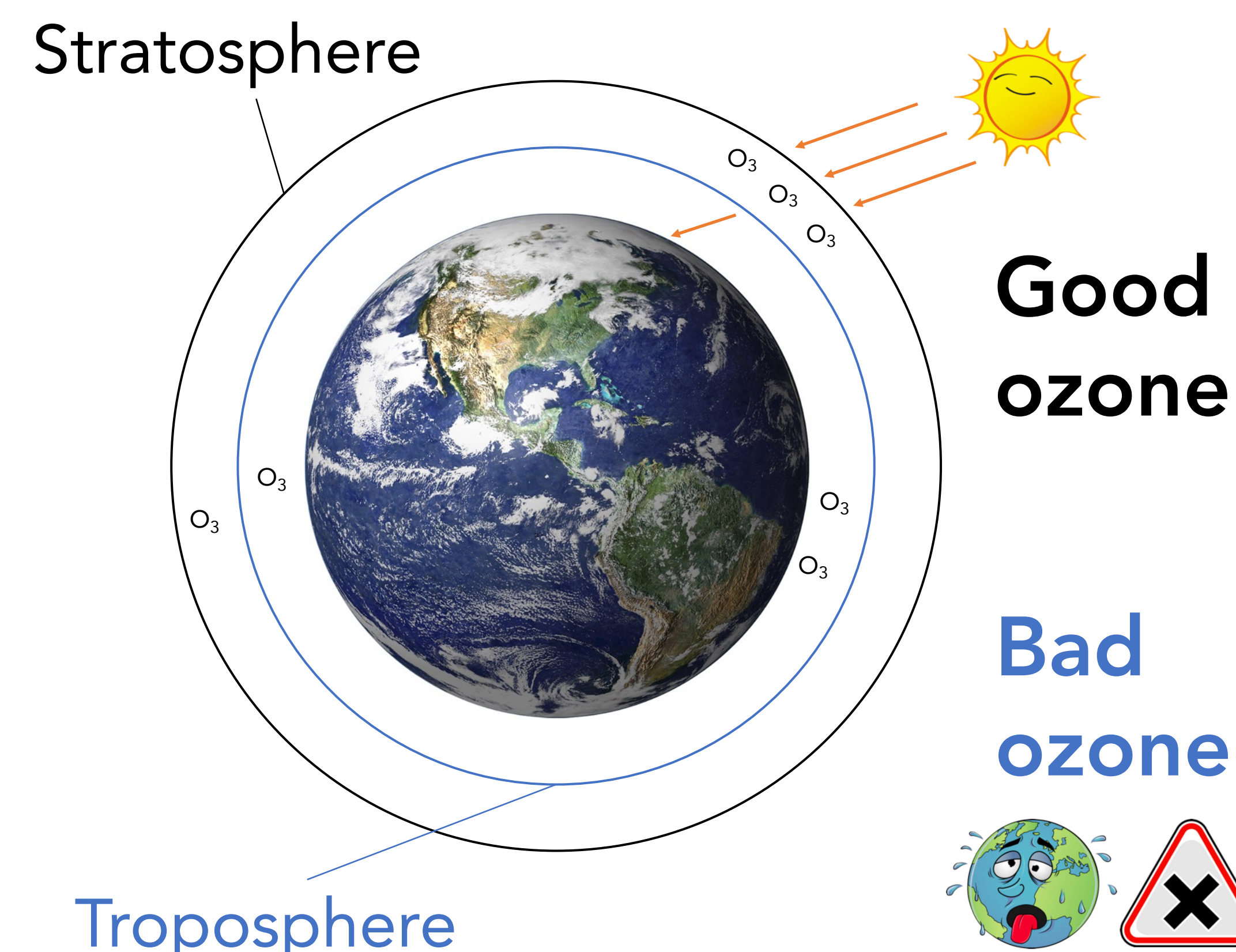


## Global Impacts of Biomass Burning on Ozone in the Remote Troposphere

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## Ozone, where does it come from and why does it matter?

