

Projecting Future Ground-Level Ozone Concentrations in Albuquerque, New Mexico

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Motivation

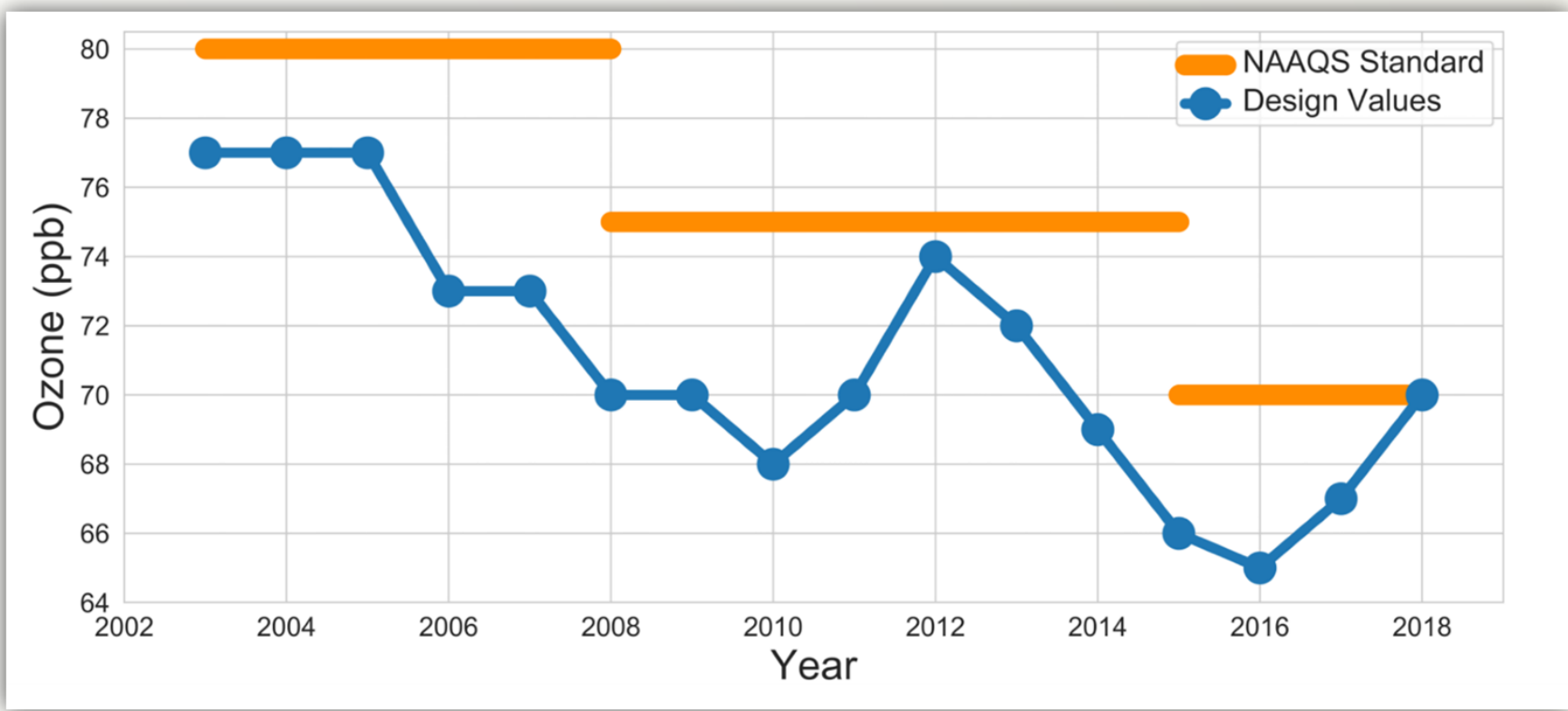


Figure 1. Ozone design values (blue line) in Albuquerque, NM, and the U.S. National Ambient Air Quality Standard (NAAQS) ozone standard (orange line).

To support the Albuquerque Environmental Health Department (AEHD) with its air quality planning, air quality modeling analyses were conducted for two high-ozone episodes in 2017 with different 2025 emission scenarios.

Purpose

Assess how future ozone concentrations in Albuquerque could be impacted by:

- National, regional, and local changes in emissions that are expected to take place between 2017 and 2025.
- Emission scenarios in 2025, which are summarized in Table 1.

Table 1. Future year (2025) emission scenarios.

