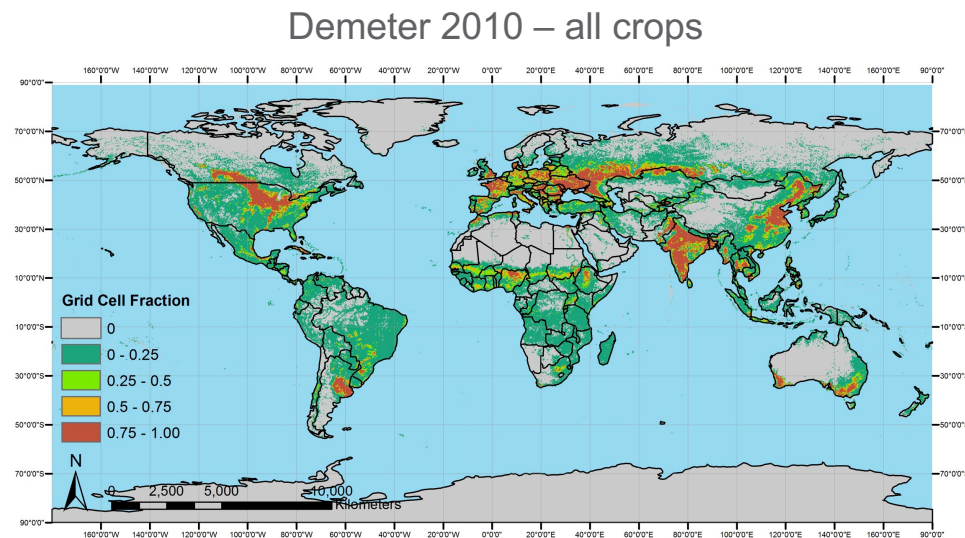


Demeter – LULCC Disaggregation



Purpose: disaggregate subregional allocation/projections of land use and land cover generated by GCAM and other human-Earth models to provide usable products for Earth system models

Resolution: defined by observed data resolution (spatial) and model output timestep (temporal)

Inputs:

- Observed land use land cover gridded data
- GCAM subregional land allocation
- Gridded constraints (optional)

Outputs:

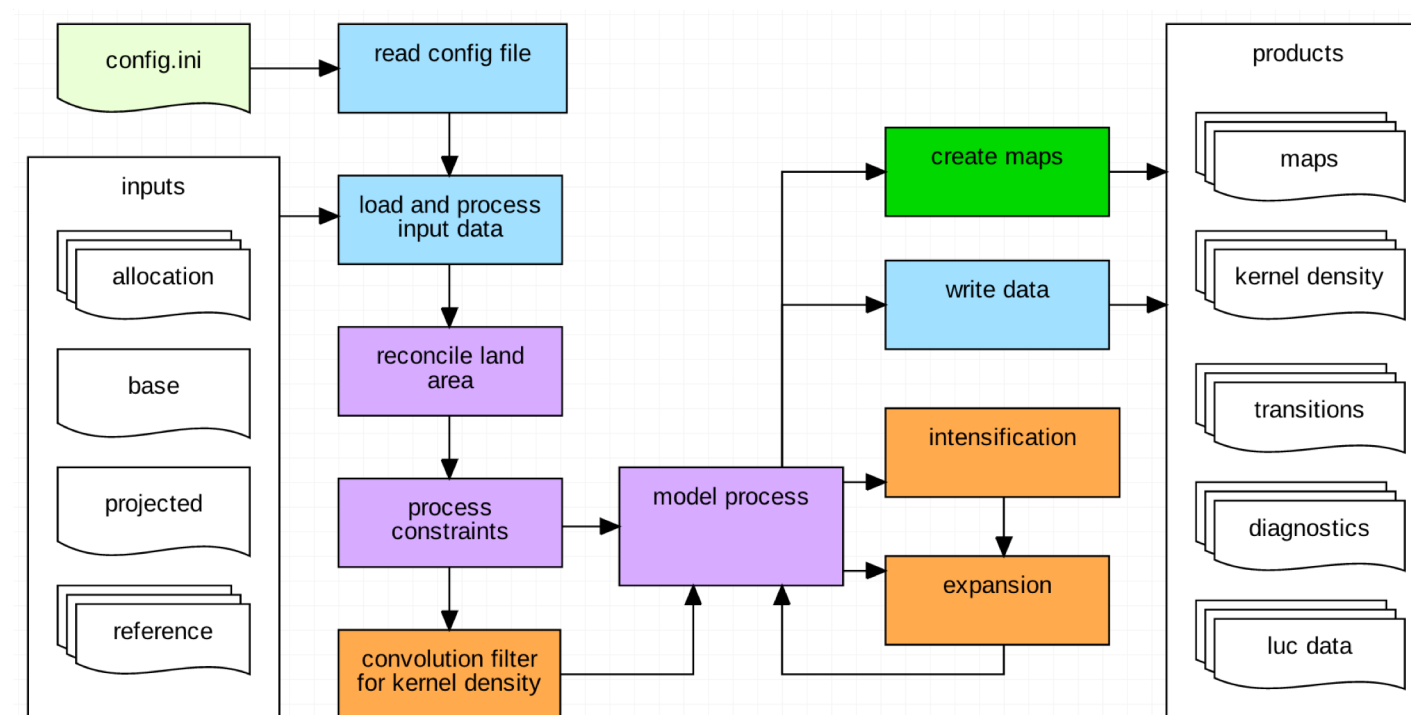
- Gridded land allocation per land class per time-step in a variety of formats (shapefile, raster, tabular, etc.)
- Maps, figures

