Biogeosciences Discuss., 6, C979–C982, 2009
www.biogeosciences-discuss.net/6/C979/2009/

Biogeosciences Discussions

Interactive comment on "Modelling LAI at a regional scale with ISBA-A-gs: comparison with satellite-derived LAI over southwestern France" *by* A. Brut et al.

J.-C. Calvet

CALVET@METEO.FR

Received and published: 1 July 2009

Response to Reviewer 2: The authors thank the referee #2 (Werner Eugster) for his review of the manuscript and for the fruitful comments. For an easier comprehension, general comments of the referee are also reported (2.XX).

2.01 [It is not quite clear how the ISBA-A-gs is used in operational mode by MétéoFrance. From the manuscript it looks like a one-way top-down approach without feedback in the reverse direction (from surface to atmospheric model)]

Response 2.01

The SURFEX modelling platform includes a description of soil and vegetation processes. Several options of the land surface model are available (e.g. one or several soil layers). It can be used offline, forced by atmospheric analyses (or by local meteorological observations), or online, coupled with an atmospheric model. In this study, SURFEX is used offline and there is no feedback from the surface to the atmosphere. SURFEX is used for research and operational applications. ISBA-A-gs is one option of the model. When ISBA-A-gs is used, the interactive vegetation capacity may be activated or deactivated. So far, the ISBA-A-gs option was used for research applications, either offline (e.g. Gibelin et al. 2006) or online (e.g. Sarrat et al., 2009). For online applications, the simulations of the coupled model last a few days, at most, and the interactive vegetation is deactivated (LAI values are prescribed).

Sarrat, C., Noilhan, J., Lacarrère, P., Ceschia, E., Ciais, P., Dolman, A. J.,Elbers, J. A., Gerbig, C., Gioli, B., Lauvaux, T., Miglietta, F., Neininger, B., Ramonet, M., Vellinga, O., and Bonnefond, J.-M.: Mesoscale modelling of the CO2 interactions between the surface and the atmosphere applied to the April 2007 CERES field experiment, Biogeosciences, 6, 633-646, 2009.

2.02 [Only one single surface site is used for ground-truthing (Section 4), and it appears that only eddy covariance fluxes have been measured there, but not LAI or surface phenology. Especially with respect to the importance of this aspect (Figures 6–8) the importance of the lack of surface phenological observations for this model validation should be stressed out]

Response 2.02

Yes, we agree. Remote sensing products are an important source of information for vegetation monitoring, as they provide a repetitive and spatially coherent information. There is clearly a need for local validation of models and remote sensing products, but it is equally important to compare remote sensing product between them and to com-

pare them with model simulations in contrasting conditions. An optimal ground-truthing regional network of phenological observations should be dense, address the main vegetation types, and cover the studied period. Unfortunately, the information available is local, patchy, and infrequent, and the importance of the lack of surface phonological observations has to be stressed out. The available information is summarised below. LAI observations were performed at the grassland site of Laqueuille in 2002. They are shown in Figure 7 of Vuichard et al. (2007). The low-fertilized and extensively grazed grassland of Laqueuille grew rapidly in June and reached a maximum LAI of about 2.5 m2m-2 at the beginning of July. A few field observations of LAI were performed in 2005, close to Toulouse, over crops and forests (Dolman et al., 2006, Jarosz et al., 2009). In the case of a wheat crop (Lamasquère), maximum LAI was attained at the end of May and the senescence occurred in June. A barley field (Montbartier) presented maximum LAI values at the beginning of May and the senescence occurred in May. A rapeseed field (Auradé) presented maximum LAI values at the end of April and the senescence occurred in June. The maximum LAI of irrigated maize fields (Saint-Sardos) was attained in July and remained stable till the senescence, which occurred in October. In the case of a sessile oak forest (the Agre forest), leaf emergence was observed in March, and maximum LAI was attained in May (at the beginning of May or later, depending where LAI was measured). Over the Les Landes forest (coniferous trees) site of Le Bray, the maximum LAI of the understory and of the trees were observed at the end of June, and at the end of July, respectively. The total LAI of the forest (trees and understory) reached a maximum value of 3.9 m2m-2 at the beginning of July. Calvet et al. (2008) showed that simulations of ISBA-A-gs performed for C3 and C4 crops in the region of Toulouse are consistent with the observations over wheat and maize fields, respectively. However, ISBA-A-gs has difficulties in representing earlier leaf onsets (e.g. those observed for barley and rapeseed).

Vuichard, N., Soussana, J.-F., Ciais, P., Viovy, N., Ammann, C., Calanca, P., Clifton-Brown, J., Fuhrer, J., Jones, M., and Martin, C.: Estimating the greenhouse gas fluxes of European grasslands with a process-based model: 1. Model

evaluation from in situ measurements, Global Biogeochem. Cycles, 21, GB1004, doi:10.1029/2005GB002611, 2007.

Jarosz, N., Béziat, P., Bonnefond, J.-M., Brunet, Y., Calvet, J.-C., Ceschia, E., Elbers, J.A., Hutjes, R.W.A., and Traullé, O.: Effect of land use on carbon dioxide, water vapour and energy exchange over terrestrial ecosystems in Southwestern France during the CERES campaign, Biogeosciences Discuss., 6, 2755-2784, 2009

2.03 [Graph display issues]

Response 2.03

We agree that some Figures need to be improved.

The two maps displayed in Fig. 1 use the same projection. A box outline could be added to the lower map, similar to the upper map.

The SURFEX grid is not perfectly parallel to the latitudinal lines and consequently does not plot in parallel on a regular lat/lon projection.

Interactive comment on Biogeosciences Discuss., 6, 4059, 2009.