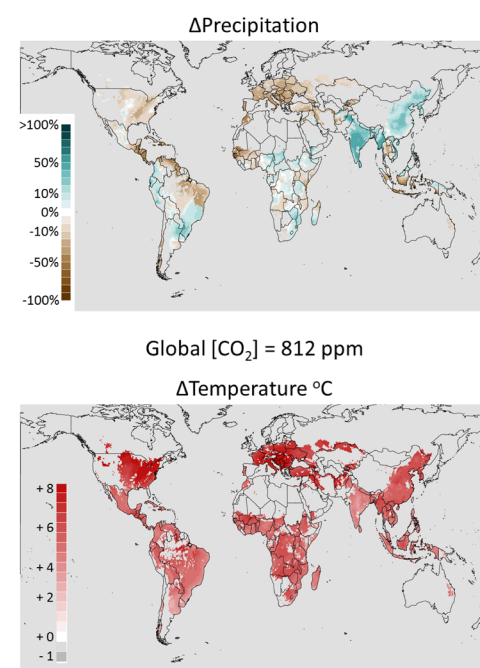
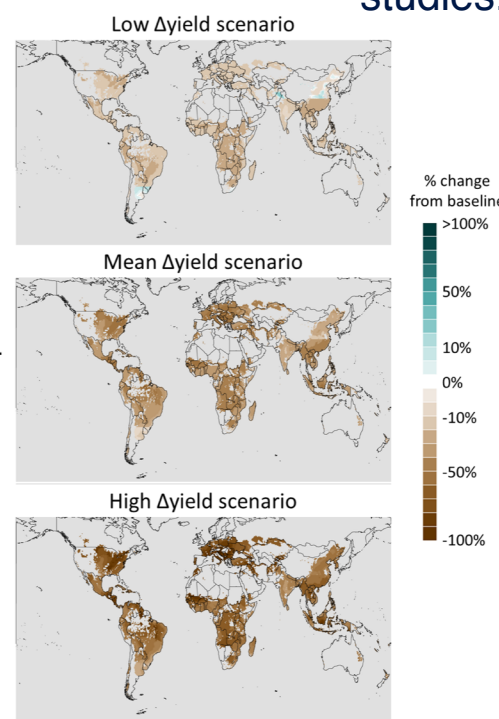


Persephone - Global Yield Change Emulator



Persephone



Local yield changes in each scenario become multipliers on GCAM exogenous yield change assumptions, defining new GCAM scenarios

GCAM

Snyder, Calvin, Ruane, and Phillips – GMD 2018 (in review).

Available at:
github.com/jgcri/persephone

Contact: abigail.snyder@pnnl.gov

Purpose: quantify the mean and spread of expected grid cell specific yield changes in response to arbitrary changes in local temperature and precipitation and global CO₂ concentration based on the best currently available data from process based crop models.

Resolution: theoretically any size grid

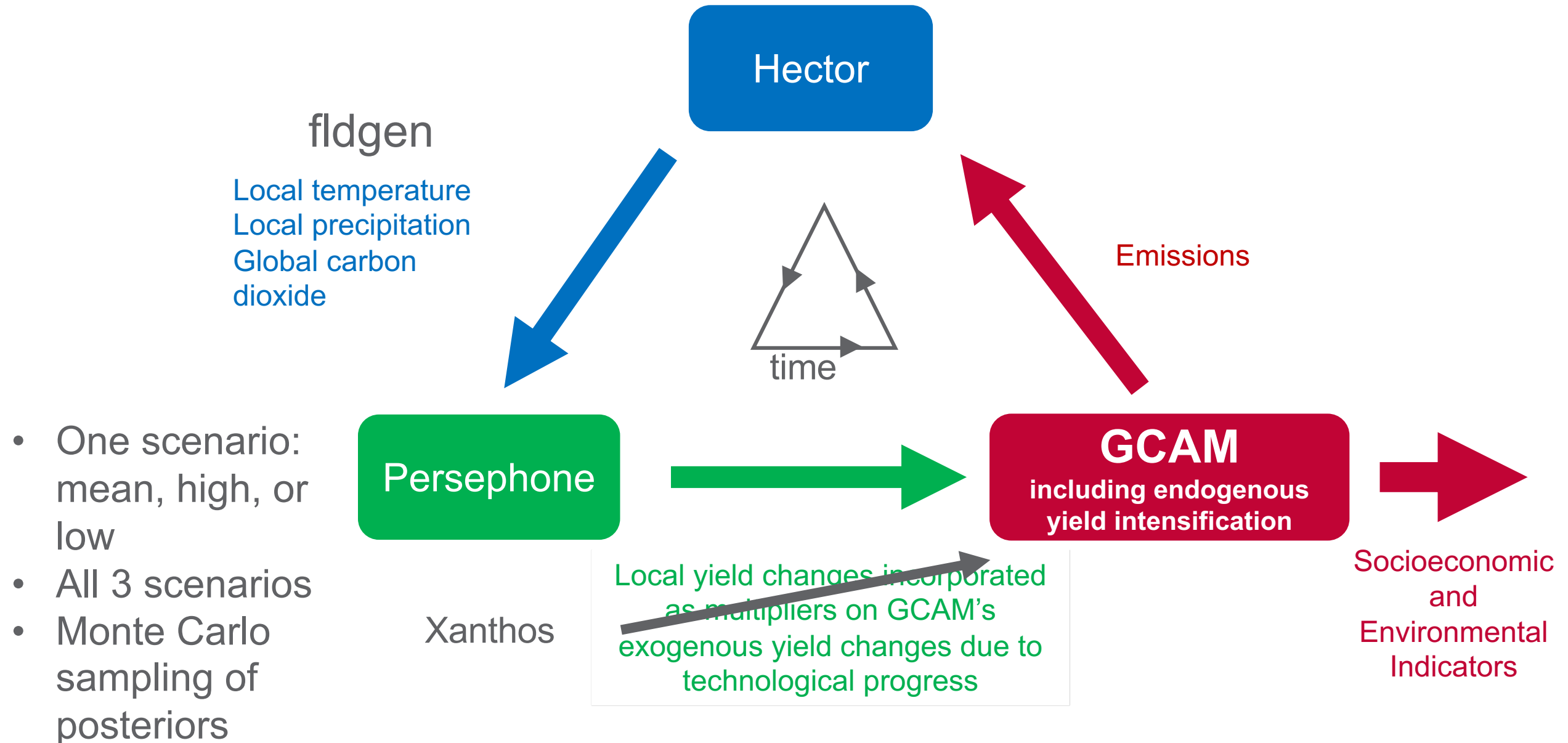
Inputs:

- Gridded temperature data
- Gridded precipitation data
- Global CO₂ concentration

Outputs:

- Gridded (at the same resolution as input data) yield changes in mean, high, and low response scenarios for a range of crops and management practices.
- Full posterior distributions of yield responses for future Monte Carlo studies.

Ultimate goal



Enabling capabilities (abigail.snyder@pnnl.gov)

- Persephone is an R package of tools for fitting AND using emulators.
- It includes but is not *just* the three yield change scenarios for each production group we look at in the GMD paper.

It's **flexible**:

- We can tailor production groups more to GCAM commodities (OilCrop = Soy + Peanut sites).
- We can easily swap in different modeling tools:
 - Multilevel modeling so that we can get finer scale regions and incorporate a nitrogen dimension (should cut down on some of the spread)
 - Different regularizing priors to make feature selection a more dynamic than our current approach
 - Different data sets
 - Really straightforward to implement different predictors and go to an interannual variability approach
- Adding integrated testing and vignettes to stay in line with JGCRI software development best practices.