



EUROPEAN FOREST INSTITUTE

Taru Palosuo

YASSO-model

Modelling party
April 5-8, 2006 at Koli, Finland

www.efi.fi





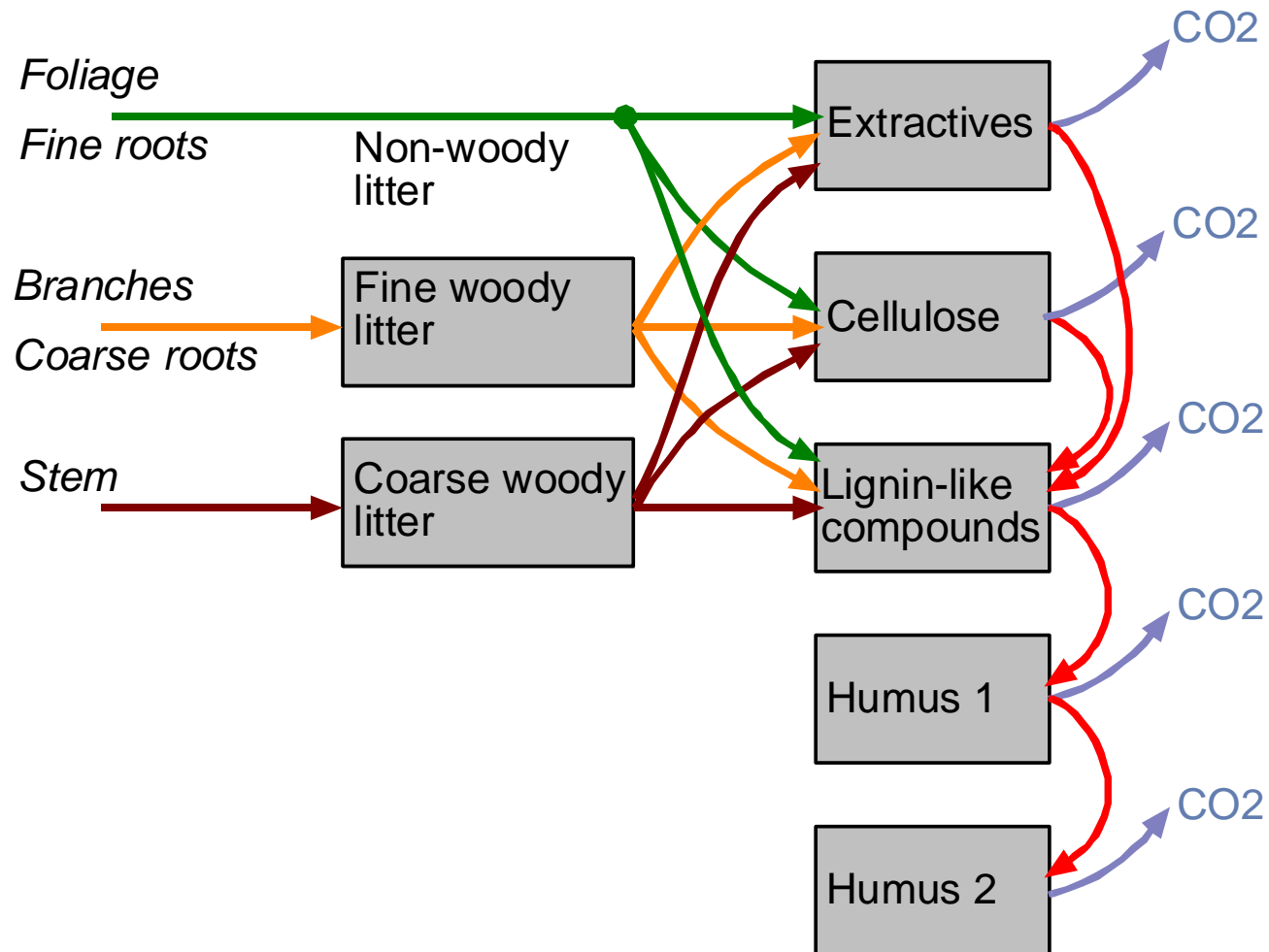
Aims

- model for forestry applications
- model between detailed models (e.g. CENTURY) and simple models (e.g. LPJ)
- yearly timestep



