



## **Reconstructing Critical Zone process-interactions using fallout radionuclides and coupled geomorphological-biogeochemical models**

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Long-term records provide vital evidence for change in the Critical Zone, however, their temporal richness is often associated with spatial limitations either because the record is based on monitoring of a small area or because it provides the spatially integrated record of a whole catchment. Studies using fallout radionuclides can provide complementary spatially-rich data. However, reconstruction of a temporal record from these data requires care. Here we explore the use of fallout radionuclides in conjunction with coupled geomorphological-biogeochemical models to undertake a retrospective analysis of carbon cycle perturbations resulting from hillslope erosion and deposition and floodplain deposition and reworking. We highlight areas where a full critical zone analysis is required if the process interactions are to be understood in detail. We identify a strategy to accomplish this.