

# Cannabis Emissions and Predicted Ozone in Santa Barbara County

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# Disclaimer

- All articles, reports, and presentations represent the opinions and views of the author and sponsors had no influence on results or conclusions
- NSF participation did not involve the manufacture, import, possession, use or distribution of cannabis
- All results presented here are publicly available and can be provided upon request - [Vizuete@unc.edu](mailto:Vizuete@unc.edu)

# Can the cultivation of cannabis result in regional ozone increases?

## S.B. County air quality model predictions say No.

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Atmospheric Environment

journal homepage: [www.elsevier.com/locate/atmosenv](http://www.elsevier.com/locate/atmosenv)

Leaf enclosure measurements for determining volatile organic compound emission capacity from *Cannabis spp.*

Chi-Tsan Wang<sup>a</sup>, Christine Wiedinmyer<sup>b</sup>, Kirsti Ashworth<sup>c</sup>, Peter C. Harley<sup>d</sup>, John Ortega<sup>d</sup>, William Vizuite<sup>a,\*</sup>

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**Potential Regional Air Quality Impacts of Cannabis Cultivation Facilities in Denver, Colorado**

Chi-Tsan Wang, Christine Wiedinmyer, Kirsti Ashworth, Peter C. Harley, John Ortega, Quazi Z. Rasool, and William Vizuite

**acp-2019-479** Submitted on 20 May 2019

Atmospheric Chemistry and Physics

# Cannabis has no impact on ozone

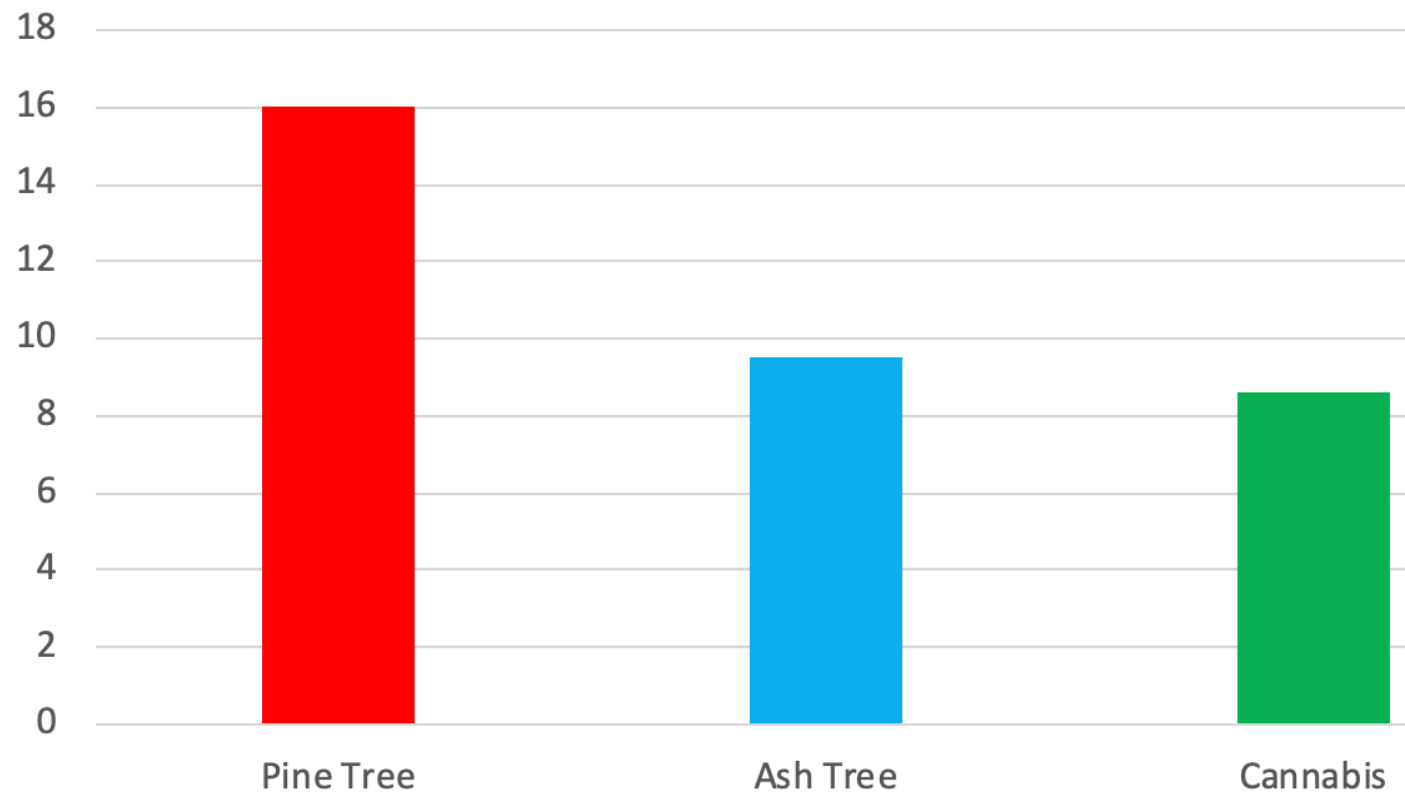
Model Scenario	Santa Barbara County BVOC emissions (tons/year)
Current baseline of BVOC from all plants in Santa Barbara County	39,042
Model: Add 5 tons BVOC to simulate addition of Cannabis Industry	39,047
Maximum Change in PPB on Worst Day Due to Addition of Cannabis Industry in SBC	No predicted Impact

