



Turbulent ozone fluxes and ozone deposition velocities within and above a spruce forest (Waldstein/Fichtelgebirge)

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To study the processes of ozone dry deposition at the forest floor and above the forest canopy, ozone fluxes have been measured by the eddy covariance method at the spruce site in September and October 2007. Our instrumentation included (a) a GFAS fast-response ozone sonde (surface chemiluminescence), (b) a slow-response ozone analyzer (UV absorption), and (c) a 3D Gill sonic anemometer. Half-hourly mean ozone fluxes, deposition velocities (V_d) and uncertainties have been computed and analyzed. Our results show, that there are obvious variations in the diel pattern of the ozone flux and deposition velocity above the forest canopy. Mean ozone mixing ratios over the forest were 34.4 ppb and 30.7 ppb, mean V_d are 0.75 cm.s^{-1} and 0.52 cm.s^{-1} , and mean corresponding ozone fluxes are $-0.46 \times 10^{-6} \text{ g m}^{-2} \text{ s}^{-1}$ and $-0.28 \times 10^{-6} \text{ g m}^{-2} \text{ s}^{-1}$ during daytime (06:00-18:00 local) and nighttime (18:00-06:00 local), respectively. At the forest floor (at 1m), mean ozone V_d and flux are 0.05 cm.s^{-1} and $-0.025 \times 10^{-6} \text{ g.m}^{-2} \text{ s}^{-1}$, respectively. The diel variations of the ozone V_d and the ozone flux could hardly be observed. The means of ozone V_d which have been corrected for lag time differences, insufficient frequency response, non-level terrain (coordinate rotation, planar fit), and density fluctuations are +11.7%, +2.1%, +7.4%

and -1.0% larger (smaller) than those before the corrections, respectively.