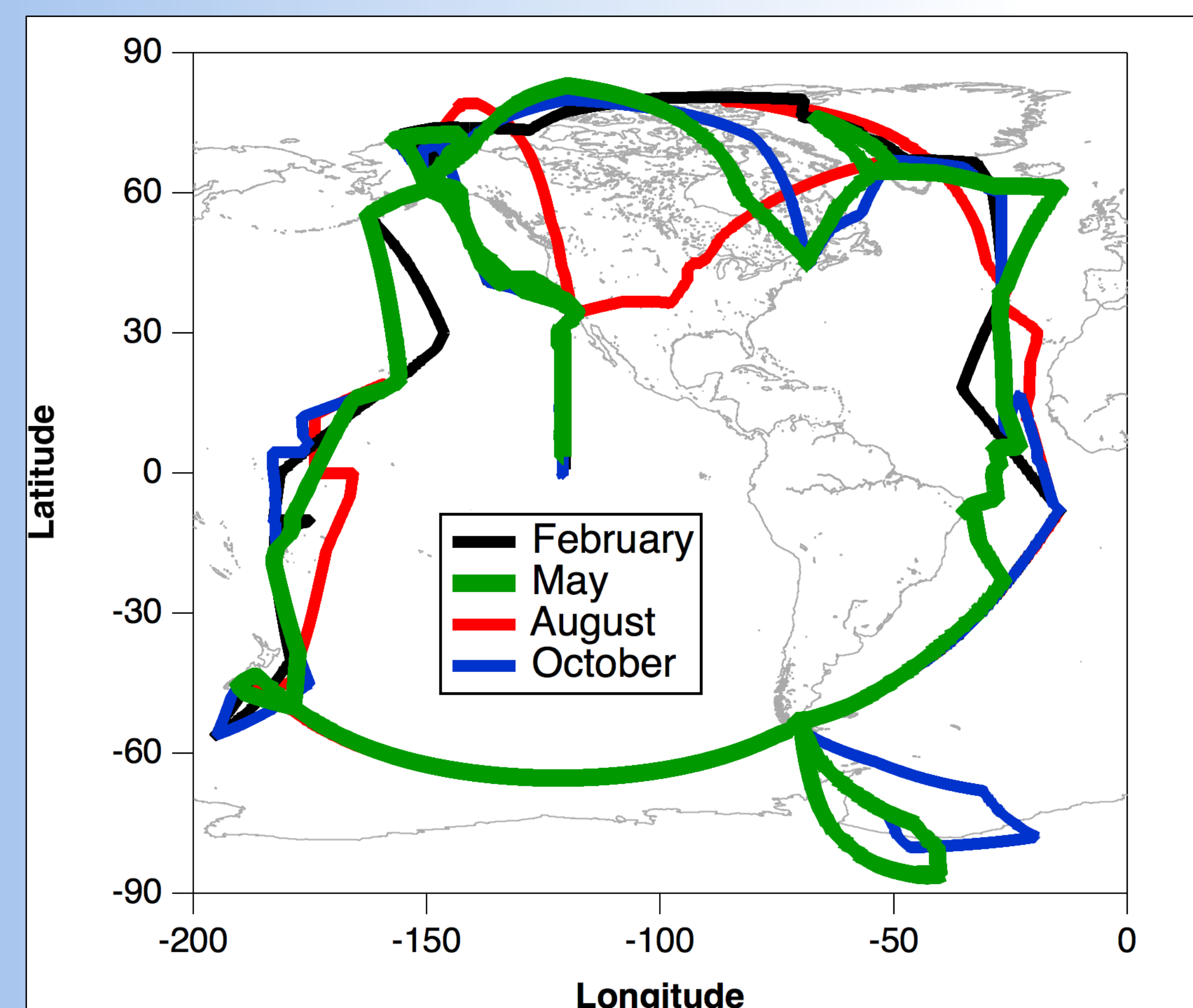
1. Ozone ( $O_3$ ) is a secondary air pollutant, photochemically produced from the reaction of nitrogen oxides ( $NO_x$ ) and volatile organic compounds (VOCs).



