



Changes of the spruce forest stand aerodynamic properties during ten growing seasons

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Objective of this study was to quantify the influence of a young spruce forest stand on airflow and its aerodynamic characteristics during ten growing seasons. With this aim the wind speed profiles measured in and above investigated spruce stand during growing seasons, from May to October, 1998-2007 were analysed. Experimental site is situated on a mild slope with SW orientation in the locality Bílý Kříž (49°30'17" N, 18°32'28" E, 898-908 m a.s.l.), which is in the highest part of the Moravian-Silesian Beskydy Mts, Czech Republic. The experimental site consisting of two plots Fd and Fs with different tree density is created by the monoculture of young Norway spruce stand (*Picea abies* L., Karst) with age of 17 years in 1998. Each of these plots has the area of 2500 m², density of 2600 trees/ha in Fd plot and 2400 trees/ha in Fs plot in 1998, and gradually 1652 trees/ha (Fd) and 1428 trees/ha (Fs) in 2007. The aerodynamic characteristics can be described by the roughness length (z_0) and the zero plane displacement (d). The presented study aims to analyse the changes in d and z_0 values for a young spruce forest stand during ten consecutive growing seasons, and to relate the aerodynamic properties of an air layer affected by this stand to its growth parameters. It is known, that the local terrain and structure of forest stand influenced the direction and power of the airflow, as well as the structure of vertical wind speed profiles. From the wind speed profile analysis it follows, that the investigated spruce stand was in an aerodynamic unsteady state and then d and z_0 values vary also with the wind speed. During investigated seasons the mean seasonal z_0 values ranged between 0.48 m and 1.32 m in Fd and the corresponding values in Fs plot varied between 0.41 m and 1.36 m. The mean seasonal d values varied between 0.60h and 0.76h in Fd, and 61h and 0.76h in Fs, h is mean stand height.