Scenario	Detail
Electric Vehicle NO _x ↓ 56% VOC ↓ 90%	Electrification of the gasoline vehicle fleet in Bernalillo County.
I&M Expansion NO _x ↓ ~5% VOC ↓ ~7%	Expand the Inspection and Maintenance (I&M) program to Sandoval and Valencia Counties.
Peaker Plants NO _x ↑ ~8-10X	Local peak-demand electrical generating units (EGUs) operating at permitted emission levels.
Tri-County Reduction NO _x ↓ 25% VOC ↓ 25%	Tri-county (Bernalillo, Sandoval, and Valencia) anthropogenic emissions reductions.

Method

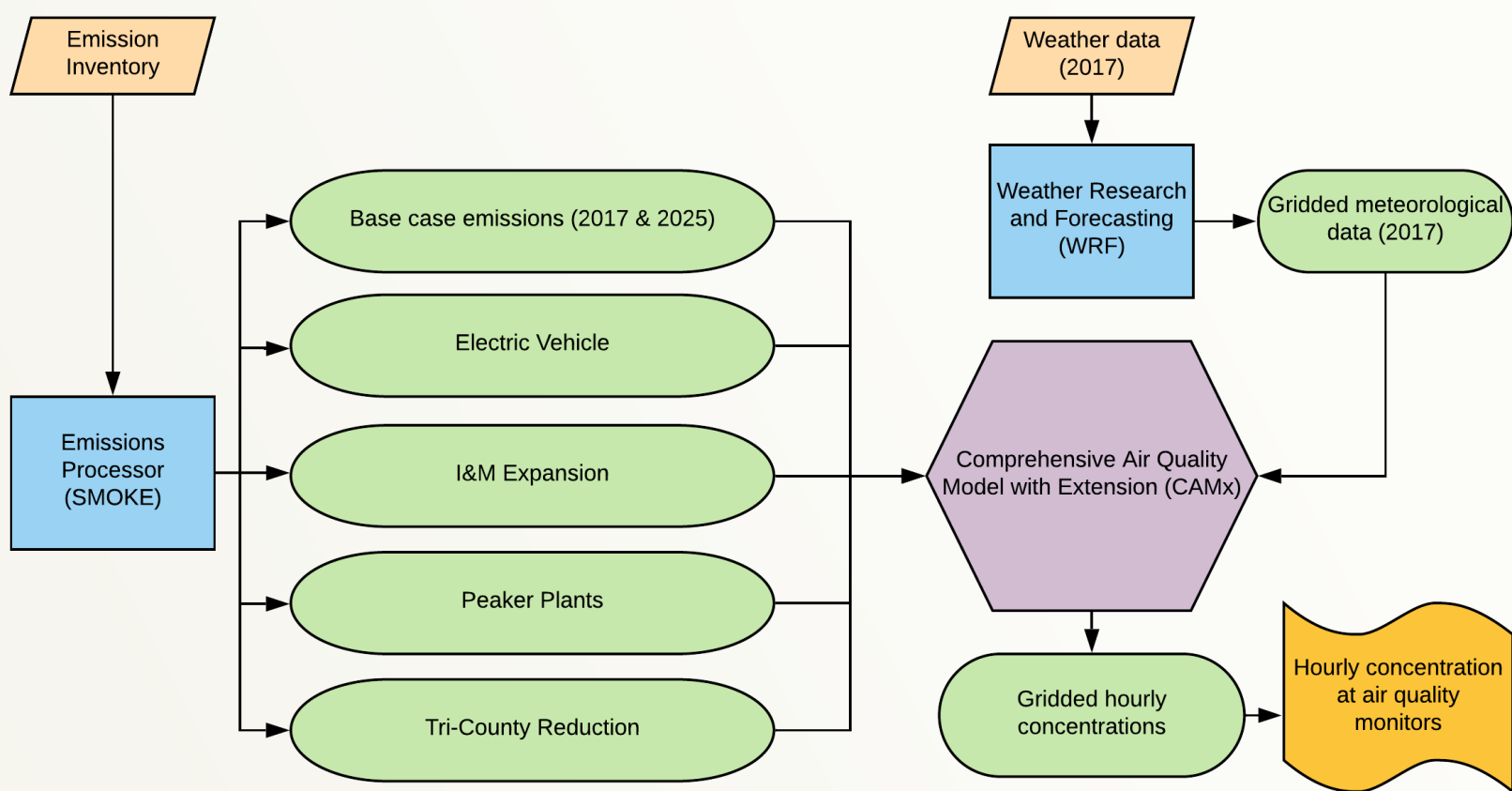


Figure 2. Flow chart of the modeling approach and emission scenarios.

