



Turbulent and Advective Transport in Mixed Forests

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Turbulent and advective transport are controlling factors in mass balances of heat, moisture and trace substances inside and above canopies. The different terms of balance equations for sensible heat and moisture were determined from measurements in the field during ECHO 2002/2003 and compared to results of BEMA 1993/1994. All experiments were performed in mixed forests of different canopy height h and LAI.

Different results will be discussed: Depending on the upper canopy flow conditions and radiation input, the flow inside the canopy is coupled to or decoupled from the atmosphere above. Secondary flow systems can develop by thermal gradients leading to strong deviations of flow directions in the canopy during daytime and nighttime. The daytime secondary flow inside the canopy decouples and couples to the flow at canopy top with a frequency of about 0.002-0.005 1/s. The decoupling of the flow direction is observed mostly for $z/h < 0.8$. For many conditions the divergence of the wind field dominated the balances of heat and moisture.