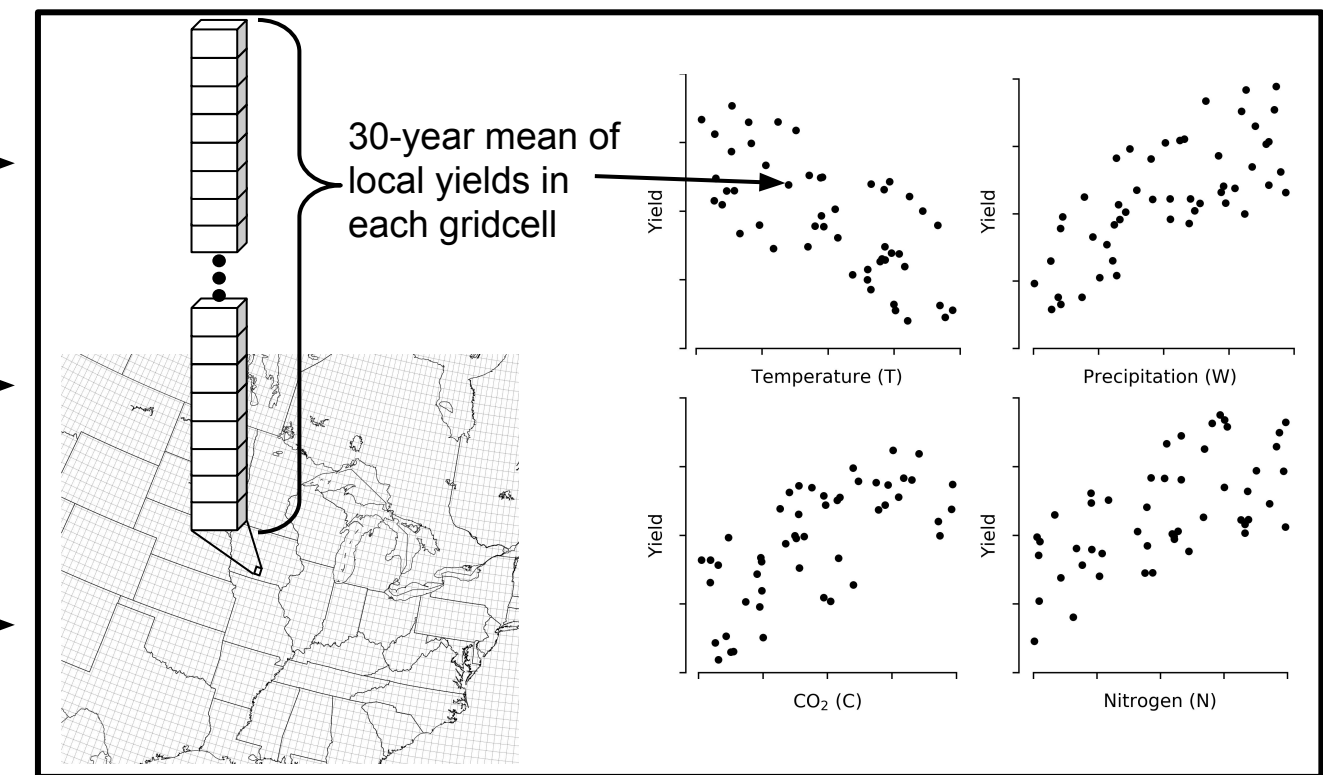
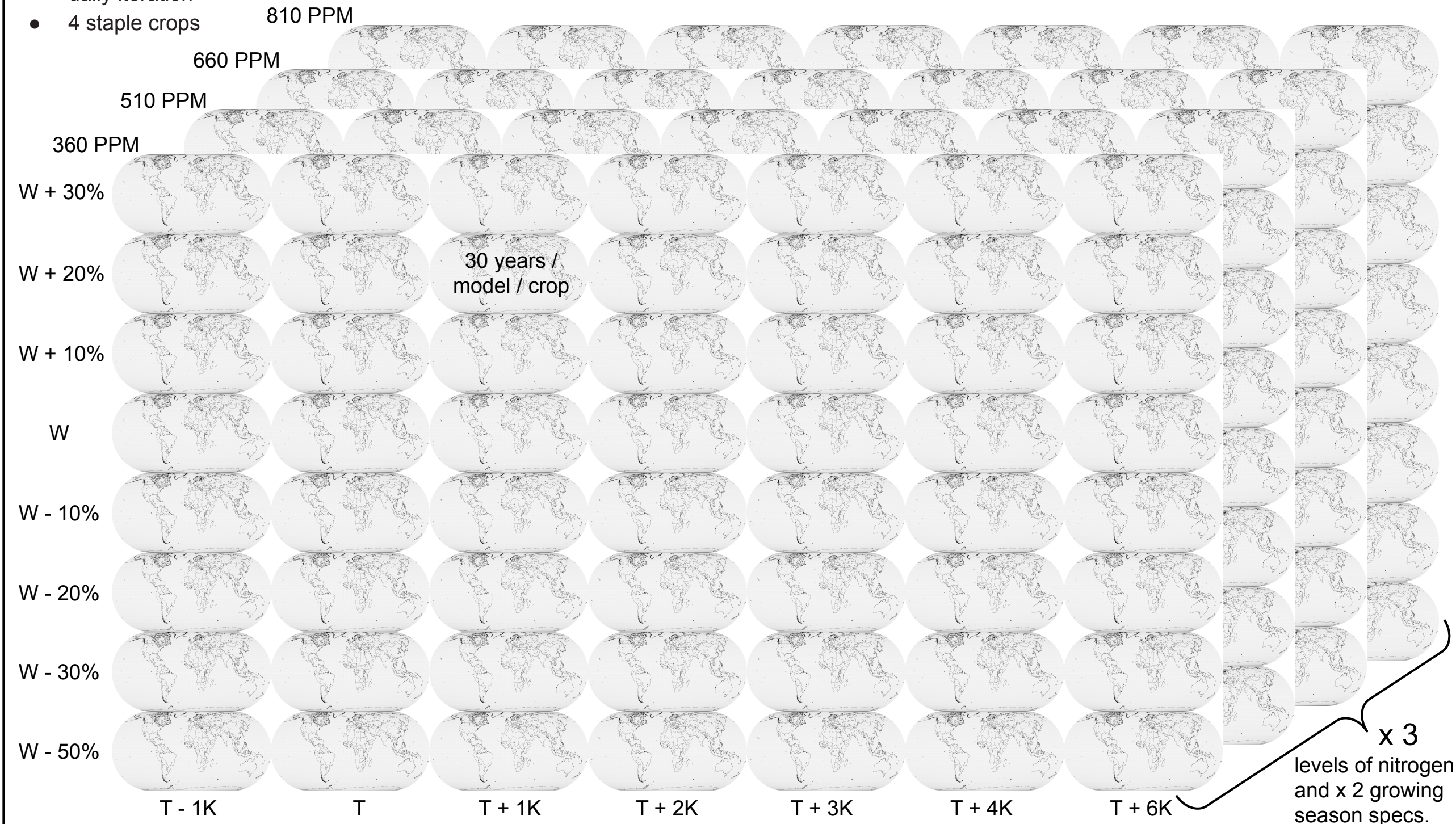