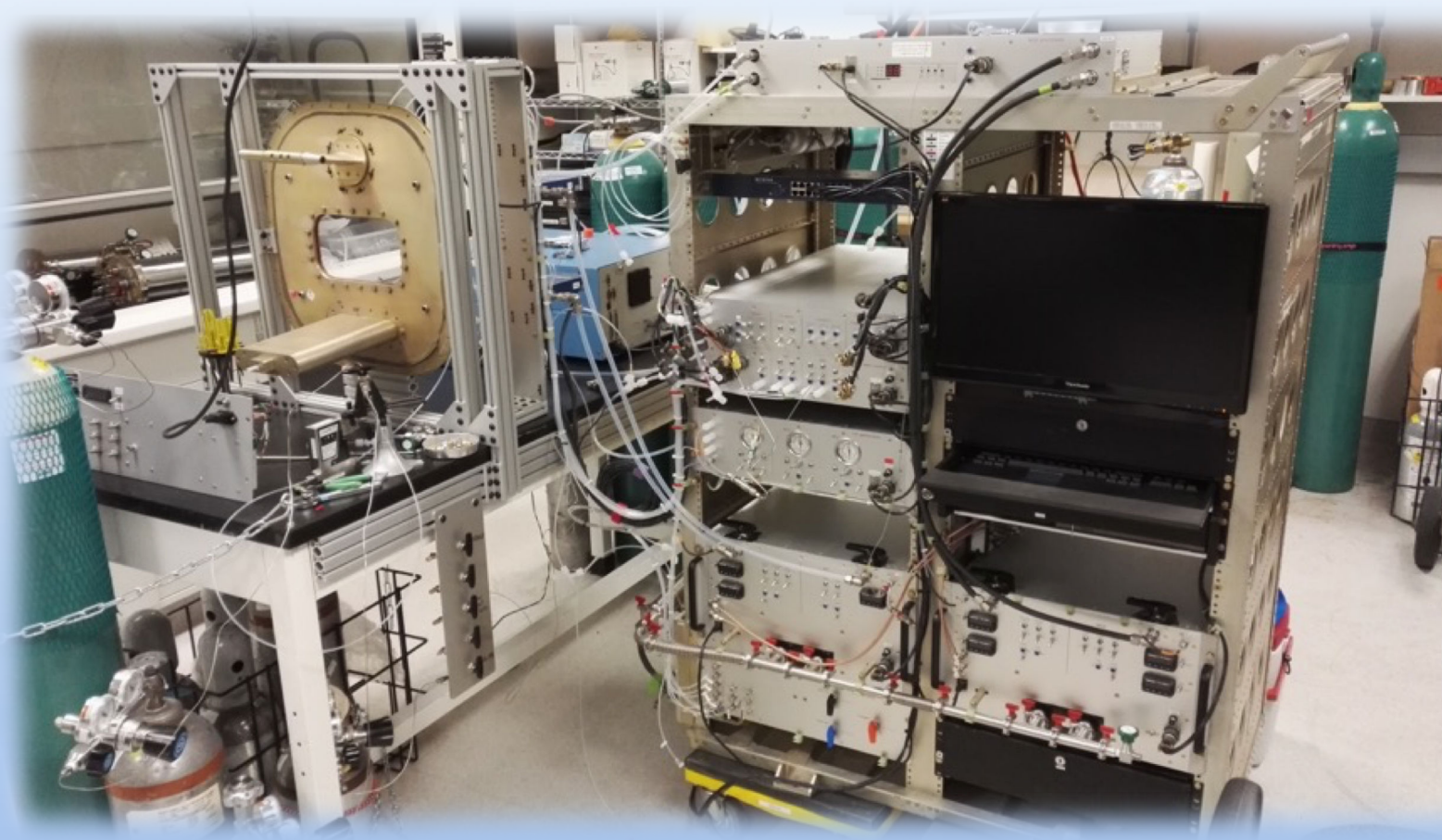
2. In the stratosphere,  $O_3$  protects the Earth from UV radiation. In the troposphere,  $O_3$  is a toxic air pollutant and a greenhouse gas

What are the main sources of  $O_3$  precursors in the troposphere?

