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# A Traceability Framework to facilitate model evaluation

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Land models have been developed to account for more and more processes, making their complex structures difficult to be understood and evaluated. Here we introduced a framework to decompose a complex land model into traceable components based on their mutually independent properties of modeled biogeochemical processes. The framework traces modeled ecosystem carbon storage capacity (Xss) to (1) a product of net primary productivity (NPP) and ecosystem residence time ($\tau$_E). The latter $\tau$_E can be further traced to (2) baseline carbon residence times ($\tau$_(E )'), which are usually preset in a model according to vegetation characteristics and soil types, (3) environmental scalars ($\xi$) including temperature and water scalars, and (4) environmental forcings. We have applied the framework to the Australian Community Atmosphere Biosphere Land Exchange (CABLE) model to help understand differences in modeled carbon processes among biomes and as influenced by nitrogen processes. Our framework could be used to facilitate data-model comparisons and model intercomparisons via tracking a few traceable components for all terrestrial carbon cycle models.