Comparison of EASIUR to AP2

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- Figures 1 to 4 compare EASIUR with deterministic AP2 values published in Muller (2014).

- The AP2 for year 2005 was downloaded from the supporting material at the journal website.

- Adjustments were made to isolate the comparison to air quality modeling:

  - Because AP2 uses \$6M (to be exact, \$5,907,840) for VSL, AP2 is adjusted to the EASIUR's base VSL (\$8.6M).

  - AP2 is converted from \$ per short ton to \$ per metric ton.

  - Both EASIUR and AP2 use the same concentration-response relation, 6% increase in mortality per an increase of $10\,\mu g\,PM_{2.5}/m^3$.

- I treated three old counties in AP2 that do not exist anymore: one (12025) simply changed its FIPS code (12086); the other (51560) merged to an other county (51005) was assigned with values from the parent county; and another, a newly created one (8014), was assigned with inverse-distance weighted averages of three nearby counties.

- EASIUR's $150\,m$ and $300\,m$ are modeled for the physical stack heights of $150\,m$ and $300\,m$ with a common stack characteristics (e.g. plume temperature and flow rate). CAMx internally simulated plume rise accordingly depending on ambient conditions. AP2 Medium represents effective stack heights ranging $250\,m$ to $500\,m$, which include plume rise in addition to physical height.

