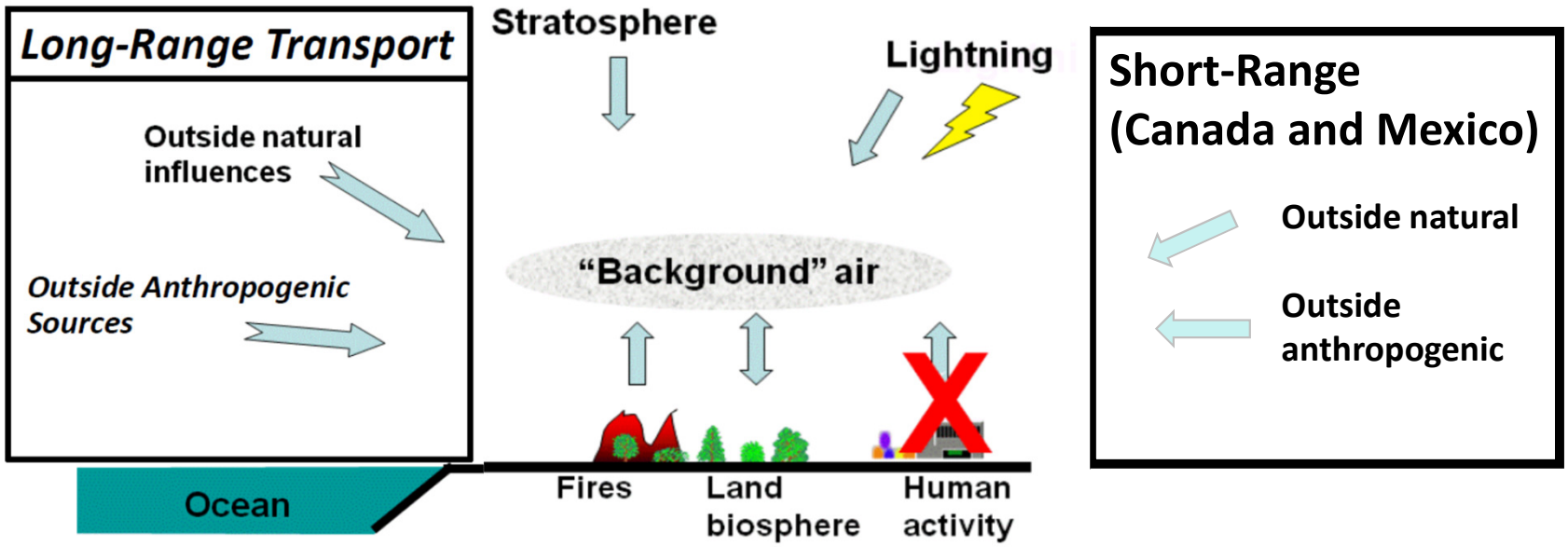
Background Ozone (BGO3)

- BGO3 includes ozone formed from natural sources and international (i.e., non-US) anthropogenic sources



Definitions: "Ozone concentrations that would exist in the absence of anthropogenic emissions of ozone precursors from _____"

"all people" - Natural Background
"the U.S. only" - U.S. Background
"the U.S., Canada and Mexico" - North American Background (historically PRB)

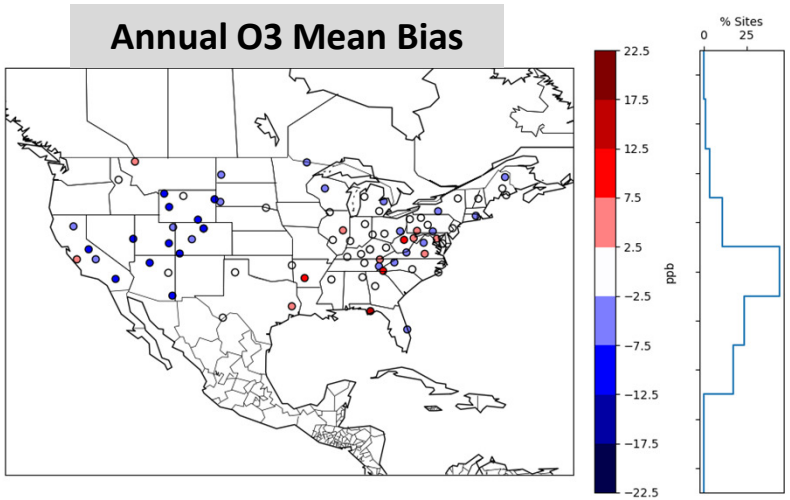
Addressing "Background" in NAAQS Reviews and Implementation

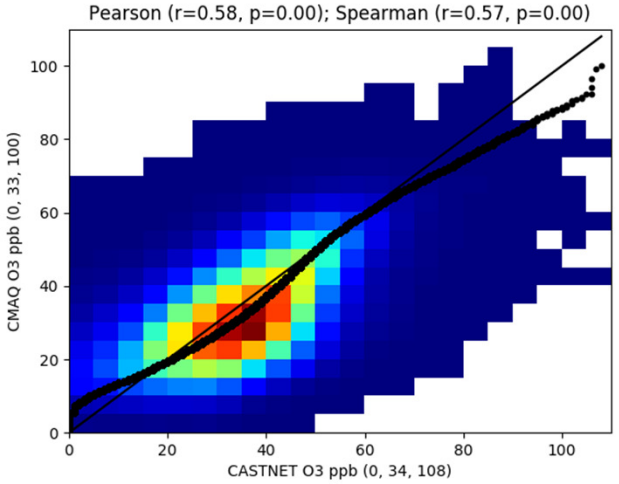
- Current Ozone NAAQS Reviews
  - Integrated Science Assessment and Policy Assessment for each review includes summary of latest literature on US background including international transport
  - Policy Assessment updating US Background including international transport for recent year
  - Recent court ruling upholding 2015 ozone NAAQS:
    - "Because the Clean Air Act prohibits EPA from adjusting for background ozone in setting the NAAQS, EPA did not act unlawfully or arbitrarily and capriciously in setting the NAAQS without regard for background ozone."
    - "[T]he fact remains that Congress decided that EPA should account for background ozone during enforcement, not when setting standards."

- NAAQS Implementation
  - Exceptional Events Rule allows for exclusion of certain events that meet the criteria in the Exceptional Events Rule and CAA §319:
    - Natural events (e.g., fires or stratospheric intrusions)
    - Anthropogenic activity that is unlikely to recur (e.g., facility explosion)
  - CAA § 179B:
    - Allows EPA to approve an attainment plan for a nonattainment area, if international transport of pollution is a significant impediment to meeting the standard on time, i.e., would have attained "but for" international emissions.

Tools to Characterize Background Ozone

- We use photochemical models to estimate **background ozone** since even the most remote monitors include contributions from US anthropogenic emissions
- So how are measurements valuable for characterizing background ozone?
  - Model evaluation against ambient monitors is needed to build confidence in results and help identify areas to explore for model improvement
    - This is especially important in locations with high background ozone concentrations
    - Coarser resolution hemispheric models need to be evaluated in rural locations away from gradients in near proximity to sources
  - Sufficiently remote monitors can provide information about **Baseline Ozone which** is "the statistically defined lowest abundances of O3 in the air flowing into a country." (HTAP 2010)
  - Monitors in remote locations can help to detect the influence from various background sources when paired with additional monitoring capabilities
    - CO, RH, vertical gradients: stratospheric intrusions and/or long-range transport
    - PM (speciated if possible): fires
  - Monitors in remote locations over long time periods can help provide information about trends in Baseline Ozone





Plots courtesy of Barron Henderson