variables (e.g. Leaf Area Index (LAI), energy ...), we can then compute reflectance and surface temperature time profiles.

Our main objective is to derive information from the remotely sensed data, that are helpful in calibrating the model wherever and whenever ground or literature estimates are missing or inaccurate. By assimilating short and long wavelength observations, model pertinent parameters can be optimised so that a best possible agreement with these observations is obtained. We will discuss the estimation of seasonal energy balances using this approach.

The results suggest that an accurate description of the vegetation seasonal growth is crucial in arid or semiarid regions, because neither soil and nor vegetation dominate the exchange of heat flux and water with the atmosphere and meaning that, the vegetal cover (e.g. LAI) has considerable effect on the surface temperature. This emphasises the interest in assimilating short and long wavelength satellite observations in a vegetation/SVAT model.

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