Process-based Crop Simulations

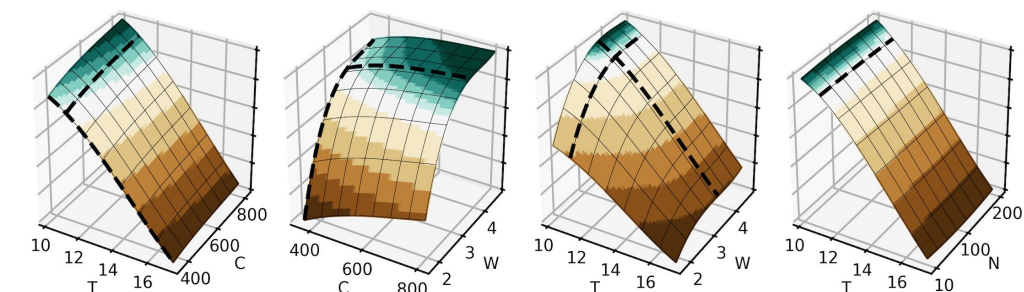
- 0.5° global simulations
- 756 input combinations
- daily iteration
- 4 staple crops

pDSSAT LPJmL LPJ-GUESS PROMET PEPIC EPIC-TAMU GEPIC CARAIB JULES



Local (i,j) mean yields are related to local mean weather (T, W), local nitrogen application (N), and global CO₂ (C) with a third order polynomial with interaction terms:

$$\hat{Y}_{i,j} = \alpha_{i,j} + \sum_{n=1}^3 \beta_{1n(i,j)} C^n + \beta_{2n(i,j)} T_{i,j}^n + \beta_{3n(i,j)} W_{i,j}^n + \beta_{4n(i,j)} N_{i,j}^n + \beta_{5n(i,j)} C^n \cdot T_{i,j}^n + \dots$$



4-D parametric response surface

Temporal Aggregation

Polynomial Emulation