Geophysical Research Abstracts
Vol. 14, EGU2012-11555, 2012
EGU General Assembly 2012

Measurements of turbulence and vegetation structure across a forest clearing

R. Queck (1), C. Bernhofer (1), A. Bienert (2), and H.-G. Maas (2)

(1) Technische Universität Dresden, Chair of Meteorology, Germany, (2) Technische Universität Dresden, Chair of Photogrammetry, Germany

Detailed knowledge of the energy and mass exchange between forests and atmosphere is essential for the assessment of carbon sequestration of forests and their capacity for absorption and emission of atmospheric trace gases. Compared to agricultural land uses the vegetation layer of forests is much larger, involves significant currents of air and acts as storage for energy and gases. Advective fluxes within and above a forest canopy occur as a result of the heterogeneity of the soil conditions and the vegetation composition.
Turbulent and advective fluxes change with meteorological conditions (e.g. radiation, wind speed and direction) but also with the state of the canopy. The influence of the canopy structure on the fluxes is rarely investigated.
To address this topic and to improve the parameterisation of unresolved exchange effects at inhomogeneities in numerical models the TurbEFA experiment was designed.
TurbEFA is the acronym for the interdisciplinary project “Turbulent Exchange processes between Forested areas and the Atmosphere”, it encompasses the work of five groups applying terrestrial laser scanning, meteorological field measurements, wind tunnel measurements, boundary layer modelling and large eddy simulation.
Subject of investigation is the FluxNet site ‘Anchor Station Tharandt’ which is located about 20 km southwest of the city of Dresden in Germany (N 50°57’49", E 13°34’01", 380 m a.s.l.). From May 2008 to May 2009 intensive measurements took place across the forest clearing „Wildacker“ in the vicinity of the FluxNet site. Sonic anemometers at 32 measurement positions in total are used to record the turbulent flow at 4 towers (heights: 40m, 40m, 40m, 30m) and five ground level positions (2 m).
The forest stands around the clearing (500 m x 60 m) were scanned applying a terrestrial laser scanner. Thereby scans from different ground positions and from the top of two towers (height: 40m) were accomplished. The scans were filtered and combined to a single 3D representation of the stands.
The presentation describes the field measurements which are conducted in the frame of TurbEFA. They are part of a reference data set available at the project homepage. The aim of this presentation is to make the dataset public and to invite modellers to further data analysis.