

# A World Record: Drought Turns the Missouri Ozark AmeriFlux (MOFLUX) Site into an Isoprene Volcano

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## Objective

- Understand biotic and abiotic controls of forest ecosystem emissions of isoprene, an important precursor to the air pollutant ozone and to test predictive models

## New Science

- Isoprene emission observations were added to the long-term Missouri Ozark AmeriFlux site, a broadleaf deciduous forest
- Isoprene emission rates observed during the drought of 2011 reached  $53.3 \text{ mg m}^{-2} \text{ h}^{-1}$  ( $217 \text{ nmol m}^{-2} \text{ s}^{-1}$ ), the highest ever recorded for any ecosystem in the world
- Current models predicted isoprene emission rates before drought, but their performance deteriorated as drought progressed
- Inability of ecosystem models to predict ecosystem functions under drought is unfortunately common

## Significance

- Isoprene's oxidation in the atmosphere affects both the production of tropospheric ozone and secondary aerosol formation
- Isoprene production by plants is an important biosphere-atmosphere interaction with implications for the management and control of regional air quality and the aerosol formation impacting global climate change
- This study identifies areas where model improvements are needed and provides data for model testing

Citation: Potosnak MJ, LeSturgeon L, Pallardy SG, Hosman KP, Gu LH, Karl T, Gerone C & Guenther AB (2014) Observed and modeled ecosystem isoprene fluxes from an oak-dominated temperate forest and the influence of drought stress. *Atmospheric Environment* 84: 314-322.

