ABSTRACT: The Partitioning in Trees and Soil (PiTS) project at ORNL was established to improve the parameterization of C partitioning routines in existing ecosystem models by exploring mechanistic model representations of partitioning tested against field observations and manipulations. The Enriched Background Isotope Study (EBIS) experiment was designed to use unique $^{13}$C-enriched materials to characterize the rate of C flux from litter sources to mineral soil sinks over a range of climatic and biological conditions. These two existing field data sets at ORNL provide a unique opportunity for the evaluation, calibration and development of ecosystem models particular the Community Land Model (CLM) supported by the U.S. Department of Energy (DOE). In this presentation we will report our ongoing work to set up the CLM simulations and improve the model performance at these two sites. In addition, we will discuss future directions bettering the observation and CLM development based on these experiment-model integrations.