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Ecosystems have both above-ground and below-ground components that are inextricably linked yet are often studied separately. Ecological interactions in above ground systems have the potential to indirectly influence the below ground system biota by altering the quality and quantity of resources transferred from above- and below-ground systems. Natural processes like meteorological events can bring in high winds and drenching rains that have the ability to flush vegetation, biota, and excess water from the top of the canopy to the base of the tree. One of the main transfers from forest canopies to soils is from stemflow, which is the flow of water down the trunk of a tree that is responsible for nutrients from the canopy to the base of the tree. However, little is known about the transference from above- to below- ground systems. We tested the hypothesis that major storm events transfer significant quantities of invertebrate biomass from above- to below- ground systems. Specifically, we predicted that this transfer of invertebrates constitutes a considerable source of nutrients. To determine how storm events impact the quantity and quality of invertebrate input from canopies to forest floor we setup stemflow collectors in a heavily dense oak-hickory forest at Sessums National Area in Starkville, Mississippi. A tree stem-flow collar comprised of polyethylene tubing was placed around 18 selected oaks and hickories. Within twenty-four hours of each storm event, water was collected from each bin and inverts sifted in a 0.25mm diameter sieve. Inverts were then pooled together after each storm event, placed in a 250ml vial, and preserved in a 70% methanol solution to later be identified to family and to determine biomass and chemistry.

There was a total of 1790.95 inches in rain and 14 storm events from March 2015 to June 2016. Our preliminary results indicated that the greater the storm event the lower the amount of insect biomass transferred from canopies to the forest floor. There was a high diversity of invertebrates (21 Orders) among the samples with an average of 16 ± 4.5 orders per sample. Beetles (Coleoptera) had the greatest biomass in our initial samples (14.7%), and drove the negative relationship between stemflow and invertebrate biomass. When Coleoptera were removed from the total biomass of invertebrates, there was no relationship between stemflow and invertebrate in our initial results indicating a consistent input of invertebrate biomass (17.4 ± 3.5) with each storm event. These results suggest that during less intense storm events, invertebrates, and beetles in particular, may not take as much shelter as they would during more rain. Above- and below- ground systems are affected by any change in environment since the tree serves as a link. This exchange of invertebrate biomass following storm events between above- and below- ground systems impacts both the canopy and the forest floor; therefore, as the canopy loses these nutrients, the forest floor is able to gain these nutrients. This promotes a high availability of resources for tree growth and ecosystem function for potential organisms at the base of the tree. The nutrients from this nutrient cycling can stimulate more invertebrates to inhabit either the canopy or the base of the tree by increasing nutrients trees can use for growth. Thus, the transfer between the two subsystems are continuously in motion.