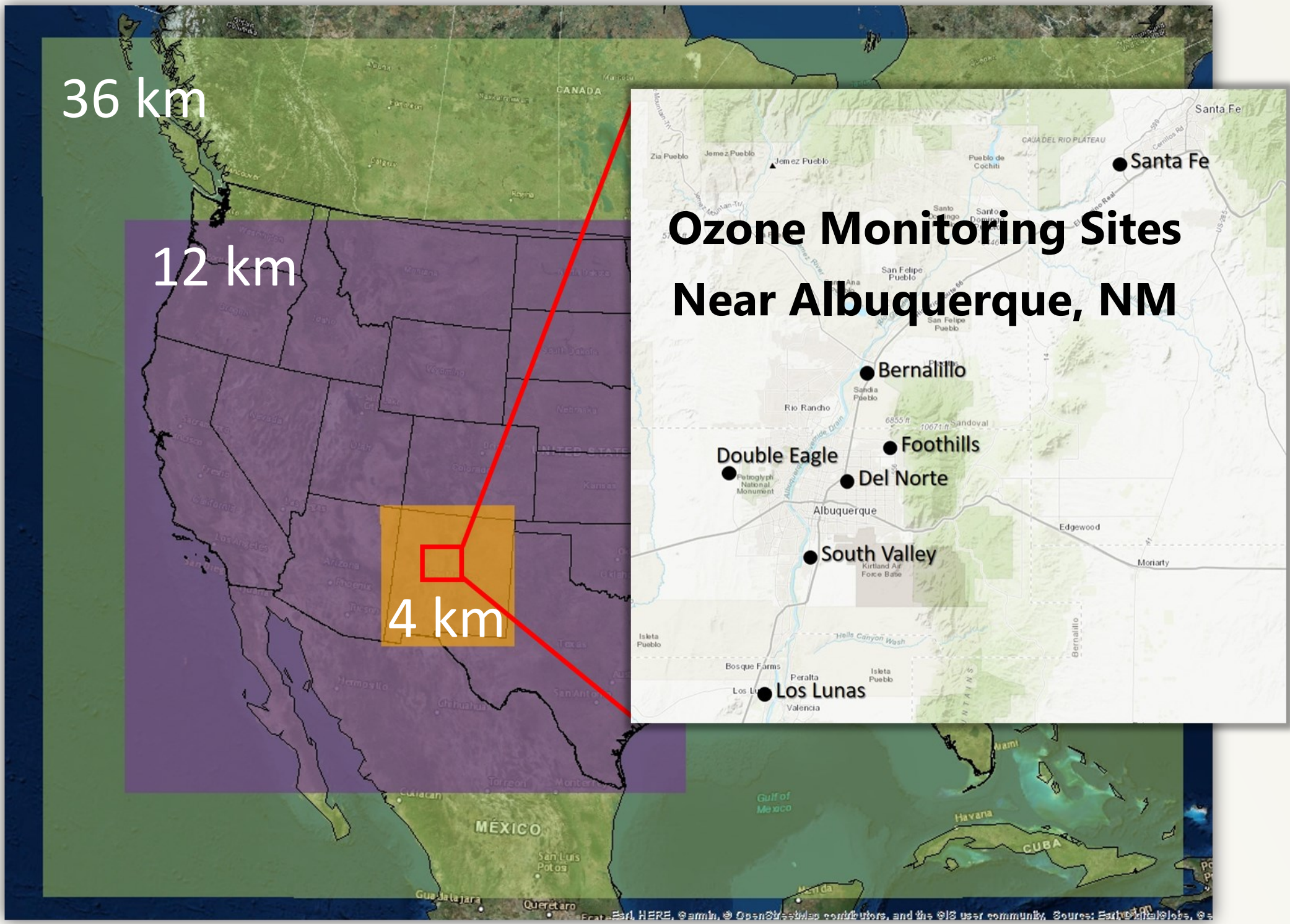


Figure 3. Modeling domains and ozone monitor sites near Albuquerque, NM.