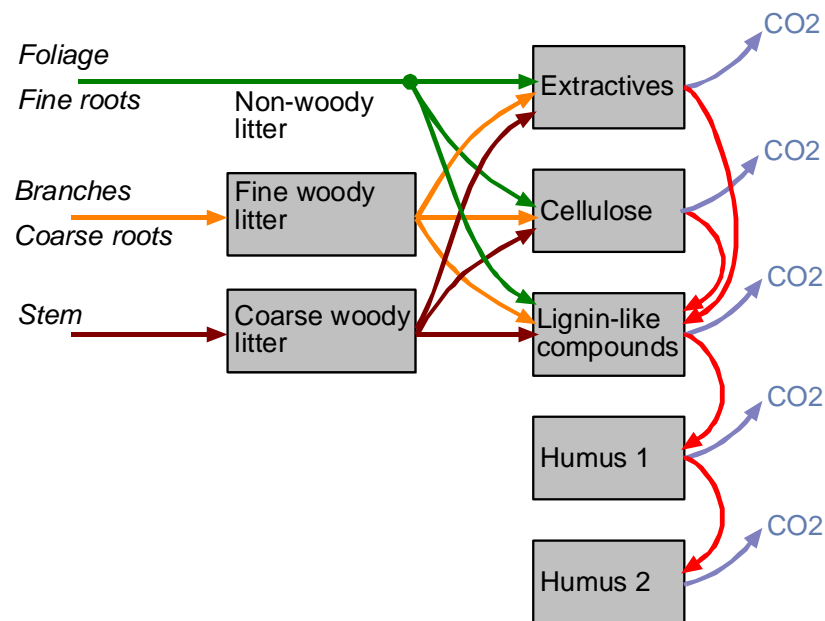


Yasso - Model structure





Assumptions



- 1 Litter and soil organic matter consist of different compounds that decompose at their typical rates.
- 2 Decomposing compounds lose a certain proportion of their mass in a unit time.
- 3 A proportion of the decomposed mass leaves the soil mainly as CO₂ while the rest forms more recalcitrant compounds.
- 4 The decomposition rates depend on temperature and moisture.
- 5 Woody litter is not readily decomposable according to its chemical quality.





Input data

- litter input
 - non-woody, fine woody and coarse woody litter
- litter quality
 - extractives, cellulose and lignin-like compounds
- climate data:
 - mean annual temperature or
 - effective temperature sum
 - for the drought index
 - mean monthly temperatures
 - monthly precipitation
- initial soil carbon





Limitations

- Applicable for upland forest soils
- Climatic regions climatic restrictions
 - Annual mean temperature
 - from -5 to 17 °C
 - Temperature sum (0 °C threshold)
 - from 1100 to 6100 °C days
 - Precipitation - PET (May to September)
 - from -560 to 180 mm
- Compartments not measurable





Examples of applications on regional scale

- Statistics Finland. 2006. Greenhouse gas emissions in Finland 1990-2004, National Inventory Report to the European Union, 15 January 2006. 264 p. [Reprint](#).
- Statistics Finland. 2005. National Greenhouse Gas Inventory System in Finland. 40 p. ISBN 952-467-384-3. [Reprint](#).
- Liski J., Lehtonen A., Palosuo T., Peltoniemi M., Eggers T., Muukkonen P. and Mäkipää R. Carbon accumulation in Finland's forests 1922-2004 - an estimate obtained by combination of forest inventory data with modelling of biomass, litter and soil. Manuscript accepted for publication in Annals of Forest Science.
- de Wit, H., Palosuo, T., Hysten, G. & Liski, J. 2006. A carbon budget of forest biomass and soils in southeast Norway calculated using a widely applicable method. Forest Ecology and Management 225(1-3): 15-26.
- Thuerig, E., Palosuo, T., Bucher, J. & Kaufmann, E. 2005. The impact of windthrow on carbon sequestration in Switzerland: a model-based assessment. Forest Ecology and Management 210(1-3): 337-350.
- Soil module of CO2FIX, EFISCEN and MOTTI





Further information

<http://www.efi.fi/projects/yasso/>

