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Total OH reactivity changes above the Amazon rainforest during an El Niño event

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In the Amazon basin, high temperatures and drought unprecedented in records since 1900 occurred during the 2015/16 El Niño event. How tropical forests react to such extreme conditions in terms of volatile organic compound (VOC) emissions is of interest as the frequency of these events is predicted to increase through climate change. The diverse VOCs emitted in response to drought stress can be significant for both the plant-internal and global carbon budgets, they can influence ozone and particle production, and impact OH concentrations through their reactivity. Total OH reactivity is a directly measureable quantity that gives the reaction frequency of OH radicals with all reactive species in the atmosphere in s-1. Here we present a comparison of the OH reactivity diel cycle from November 2015, i.e. extreme drought and elevated temperatures associated with strong El Niño conditions, with the OH reactivity diel cycle from November 2012, a “normal”, El Niño Southern Oscillation (ENSO)-neutral period. The diel maximum of OH reactivity during the El Niño event occurred at sunset, opposed to early afternoon under ENSO-neutral conditions. The absolute total diel OH reactivity, however, did not change significantly. Daytime OH reactivity averages were 24.3 $\pm$ 14.5 s-1 in 2012 and 24.6 $\pm$ 11.9 s-1 in 2015, respectively. Our findings suggest that a combination of stronger turbulent transport above the canopy with stress-related monoterpene and, possibly, other drought specific biogenic volatile organic compound (BVOC) emissions were responsible for the increased reactivity at sunset.