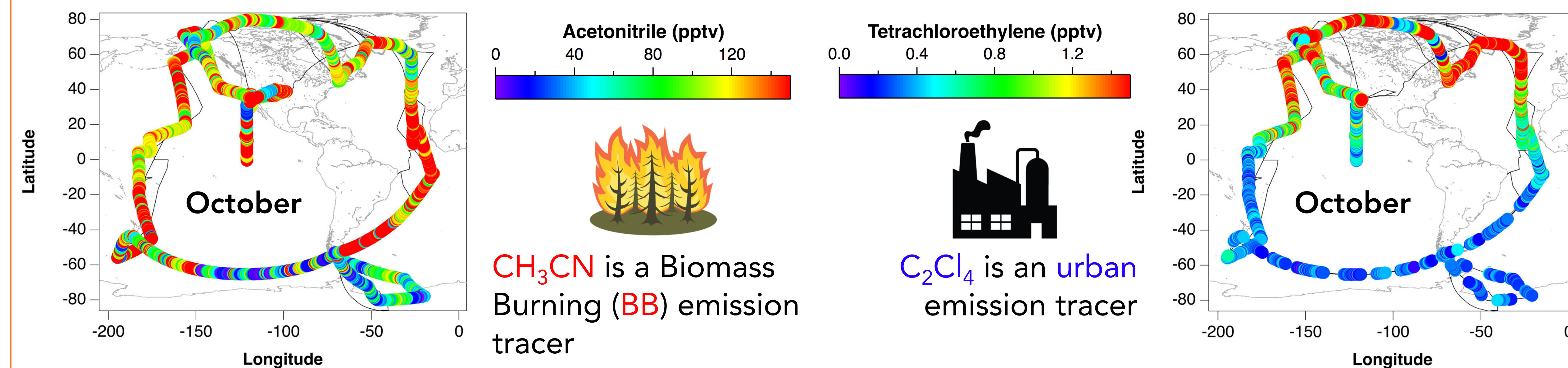
3. Designed to answer this (among others) question, the Atmospheric Tomography (ATom) mission provides a unique dataset with global coverage (> hundreds of gas phase and aerosol property measurements)



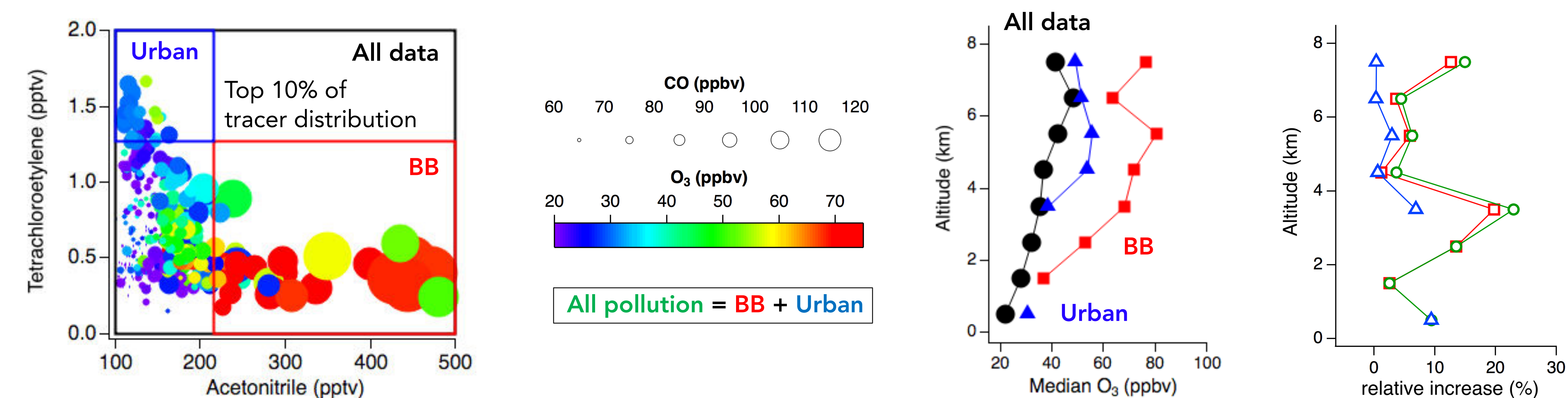
The NASA DC-8 aircraft in Hawaii

NOAA chemiluminescence (CL)  $O_3$  instrument ( $\pm 2\% + 15$  pptv).

- 4 seasonal deployments between 2016 and 2018 over the Pacific and Atlantic Oceans, from the North to the South Pole.
- Continuous vertical profiling from 0.2 to >13 km.

