A CANOPY RADIATIVE TRANSFER SCHEME WITH EXPLICIT FAPAR FOR THE INTERACTIVE VEGETATION MODEL ISBA-A-GS: IMPACT ON CARBON FLUXES

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The carbon assimilation of vegetation depends on CO2 concentration, radiant solar energy, photosynthetic capacity of the leaves and on factors that condition the distribution of solar radiation over the leaves. The radiative transfer scheme within the canopy of ISBA A-gs interactive vegetation SVAT model was defined in 1998 by Calvet et al 1998 according to a self shading approach. The incident fluxes at the top of the canopy go through a multi-layer vegetation cover. Then, the attenuated flux in the PAR wavelength domain of each layer is used by the Jacob Model to evaluate the net assimilation (An) of the leaf. Net assimilation of the leaf estimated for each layer is mixed together to derive the average An quantity of the total vegetation cover. A detailed description of the vegetation radiative transfer scheme within the canopy is given in Appendix B of Calvet et al. 1998.

The objective of the present study is the improvement of the current scheme and its evaluation (Carrer et al. 2013). Assessment of the vegetation transmittance functions and of various canopy light-response curves is made. Quantitative estimates of the impact on Gross Primary Production (GPP) in local stations are presented. This study demonstrates the added value of the upgraded canopy radiation transfer model for the simulation of photosynthesis and GPP. Moreover, this work presents a proof-of-concept for the LSM simulation of the fraction of absorbed PAR (FAPAR), that could have many applications for LSM benchmarking and in the field of assimilation of satellite-derived products in upcoming years.

References:

Keywords: radiative transfer, GPP, FAPAR, vegetation

Comments
No comment for this abstract

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