Results

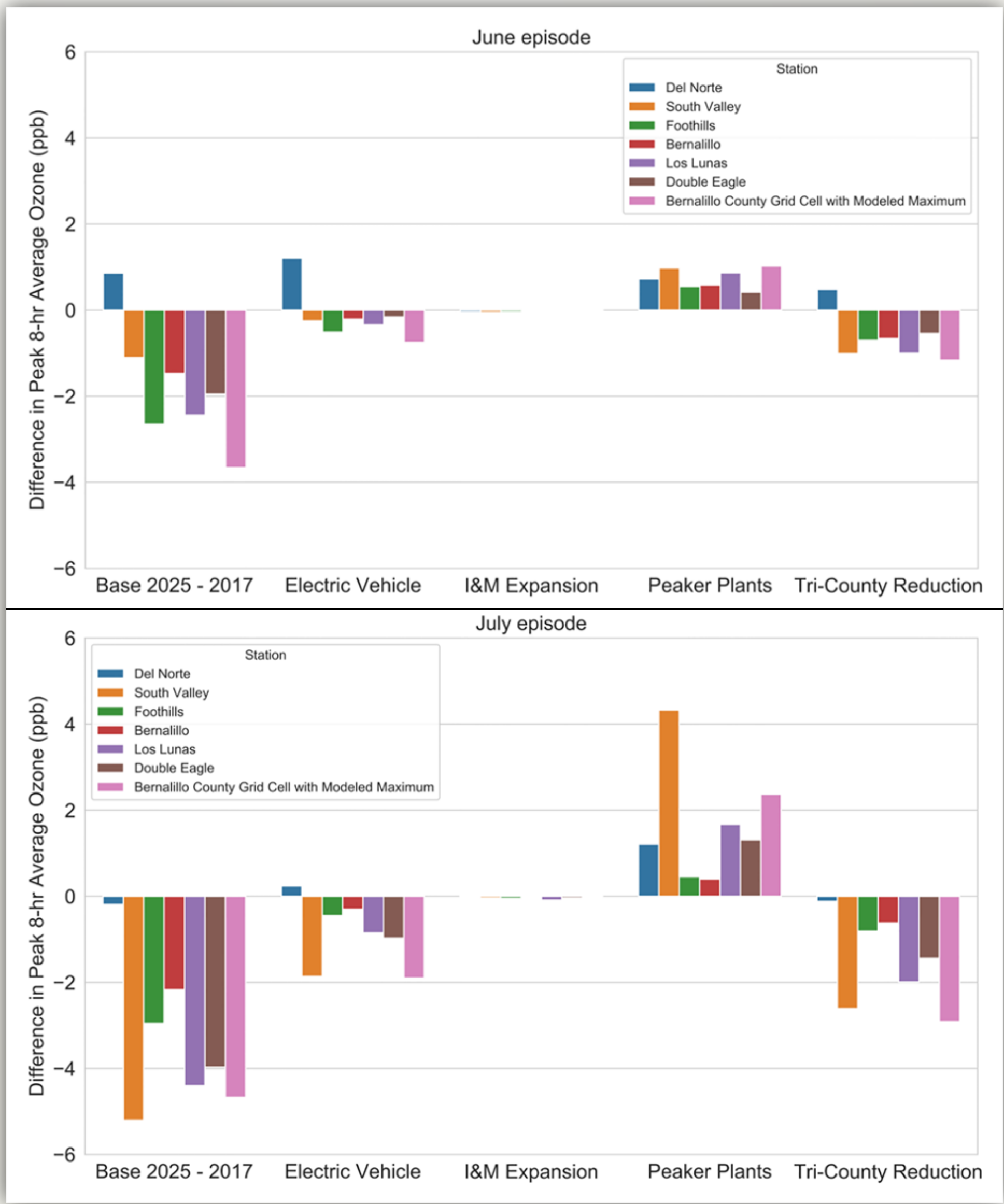


Figure 4. Differences in modeled 8-hr average ozone concentration by emission scenario for the day of maximum change in the June episode (top) and July episode (bottom).

