Windstorm effect on forest sources of biogenic volatile organic compound emissions in the High Tatras

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A b s t r a c t : The 19 November 2004 windstorm caused significant forest damage in the High Tatras. The windstorm effect on forest sources of biogenic volatile organic compounds (BVOC) has been studied using BEIS2 series of GLOBEIS model for a domain of square 16 km x 16 km with grid 1 km for periods from July to September in 2004 and 2005, respectively. Differences of total emissions of native species isoprene (ISO), total monoterpenes (TMT), other VOCs (OVC) reflect land use and vegetation structure changes due to windstorm disturbance. The decrease of emissions in range 53–59% is adequate to a 59% reduction of forest vegetation area. Estimates of total BVOC quantity for the considered periods 2004 and 2005 were 606 t (ISO - 164 t; TMT - 242 t; OVC - 201 t) and 275 t (ISO - 67 t; TMT - 113 t; OVC - 95 t), respectively. The uncertainty of the BVOC emission models is substantially larger than for anthropogenic emissions. The improvement of advanced biosphere-atmosphere exchange models includes additional parameters and reproduces the seasonal cycle.

Key words: BVOC emissions, BEIS model, windstorm, forest vegetation, the High Tatras model domain

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