Table S3. Key configuration variables for E3SM-GCAM.

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| --- | --- | --- |
| Name | Default | Description |
| EHC |  |  |
| gcam\_spinup | false | True runs GCAM calibration to generate baseline CO2, land, and restart files for 2015 start |
| run\_gcam | true | True enables GCAM to run; false allows historical EHC run without GCAM |
| elm\_ehc\_agyield\_scaling | true | True applies ELM vegetation productivity to GCAM agricultural yields |
| elm\_ehc\_carbon\_scaling | true | True applies ELM terrestrial productivity to GCAM potential carbon densities (soil and vegetation) |
| write\_scalars | true | True writes terrestrial productivity scalars to file |
| read\_scalars | false | False enables calculation of terrestrial productivity scalars; true reads scalars from file and disables scalar calculation and writing |
| write\_co2 | true | True writes diagnostic files of downscaled GCAM CO2 data |
| ehc\_eam\_co2\_emissions | true | True enables processing and passing of GCAM CO2 emissions to EAM |
| EAM |  |  |
| co2\_flag | true | True enables CO2 emissions inputs |
| co2\_readflux\_aircraft | false | False enables aircraft CO2 emissions from GCAM; true reads CO2 emissions from file |
| co2\_readflux\_fuel | false | False enables anthropogenic surface CO2 emissions from GCAM; true reads CO2 emissions from file |
| co2\_readflux\_ocn | true | True reads ocean CO2 emissions from file |
| ELM |  |  |
| co2\_type | prognostic | Prognostic enables land CO2 emission calculation and passing to EAM |
| use\_cn | true | True enables the default biogeochemistry scheme |
| do\_harvest | false | False enables processing and passing of GCAM harvest to ELM; true reads these data from file |
| do\_transient\_pfts | false | False enables processing and passing of GCAM land allocation to ELM; true reads these data from file |