TITLE	**EXPERIMENTAL WARMING AND ITS LEGACY EFFECTS ON ROOT DYNAMICS FOLLOWING TWO HURRICANE DISTURBANCES IN A WET TROPICAL FOREST**
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ABSTRACT	Tropical forests are expected to experience unprecedented warming and increases in hurricane disturbances in the coming decades; yet, our understanding of how these productive systems, especially their belowground component, will respond to the combined effects of varied environmental changes remains empirically limited. Here we evaluated the responses of root dynamics (production, mortality, and biomass) to soil and understory warming (+4°C) and after two consecutive tropical hurricanes in our in situ warming experiment in a tropical forest of Puerto Rico: Tropical Responses to Altered Climate Experiment (TRACE). We collected minirhizotron images from three warmed plots and three control plots of 12 m2. Following Hurricanes Irma and María in September 2017, the infrared heater warming treatment was suspended for repairs, which allowed us to explore potential legacy effects of prior warming on forest recovery. We found that warming significantly reduced root production and root biomass over time. Following hurricane disturbance, both root biomass and production increased substantially across all plots; the root biomass increased 2.8-fold in controls but only 1.6-fold in previously warmed plots. This pattern held true for both herbaceous and woody roots, suggesting that the consistent antecedent warming conditions reduced root capacity to recover following hurricane disturbance. Root production and mortality were both related to soil ammonium nitrogen and microbial biomass nitrogen before and after the hurricanes. This experiment has provided an unprecedented look at the complex interactive effects of disturbance and climate change on the root component of a tropical forested ecosystem. A decrease in root production in a warmer world and slower root recovery after a major hurricane disturbance, as observed here, are likely to have longer-term consequences for tropical forest responses to future global change.
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