# More Conservative Emissions Still no impact on ozone

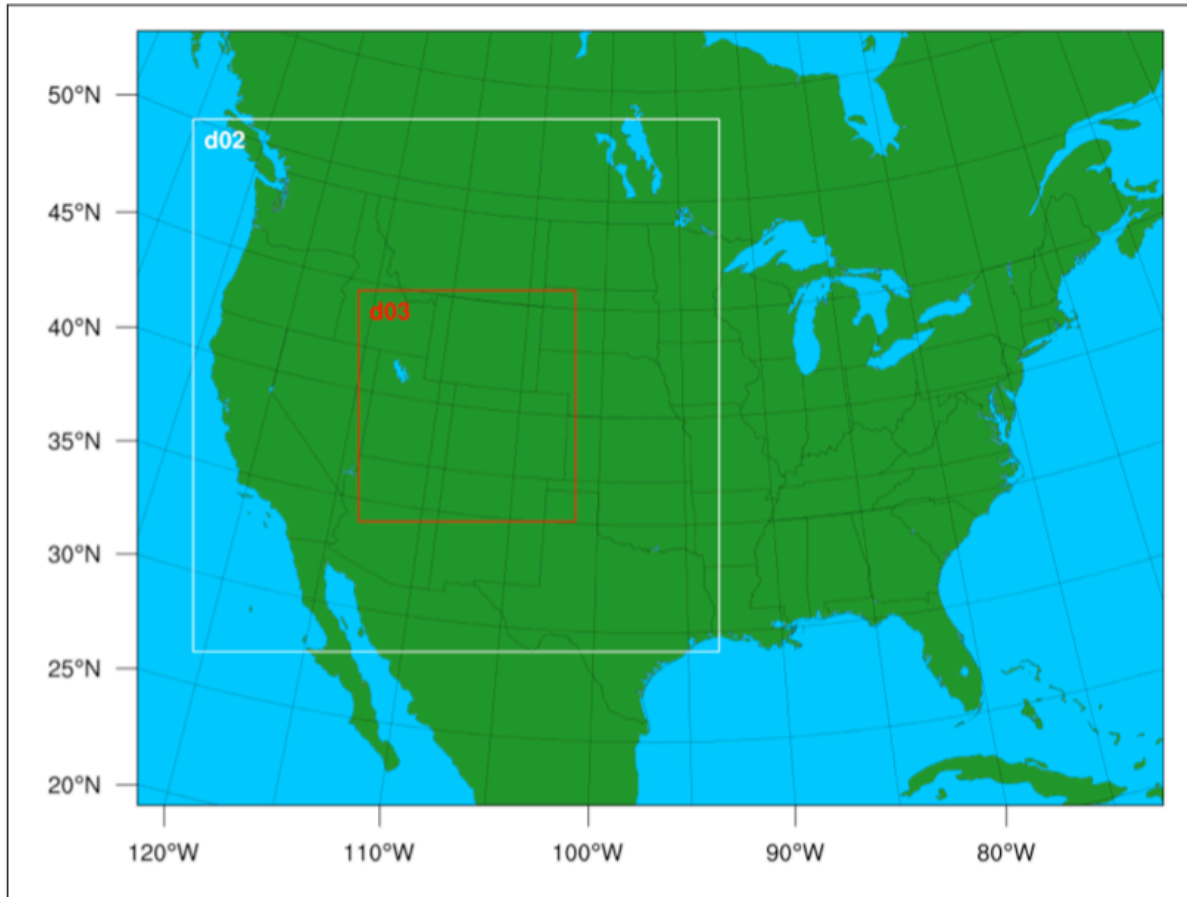
Model Scenario	Santa Barbara County BVOC Emissions (tons/year)
Current baseline of BVOC from all plants in SBC	39,042
Conservative Model: Add 50 tons BVOC (very high estimate) to simulate addition of cannabis industry	39,092
Maximum Change in PPT on Worst Day Due to Addition of Cannabis Industry in SBC	0.6% (.297 ppb)

