



Modelling light availability in agroforestry systems

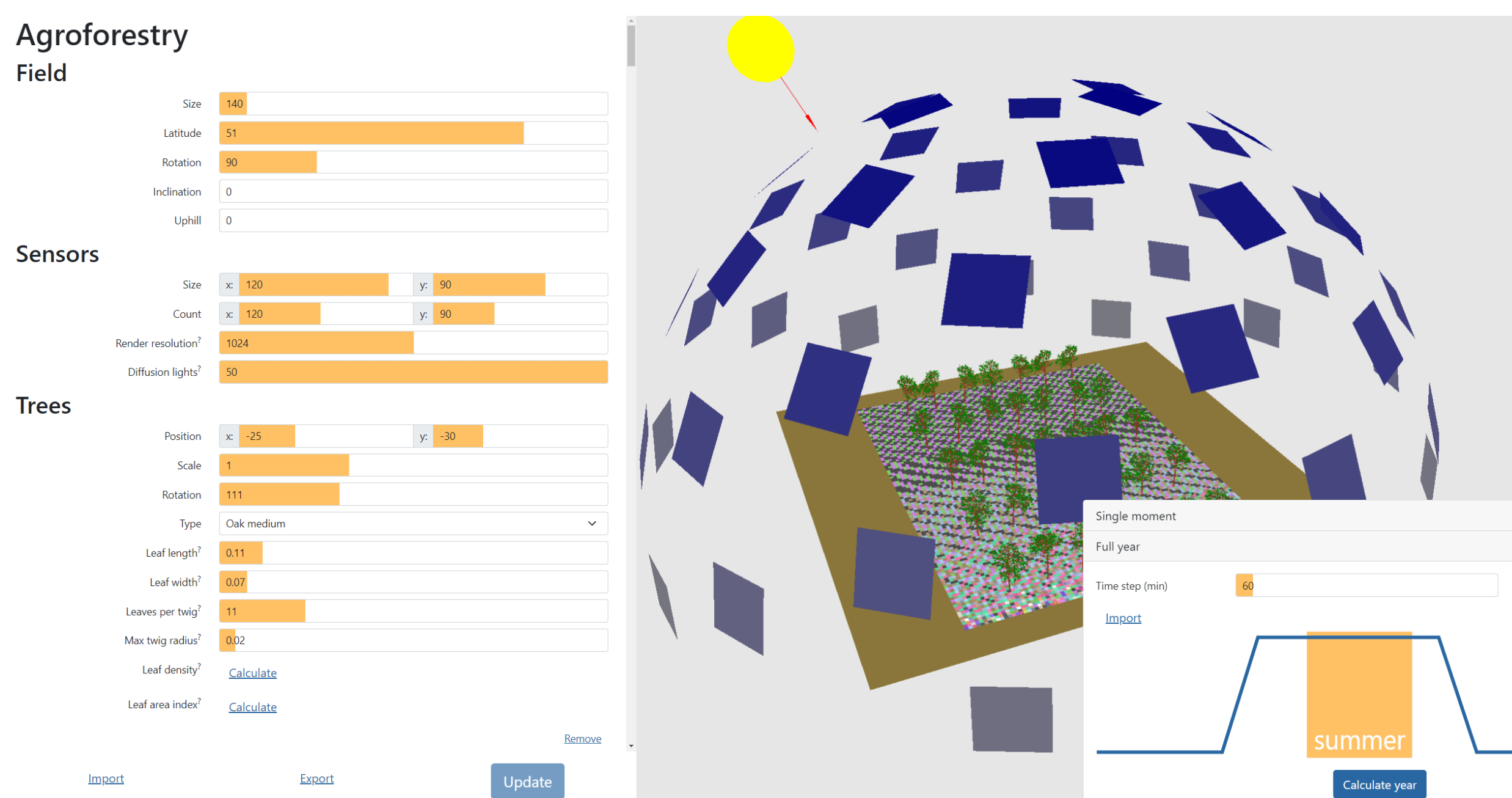
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Agroforestry meets precision agriculture

Because of the deliberate spatial variability in micro-climate, agroforestry systems could benefit from a **precision agriculture** approach: e.g. choice of varieties or fertilizer can be varied with distance from the tree row.
 This requires quantification on the variation in micro-climate, which is mainly driven by tree **light** interception.
 Our tool quantifies the variation in light intensity using 3D reconstructions of LiDAR scans of real trees.

