



The carbon observatory of geoland: results and prospects

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To monitor the biosphere vegetation-atmosphere CO₂ exchange using remote sensing data, a combination of an interactive vegetation land surface model with a data assimilation system is a powerful tool. The existing land data assimilation projects (NLDAS, GLDAS, ELDAS) only account for soil moisture and not for vegetation biomass, which limits the use of remote sensing data. The geoland Integrated Project (2004-2006) co-funded by the European Commission, aims at addressing European and global environment issues, based on the use of remote sensing data. The carbon observatory of geoland (geoland/Carbon) will provide a pre-operational global carbon accounting system, dealing with the impact of weather and climate variability on ecosystems fluxes and carbon stocks, on daily to seasonal and inter-annual time scales.

In 2005, the geoland/Carbon activities focused on the consolidation of the three global land surface modelling systems (ORCHIDEE, ISBA-A-gs, C-TESSSEL). They were validated by using local field campaigns (e.g. Fluxnet sites) and global EO-derived LAI products. The 3 models are able to simulate the CO₂ and water flux, soil moisture, LAI and the above-ground biomass. At this stage, ORCHIDEE is the only model able to estimate the carbon storage and the root biomass. However, the development of a version of ISBA-A-gs able to produce carbon storage and the root biomass is well advanced (the first tests over local sites were performed). Regarding data assimilation, it was shown that the vegetation biomass has to be analysed together with soil moisture. A strategy to implement such a pre-operational system is presented. A prototype 2D assimilation system was implemented over SW France. It will be tested in conjunction with the CarboEurope Regional Experiment.