Geophysical Research Abstracts
Vol. 14, EGU2012-5648, 2012
EGU General Assembly 2012
© Author(s) 2012

Lidar sampling study over the Barbeau/Fontainebleau forest

X. Shang (1), P. Chazette (1), K. Soudani (2), and E. Dufrêne (2)

(1) LSCE, CEA-CNRS-UVSQ, 91191 Gif sur Yvette Cedex, France (xiaoxia.shang@lsce.ipsl.fr), (2) ESE, CNRS-UPS-AgroParisTech, 91405 Orsay cedex, France (kamel.soudani@u-psud.fr)

The establishment of relationships between forest stand structure attributes and lidar measurements has been demonstrated by several publications to be a powerful asset to assess the aboveground biomass over a wide range of spatial scales. The new Canopy UV (355nm) lidar ULICE (Ultraviolet LIdar for Canopy Experiment) has been developed by CEA (France) and can fly aboard an Ultra-Light Aircraft (ULA) as well as on the French scientific aircraft Falcon-20. It has been deployed for the first time above the Barbeau forest (NE of Fontainebleau forest) in the south-east of the Paris area on November 2010. Exogenous measurements were also performed from a GPS and an artificial horizon to precisely locate the lidar ground track. The measurements performed from ULICE provide information on the vertical structure of the forest canopy (tree top heights, thicknesses of crowns of both overstory and understory trees) from the lidar-derived waveforms. Hence, the different contributions of the tree species (e.g. Oak or Hornbeam) to the lidar signal can be separated. The tallest trees have been identified and located in the Barbeau area. From such a partition we have highlighted three main different forest structures: high forest of oak without understory, high forest with a dense understory of coppiced hornbeam, and coppiced hornbeam, of which the carbon reservoirs can be very different. We have established a statistical relationship linking the vertical lidar profile in the forest structure with the tree-species distribution derived from the forest census. The site of $\sim$25 ha is representative of the forest ecosystem of Fontainebleau. Hence, such information will be a helpful tool for the assessment of the aboveground biomass at the regional scale of Fontainebleau. The experiment has been funded by the Centre National d'Etudes Spatiales (CNES) and the Commissariat à l'Energie Atomique (CEA).