# Cannabis emit less terpenes than Pine Trees

Emission Rate (ug/C/hr)

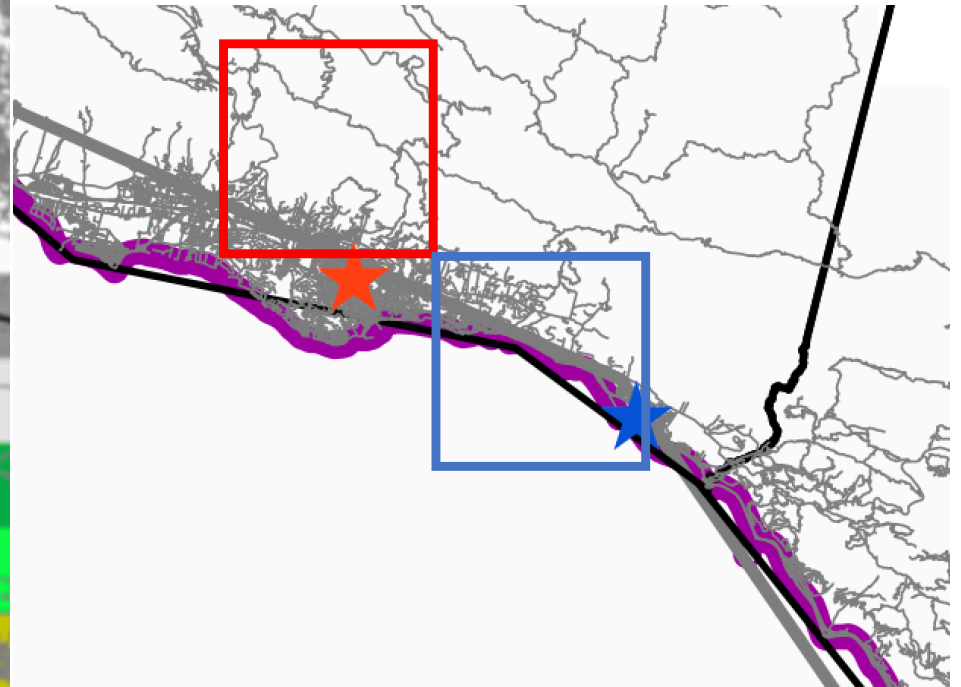
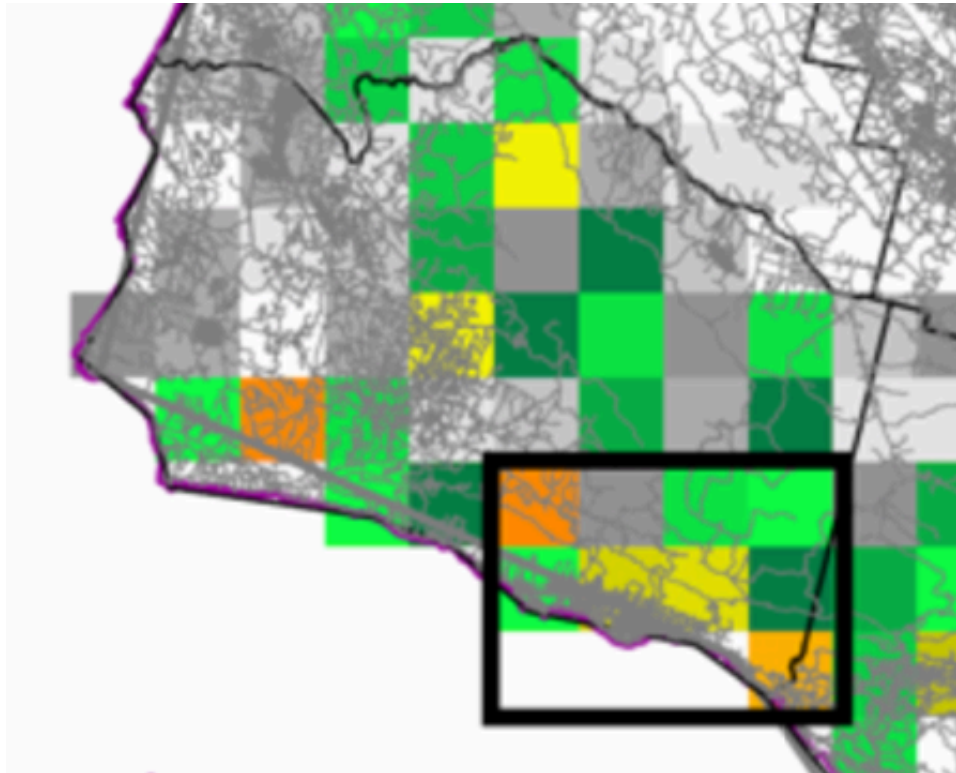


# Air quality model



- Developed by Ramboll and UNC
- CAMx version 6.1
- June 15- Sep 15, 2011
- 12x12 km horizontal resolution
- Emissions developed by EPA
- Obtained from Intermountain West Data Warehouse.

