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Validation of a SVAT model by sap flow, sensible and latent heat flux measurements

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Soil-Vegetation-Atmosphere-Transfer (SVAT) models are useful tools to quantify water and carbon fluxes. For example climate change will affect ecosystems in different ways with different consequences at the local or regional scale. SVAT models can be used to predict these consequences for extreme or future scenarios. In order to discern vegetation response to climate change from total exchange at the ecosystem level, parameterization of plant physiological processes is essential. Latent and sensible heat are important variables in meteorology, hydrology and ecology. Both latent and sensible heat fluxes determined by eddy covariance measurements of the CarboEurope project as well as tree sap flow measurements were used for SVAT validation. Data from two test sites, an old-growth beech and an old spruce stand in Saxony (Germany), were used for simulations of the model SVAT-CN. The sap flow data are measured by the Granier system that is installed in beech stems as well as in spruce. The period of investigation ranges from 2001 to 2006 for the spruce forest and from 2005 to 2006 for the beech forest. The results show higher sensitivity of the trees to soil water availability than to water vapour flux. Further the sap flow measurements provide an additional proof of model results.