Geophysical Research Abstracts
Vol. 15, EGU2013-11812-1, 2013
EGU General Assembly 2013

Impact of the use of BIOPAR Leaf Area Index (GEOV1) within a global numerical weather prediction system

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Owing to the importance of the vegetation in the land-atmosphere interaction processes, numerous studies have tried to use satellite observations to give information on the vegetation layer, and attempted to evaluate the quality of this information through their signals and impacts. This study assesses the impact of introducing a climatology and a near real time (NRT) versions of the new GEOLAND2 LAI product (GEOV1) -which is based on SPOT VEGETATION observations- on the surface fluxes and near surface atmospheric variables.
Two types of global model experiments (stand-alone surface simulation and medium range forecasts) were performed using: i)only the ECMWF land surface model CHTESSEL and ii)coupled with the Integrated Forecast System. The evaluation of the GEOV1 LAI climatology with the forecast runs shows an overall positive impact on the near surface temperature and humidity especially in northern hemisphere spring, however a slight negative impact is seen on the 2m temperature in summer over Europe.
The offline surface runs and forecasts experiments confirm the benefit coming from a more realistic treatment of vegetation by the use of NRT LAI. Using NRT LAI, anomalous year could be detected and surface fluxes were directly affected by the LAI interannual variability. The forecast runs confirmed this positive impact on the near surface weather parameters and its potential to account for near real time issues such us a rapid change in the LAI due to fast growth or harvest as well as interannual variability due to an extreme drought or an extensive snow season that may inhibit growth.