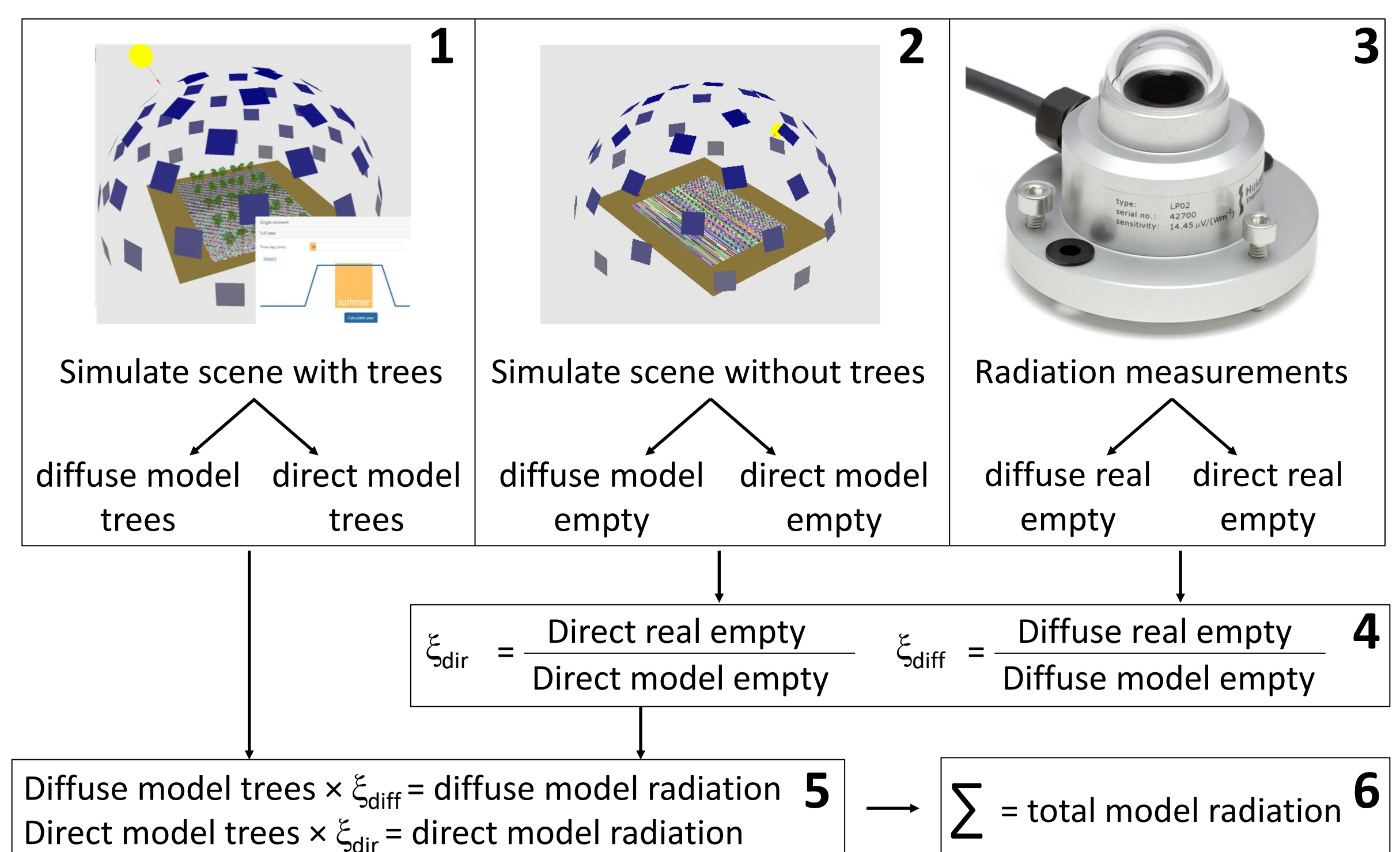
1. Scene generation

<https://agroforestry.ugent.be>



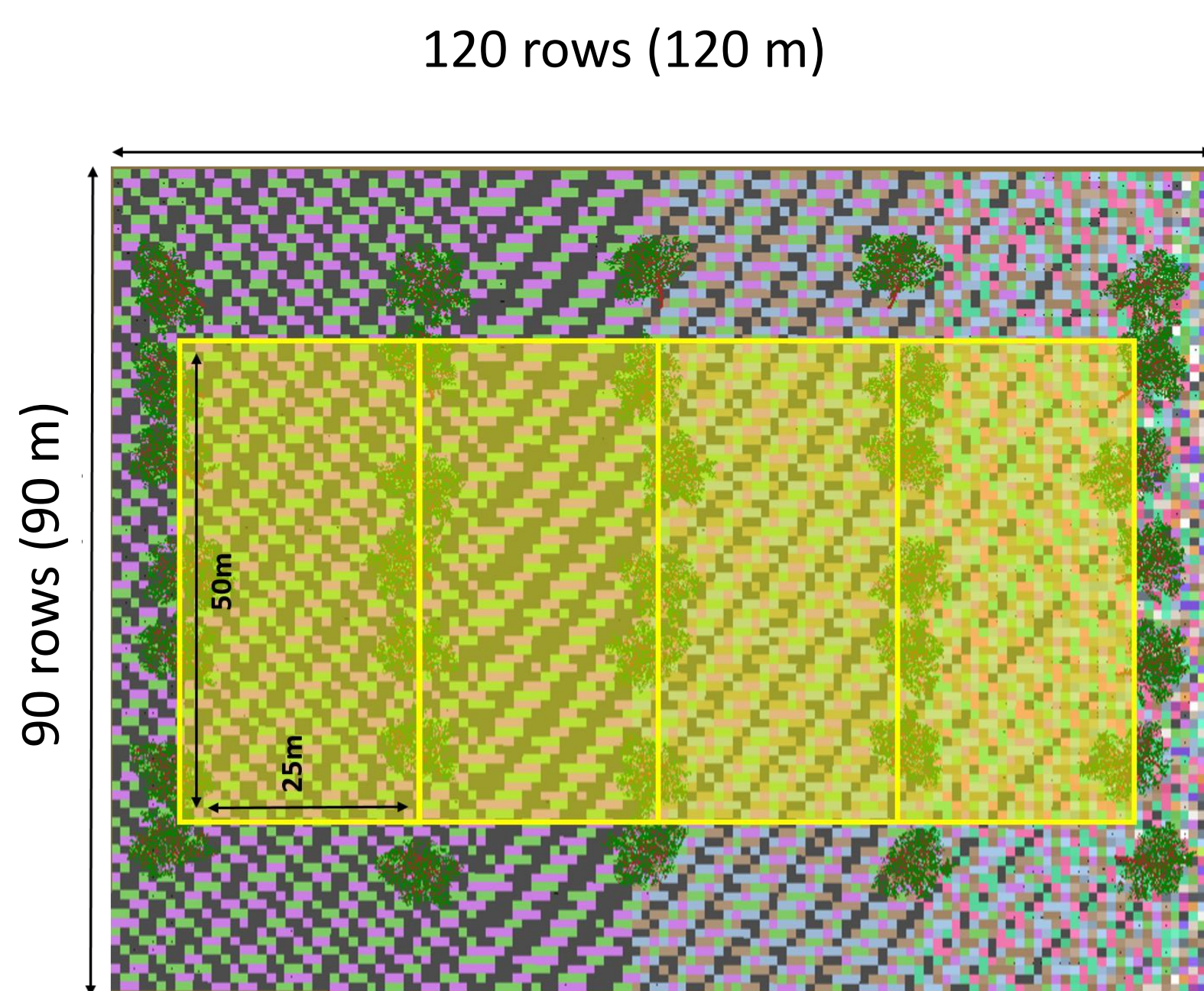
Step 1: Screenshot of the light modelling tool that allows you to generate a scene with LiDAR trees and calculate relative light intensities for each “floor tile”.

2. Data conversion



Step 2: Workflow to convert ‘relative intensities’ from the model tool into absolute values of light intensity.

