



## 3D visualization of simulated forest gap-dynamics

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State-of-the-art Dynamic Global Vegetation Models (DGVM) with gap dynamics produce a complex vegetation structure from which the average properties of a simulated gridcell are calculated. To derive an average state of a large spatial extent (simulated stand or gridcell) a predefined number of forest ‘patches’ of a small areal extent is repeated with stochastic dynamics in the establishment and mortality of individual trees or grouped ‘age cohorts’ but with identical environmental drivers. By default the output (e.g. vegetation carbon mass, carbon fluxes, leaf area index, fire probability, ...) is reported as the average over those patches. This data is then prepared and visualized in standard box-plots, line-graphs, maps and many more abstract forms for scientific papers and presentations. The averaging simplifies the handling of the model output with the loss information on vegetation structure.

When presenting to a broader audience outside the scientific community it is often hard to convey the complexity of model output state condensed into these abstractions, and impossible to communicate the full information of the model output. Here we present the R package DGVM3D, which uses output from the DGVM LPJ-GUESS per forest patch to visualize the heterogeneity of patches as individual 3D shapes. In our representation tree cohorts are distinguishable by their leaf type (shape), shade-tolerance (color) and age (height). Each patch is displayed separately, with all cohorts visible and scaled correctly to the patch area. Fire occurrences are visualized as flames. Either snapshots in time or a successional time-series of one or more patches can be visualized. This package can be used for teaching or to illustrate the modeled vegetation state in scientific presentations. It conveys more information on vegetation structure, for instance habitat characteristics or age structure, that are more relevant to stakeholders than e.g. averaged carbon pools. The tool might therefore also help to bridge between communities and facilitate the communication of information based on gap models.