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 (θ), vegetation structure (θ) and seasonality (θ) 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).

**Production (θ)**

<table>
<thead>
<tr>
<th>Site</th>
<th>Above Ground Biomass (g C m⁻²)</th>
<th>Productivity (g C m⁻²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasswang</td>
<td>167</td>
<td>48%</td>
</tr>
<tr>
<td>Rettenbuch</td>
<td>233</td>
<td>67%</td>
</tr>
<tr>
<td>Fendt</td>
<td>350</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Structure (θ)**

- **Vegetation Height (m)**
  - At the seasonal scale, the productivity (GEP, NEE) of these grasslands correlates positively with management intensity.
  - Correlated negatively with elevation.

**Seasonality (θ)**

- **Vegetation Height (m)**
  - Continuous vegetation height observations:
  - GEP (g C m⁻² day⁻¹)
  - NEE (g C m⁻² day⁻¹)

**Method**

- PLATE, Lumi & PAI

**Highlights**

- At the seasonal scale, the productivity (GEP, NEE) of these grasslands correlates positively with management intensity.
- Correlated negatively with elevation.
- Continuous vegetation height observations:
- Provides supporting evidence for observed seasonal variability in winter/spring transitions
- Simple model tests may lead to further understanding.