

Vegetation structure and productivity of three temperate upland grasslands

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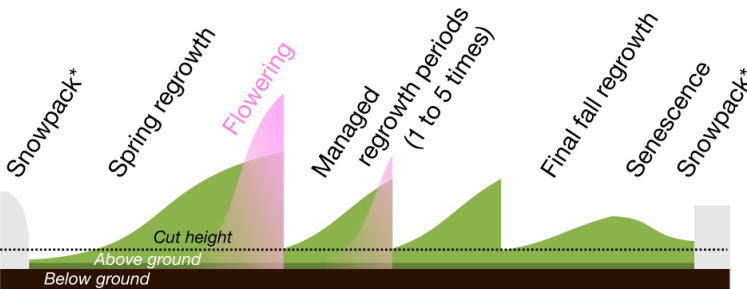
An improved regional assessment of the productivity of grasslands depends on in-depth knowledge of the interactions between climatic drivers, nutrient cycles, vegetation properties and human activity.

To this end, the relationships between productivity (①), vegetation structure (②) and seasonality (③) were investigated, contrasting three different temperate grassland sites in Southern Germany that differ in management intensity & elevation.

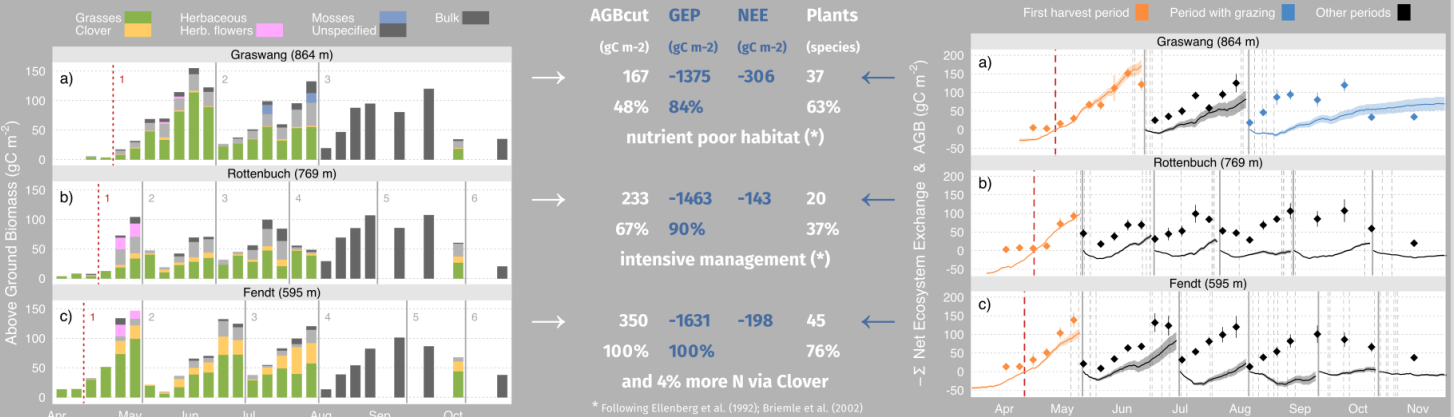
Vegetation properties and surface exchange of carbon dioxide were observed during 2015, as part of a multi-disciplinary intensive campaign (ScaleX).