Emission tracers and influence on  $O_3$ 

4.  $CH_3CN$  and  $C_2Cl_4$  are tracers of BB and urban emissions, respectively (also looking at  $HCN$  and  $CH_2Cl_2$ )



5. High  $O_3$  where  $CH_3CN$  is high, causing up to 20% increase of median  $O_3$  (Tropics in October)

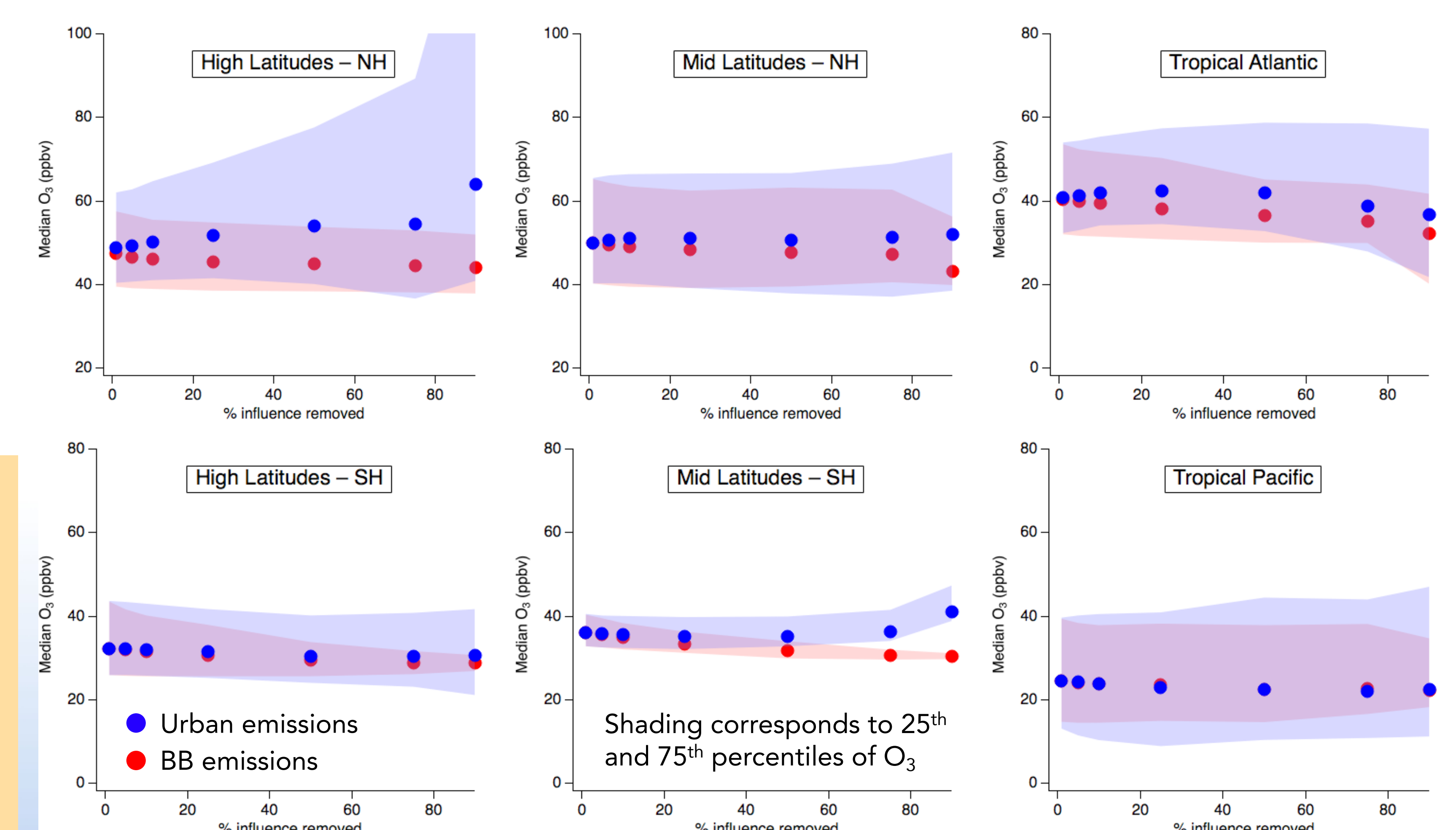
6. Removing the BB influence always leads to an  $O_3$  decrease in all regions of the globe.

Removing the urban influence has little impact on  $O_3$  distribution.

How to read these plots:

All  $O_3$  data in  $\xrightarrow{\text{x-axis}}$   $O_3$  data progressively removed the region

E.g.: at 90% on x-axis, median  $O_3$  is from the lowest 10% values of tracers (90% removed)

Is BB the main driver of  $O_3$  increase in the troposphere?

➔ Mixing model, PMF, and global modeling are the next steps