# Model Resolution



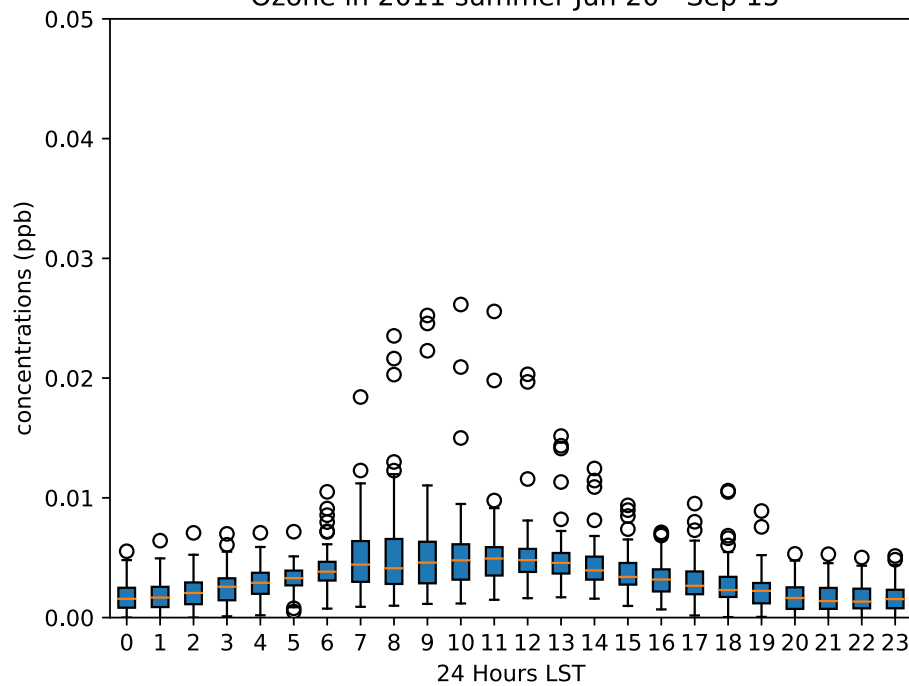


# Hourly Ozone Increase

**5 tons/year**

Carpinteria

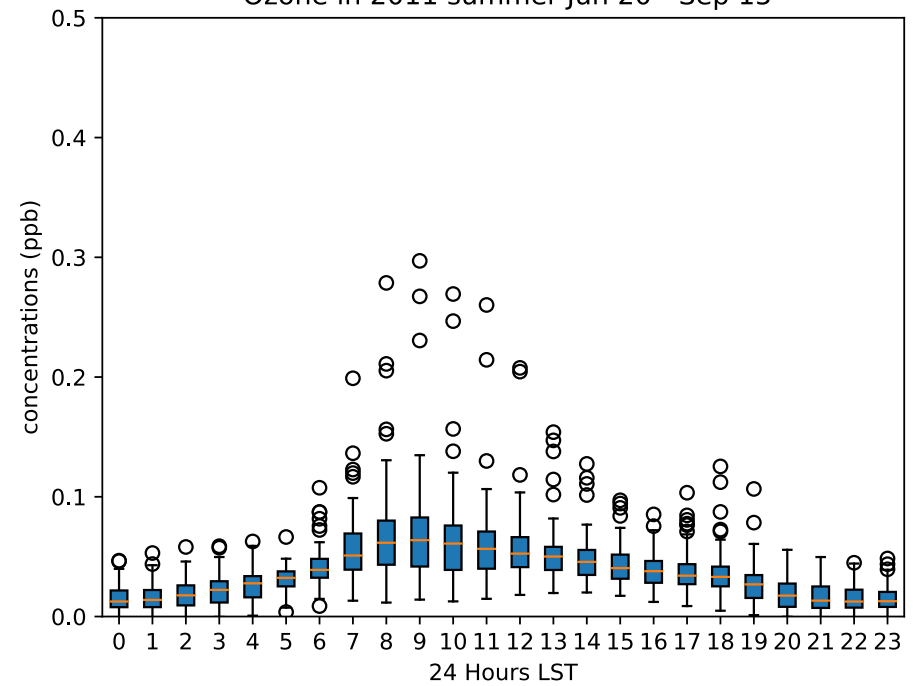
Ozone in 2011 summer Jun 20 - Sep 15



**50 tons/year**

Carpinteria

Ozone in 2011 summer Jun 20 - Sep 15



**2088 Simulated Hours**

# Monoterpene Non-toxic

- Acute short term inhalation (limonene,  $\alpha$ -terpineol, and  $\alpha$ - and  $\beta$ -pinene) is  $\sim 106$  ppm (106,000 ppb)
  - Santa Barbara County .25-.8 ppb (model)
  - Denver CO - 0.4 – 0.8 ppb (measured)
  - Amazon Rain forest – 2-4 ppb isoprene
  - Peeling an orange -  $\sim 100$  ppb Limonene
  - Saw Mills –  $\sim 50$ -100 ppm of  $\alpha$ -pinene

# Ozone 2008 NAAQS Nonattainment areas in California (USEPA, 2019)