$$P = f(E, M, Cm, \text{time})$$

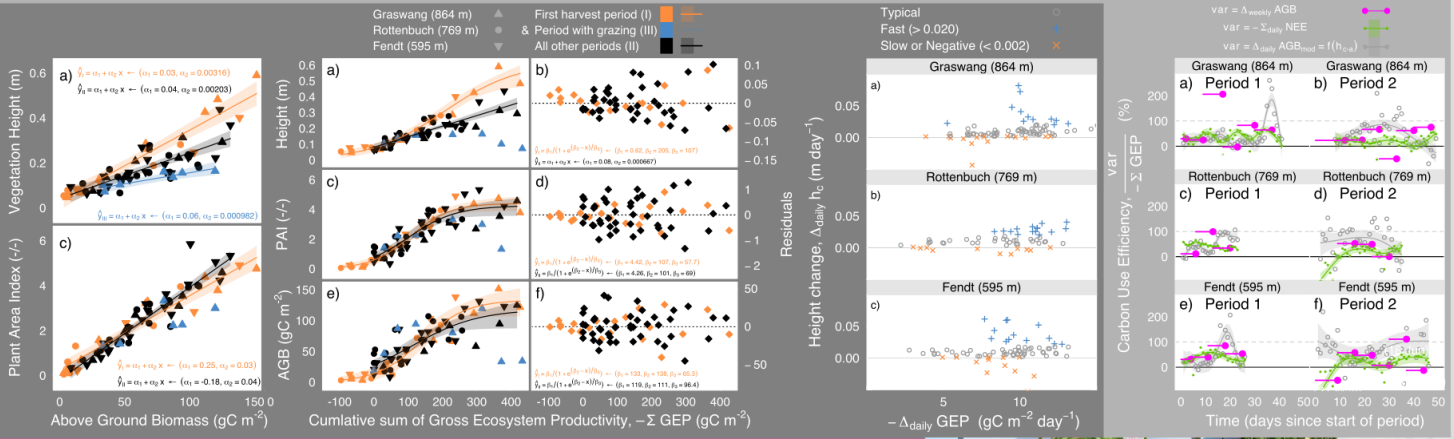
Productivity \leftarrow Environment + Management + Plant Community



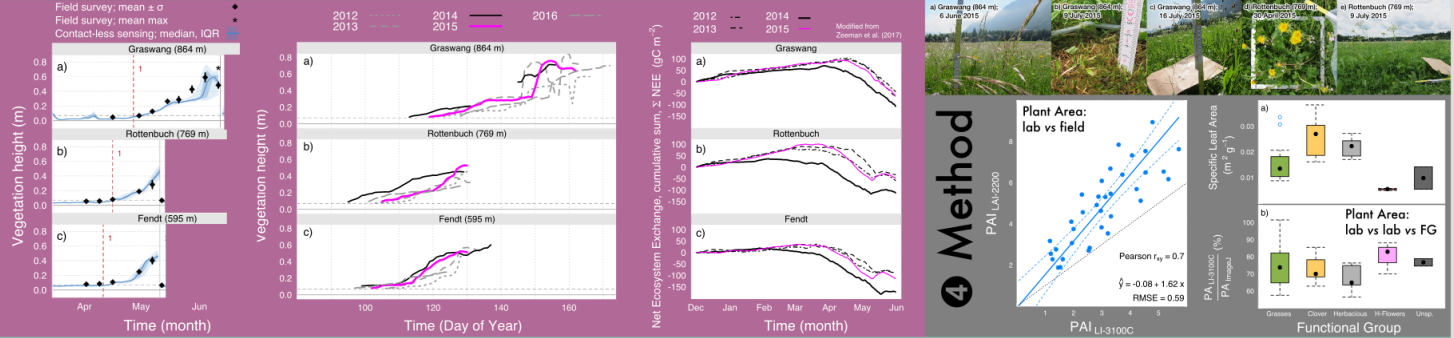
① Productivity



② Structure



③ Seasonality



Similarities in biophysical and biochemical seasonality along an elevation gradient, as productivity correlates with temperature, management, C/N and diversity.

Highlights

- Lowest elevation, intensively managed site (Fendt):
 - was most productive in terms of above-ground biomass and gross carbon uptake,
 - showed highest species abundance, and
 - showed highest clover abundance, leading to more N (4%) in the harvested biomass
- At the seasonal scale, the productivity (GEP, AGB) of these grasslands:
 - correlated positively with management intensity, and
 - correlated negatively with elevation.
- When periods between harvests were considered individually, the relationship between GEP and above-ground biomass, leaf area and vegetation height appeared to follow unified patterns for all sites.

Method

Plant Area: lab vs field
 Specific Leaf Area: lab vs field
 Plant Area: lab vs lab vs FG