3. Data aggregation

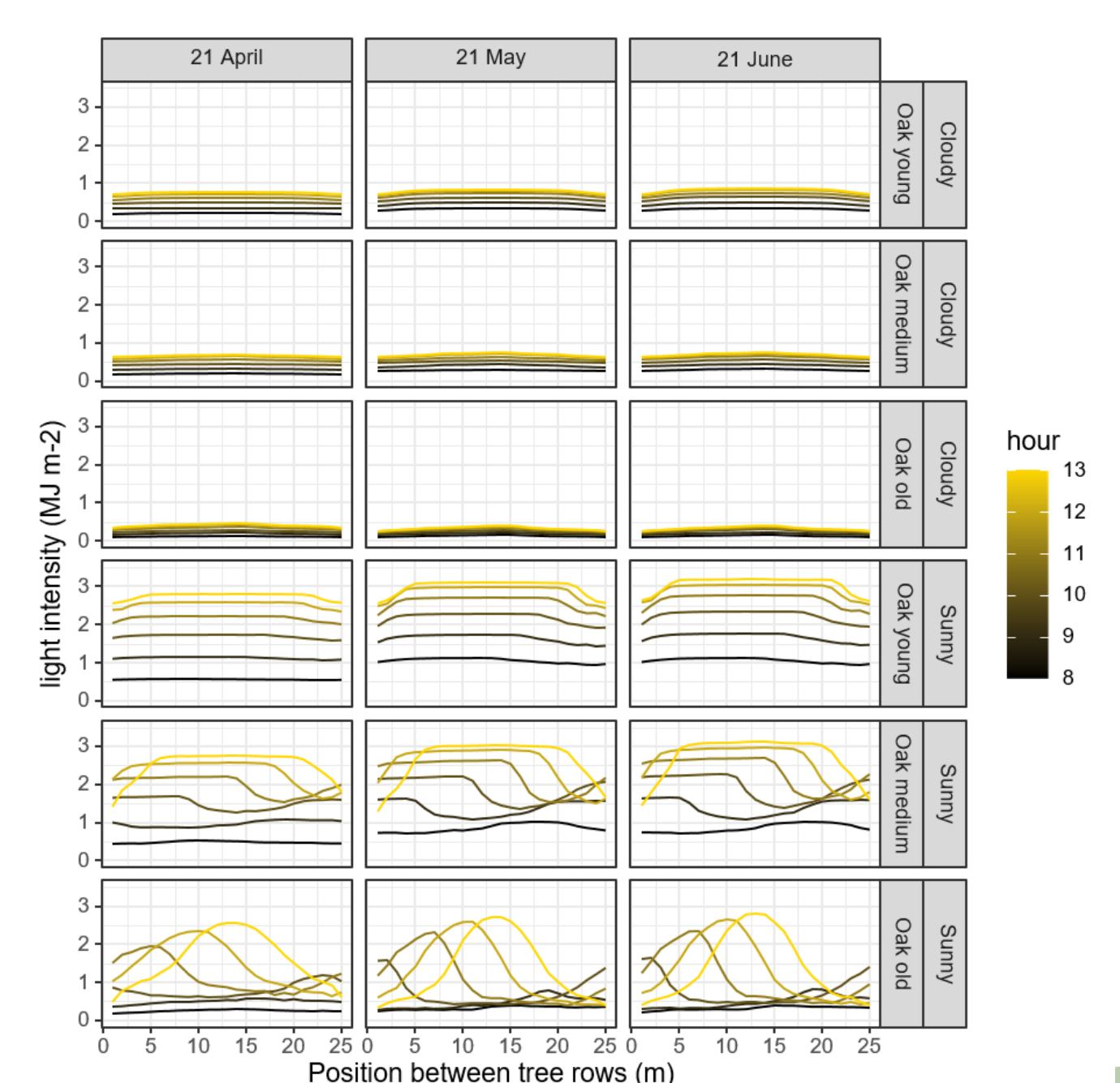
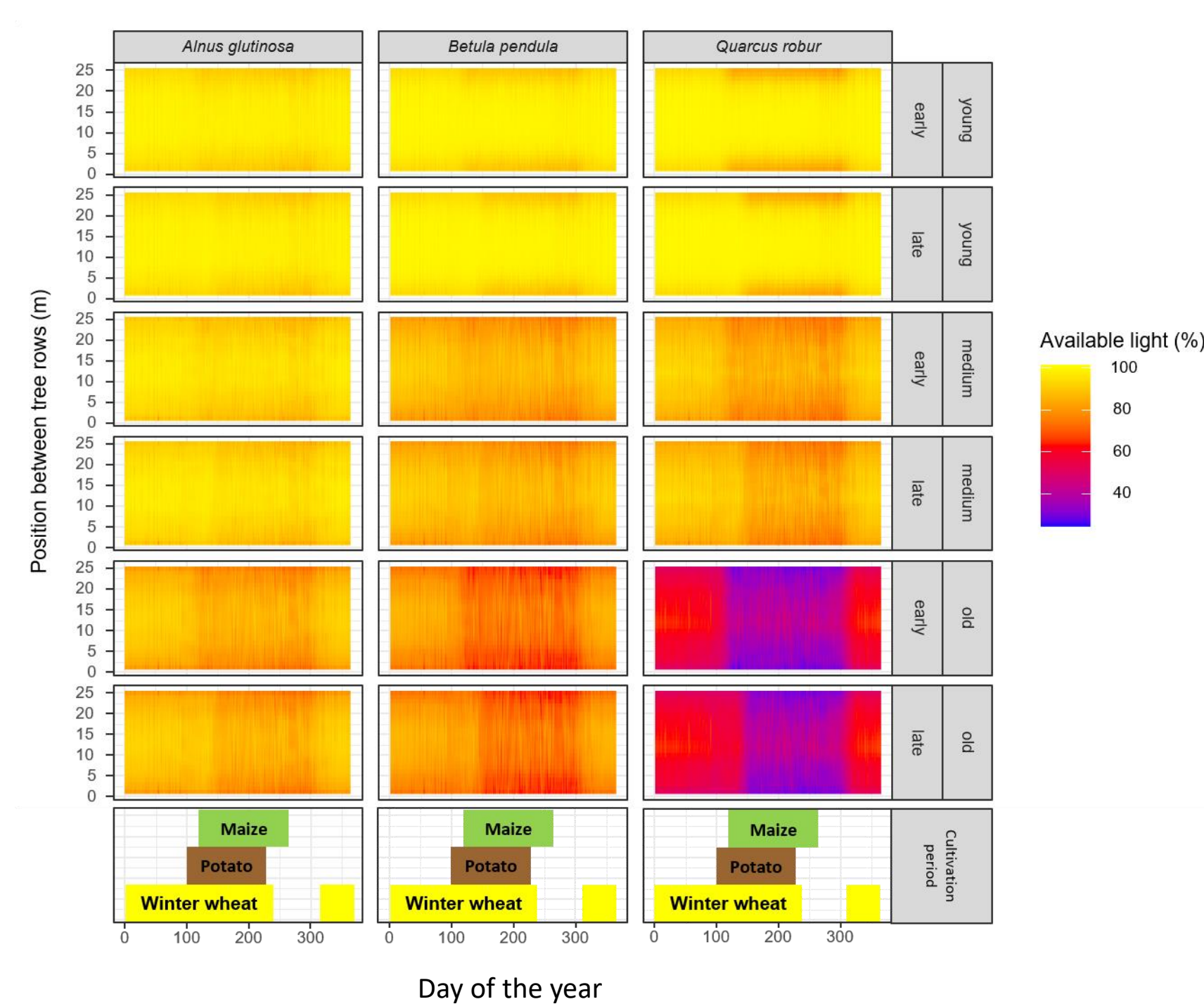


Step 3: Aggregate the data spatially from a single tile into rows or groups of tiles, and temporally from hours into days or whole years.

4. Examples

3 species: *A. glutinosa*, *B. pendula*, *Q. robur*
 3 tree ages: *young*, *medium* and *old*
 2 phenology scenarios: *early* and *late*
 365 days, mapping on three crop seasons

1 species: *Quercus robur*
 3 tree ages: *young*, *medium* and *old*
 2 light scenarios: *cloudy* and *sunny*
 3 days: 21 April, 21 May and 21 June



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