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High-resolution simulations of vegetation growth over France between 1994-2007: Analysis of its inter-annual variation.

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Land surface models describe the exchange of water, carbon and energy between the continental biosphere and the atmosphere. They are an important part of the numerical weather prediction systems and a valuable tool to describe and understand the functioning of the vegetation. In particular, allowing a more accurate quantification of the inter-annual variability of the vegetation, which is strongly driven by climate variations.

In this context; the CARBOFRANCE project studies the variability of carbon and water fluxes over France. The project includes analyses of measurements obtained from 14 existing flux towers in combination with high-resolution process models. As part of this project, new simulations of the vegetation (Leaf Area Index (LAI), water and carbon fluxes) have been undertaken over France (a domain of 550,000 km2). Using a high resolution (1km) land cover map (ECOCLIMAP II) and an 8km resolution hourly meteorological forcing data set (SAFRAN), the land surface model ISBA-A-gs (included in the SURFEX modeling platform) was run to simulate the development of the vegetation

Through this modeling framework we obtained LAI estimates for more than a decade (1993-2007) at a high spatial resolution (8 km). These data allow us to study in depth the inter annual variation in vegetation development and the relationship between vegetation and atmosphere in contrasted environments (low lands and mountains).

In this study we have a) evaluated the model with both in situ measurement and remote sensing products) and b) investigated the inter annual variation of a number of simulated variables (carbon, water and energy fluxes)and c) Compared our simulations with similar simulations from an other vegetation model : the ORCHIDEE model.

This work is a preliminarily step for the set-up of the Land carbon information Service of the GEOLAND-2 European project.