Available here: <https://github.com/IMMM-SFA/demeter>

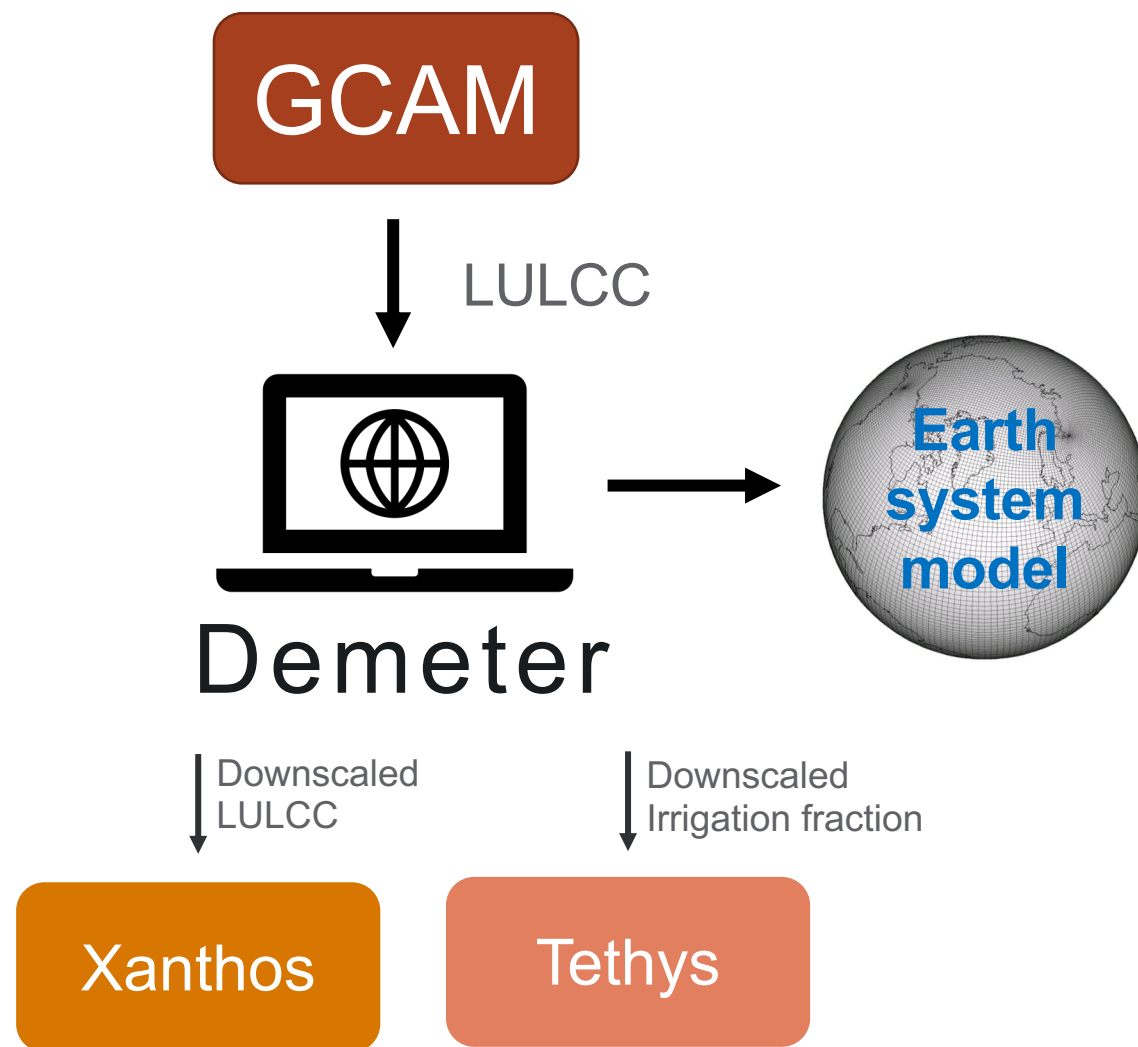
1. Vernon, et al. JORS, 2018
2. Le Page, et al. GMD, 2016
3. West, et al. ERL, 2014

Demeter features

- Easy to use
 - Modular
 - Call Demeter from other models
- Flexible
 - Apply to LULCC produced by GCAM and other models
 - Theoretically apply to any spatial resolution
- Extensible
 - User-defined spatial constraints



The role of Demeter in the GCAM ecosystem



- Bridge GCAM and downstream models with smaller spatial scales
 - Xanthos – controlling evapotranspiration
 - Tethys – affecting water sector disaggregation
- Link GCAM and Earth system models
 - Land use and land cover change in the land component
 - Albedo
 - Boundary meteorology
 - Carbon, water and other biogeochemical cycle
 - “Official” GCAM LULCC products

Demeter parameterization

- Use long-term satellite-based land cover record (ESA-CCI, 1992-2015) to make synthetic sub-regional LULCC for Demeter calibration
- Use Monte Carlo approach to perform sensitivity analysis, calibrate Demeter parameters, and quantified the parameter uncertainties
- Chen et al., in review

