GENERAL INFORMATION

author(s)	Deurinck L
year	2000
English title	Modelling the carbon cycle in a mixed deciduous forest
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supervisor	Lemeur R, Samson R
institution	Laboratory of Plant Ecology
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MATERIALS & METHODS

study area	5n (scientific zone)
time period	1997
goal	Adapt the photosynthesis module of the FORUG model (Samson_etal_1997a) and extend the model by incorporating a shrub layer and other C fluxes (i.e., leaf respiration, woody tissue respiration, soil respiration and allocation). Construct a user-friendly model to simulate the C cycle in broadleaved forests.
set-up	Photosynthesis is simulated by the light response curve method and by the Farquhar approach, for three canopy layers and one understory layer. The vertical distribution of the LAI is determined by spatial and temporal input variables. Leaf respiration is calculated with temperature-dependent functions. Woody tissue respiration is modelled by the algorithms of Ryan. Stem and branch respiration area expressed based on sapwood volume or stem area. Soil respiration is incorporated as an exponential function of soil temperature. The model simulates the daily dynamics of growth, mortality and biomass in the different parts of the forest ecosystem (leafs, branches, twigs, stems, fruits, fine roots, large roots).
data collection	
remarks	+ FORUG-SKYCOOFOREST Modelling C fluxes in a mixed broadleaved forest. Manual (in Dutch)

RESULTS

Total net photosynthesis for 1997 was 7.74 ton C/ha (light response curve) and 11.86 ton/ha (Farquhar), 1.3 ton/ha (light response) or 3.9 (Farquhar) for the shrub layer. Respiration of the woody biomass was 3.4 ton/ha (oak-beech plot), 2.73 ton/ha (ash plot). If the temperature is + 1.5°C and the CO_2 concentration is 700 ppm, the overall net C exchange will be lower because of a higher respiration. Yet, the C uptake remains positive.