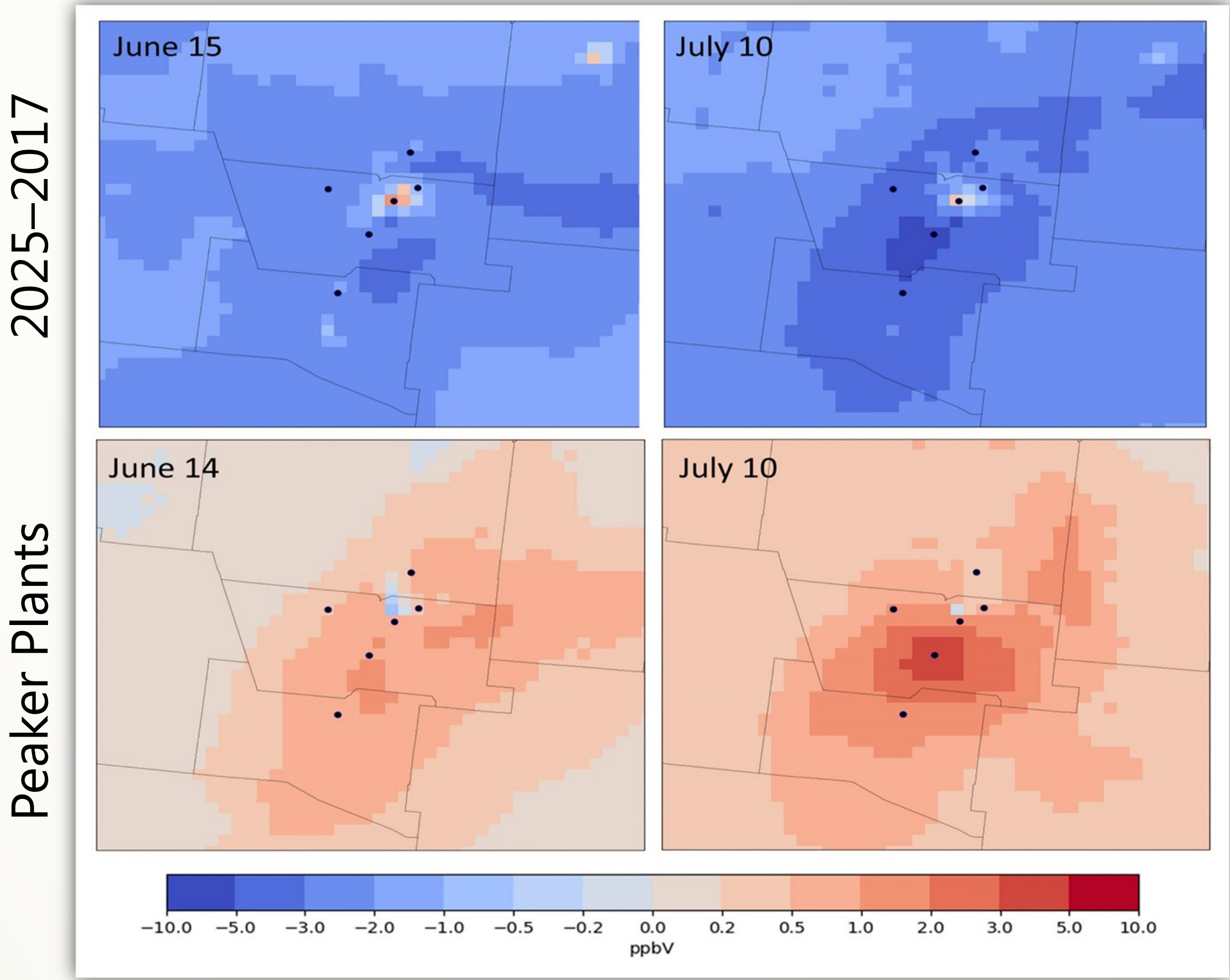


Figure 5. Difference in modeled peak 8-hr average ozone concentration between the 2025 and 2017 base cases (top), and for the impact from the Peaker Plant scenario (bottom).

Summary

- The modeled peak 8-hr ozone concentration for 2025 was lower than the modeled 2017 concentration by as much as 5.0 ppb.
- Transitioning all light-duty vehicles in Bernalillo County to electric-powered vehicles in 2025 reduced the peak 8-hr ozone concentration by as much as 1.9 ppb.
- Expanding the I&M program to Sandoval and Valencia counties reduced the future ozone concentration by as much as 0.5 ppb.
- The emissions from the peak-demand power plants would increase ozone in Albuquerque/Bernalillo County in the future by as much as 4 ppb if they were operated at permitted emission levels.
- If tri-county anthropogenic emissions were reduced by 25%, the future peak 8-hr ozone concentration would decrease by as much as 2.9 ppb.

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