



Test of the new agro-forestry model “AFCASS”

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Based on plot scale experiments and simulations we develop and parameterize the new Agro-Forest Crop Atmosphere Soil System model (AFCASS) within the ecosystem modelling framework Expert-N that combines tree growth and crop respectively grass growth models assuming three different field areas: (i) tree strip area, (ii) transition area between trees and crop/grass and (iii) crop/grass land area to simulate the complete field scale agro-forestry system.

The model structure of the new model is presented and discussed. Simulations include light attenuation and plant internal water flow, leaf photosynthesis, plant growth and nutrient uptake for the three different agroforest areas for which also soil organic matter turnover and specific crop residue management is modelled by using the models SOILN and CENTURY and the Expert-N surface litter turnover model adapted to include tree litter: twigs, branches and specific fruits.

The model is parameterized and tested using experimental data obtained by sub-projects of the BONARES SIGNAL Project that investigates agro-forestry systems at five different sites within different regions of Germany.

It is the aim to study scenarios to analyse possible impacts of various management options (tree & crop area, tree & crop species, crop rotations, harvesting intervals, exposition) on soil and ecosystem properties (biodiversity, C-sequestration, nitrate leaching, soil erosion, plant water availability).