

Publication

Four ways to define the growing season

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What is addressed as growing season in terrestrial ecosystems is one of the main determinants of annual plant biomass production globally. However, there is no well-defined concept behind. Here, we show different facets of what might be termed growing season, each with a distinct meaning: (1) the time period during which a plant or a part of it actually grows and produces new tissue, irrespective of net carbon gain (growing season *sensu stricto*). (2) The period defined by developmental, that is, phenological markers (phenological season). (3) The period during which vegetation as a whole achieves its annual net primary production (NPP) or a net ecosystem production (NEP), expressed as net carbon gain (productive season) and (4) the period during which plants could potentially grow based on meteorological criteria (meteorological season). We hypothesize that the duration of such a 'window of opportunity' is a strong predictor for NPP at a global scale, especially for forests. These different definitions have implications for the understanding and modelling of plant growth and biomass production. The common view that variation in phenology is a proxy for variation in productivity is misleading, often resulting in unfounded statements on potential consequences of climatic warming such as carbon sequestration.

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