

## Building A Virtual Ecosystem Dynamic Model for Root Research

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Understanding the fundamental mechanistic processes within large environmental models has great implications in model interpretation and future improvement. However, obtaining a good understanding of these processes can be challenging due to the complexities in model structures and software configurations. This effort uses a function test framework – with unique approaches to tackling software complexities in large environmental models – to facilitate process-based model exploration and validation. A Virtual Ecosystem Dynamic Model is developed as a case study to better understand and validate root-related processes in the ACME Land Model (ALM). The proposed framework could help empiricists better access the inner workings of large environmental models, and facilitate integrative collaborations among broad scientific communities including field scientists, environmental system modelers, and computer scientists.