Reference

Muller, Nicholas Z. 2014. "Boosting GDP Growth by Accounting for the Environment." Science 345 (6199): 873-74.
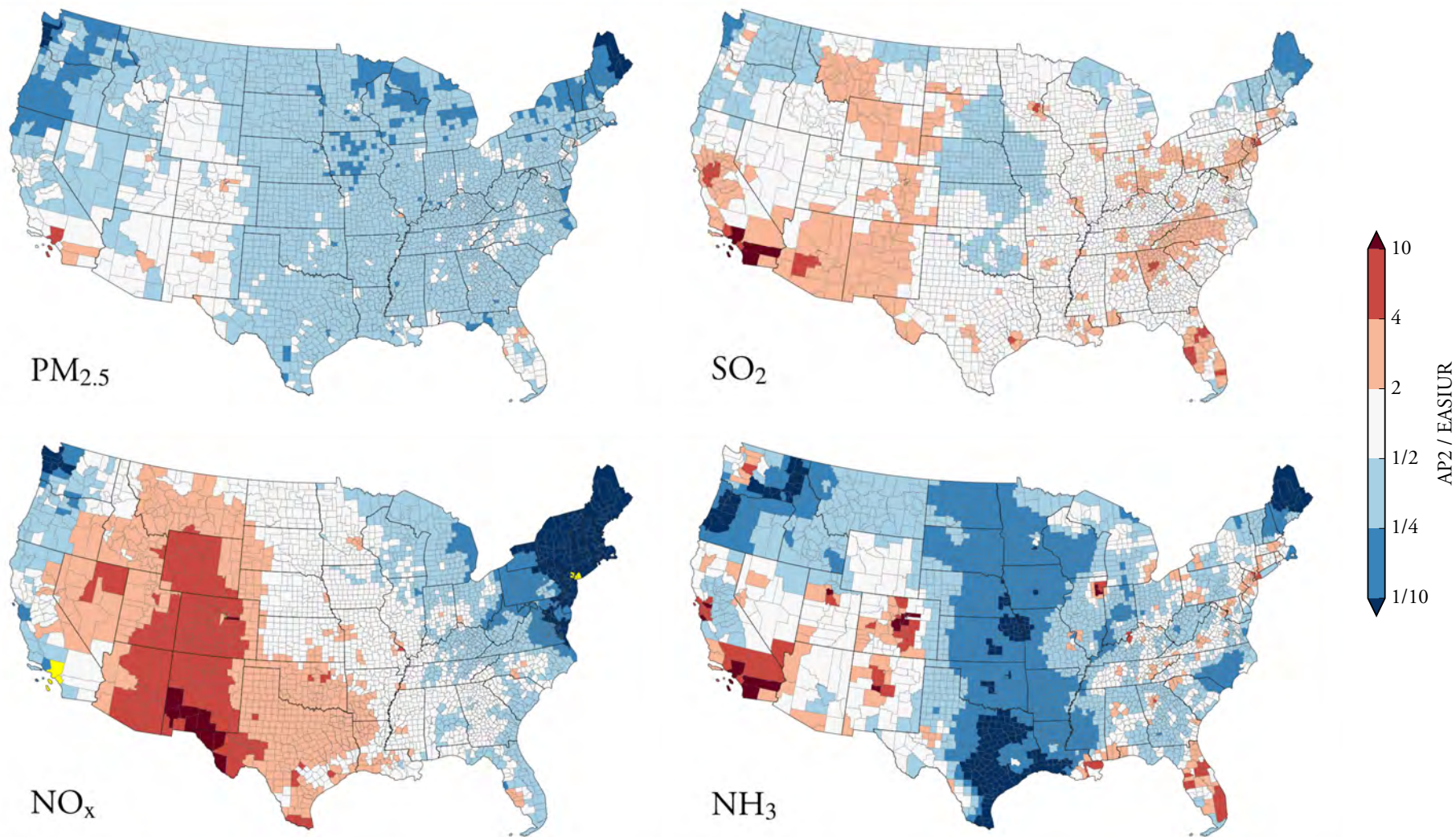
Figure 1: EASIUR v.s. AP2 (Muller, 2014) for ground-level emissions. For each county, AP2's estimate is divided by EASIUR's. Yellow areas indicate where AP2 reported negative values.
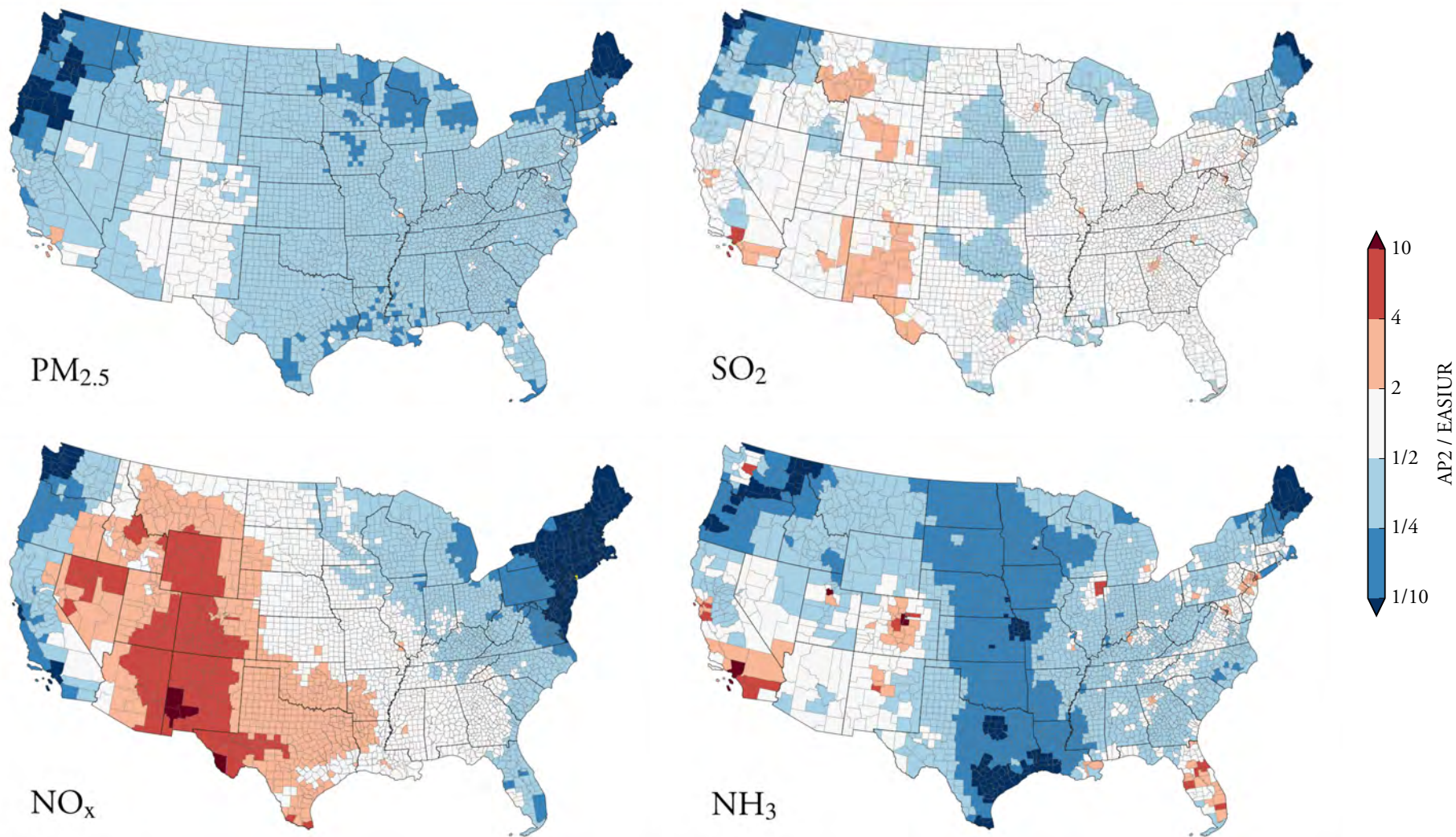
Figure 2: EASIUR 150 m v.s. AP2 Medium (Muller, 2014). EASIUR 150 m indicates a 150 m physical stack height while AP2 Medium is modeled for effective stack heights ranging 250 m to 500 m.
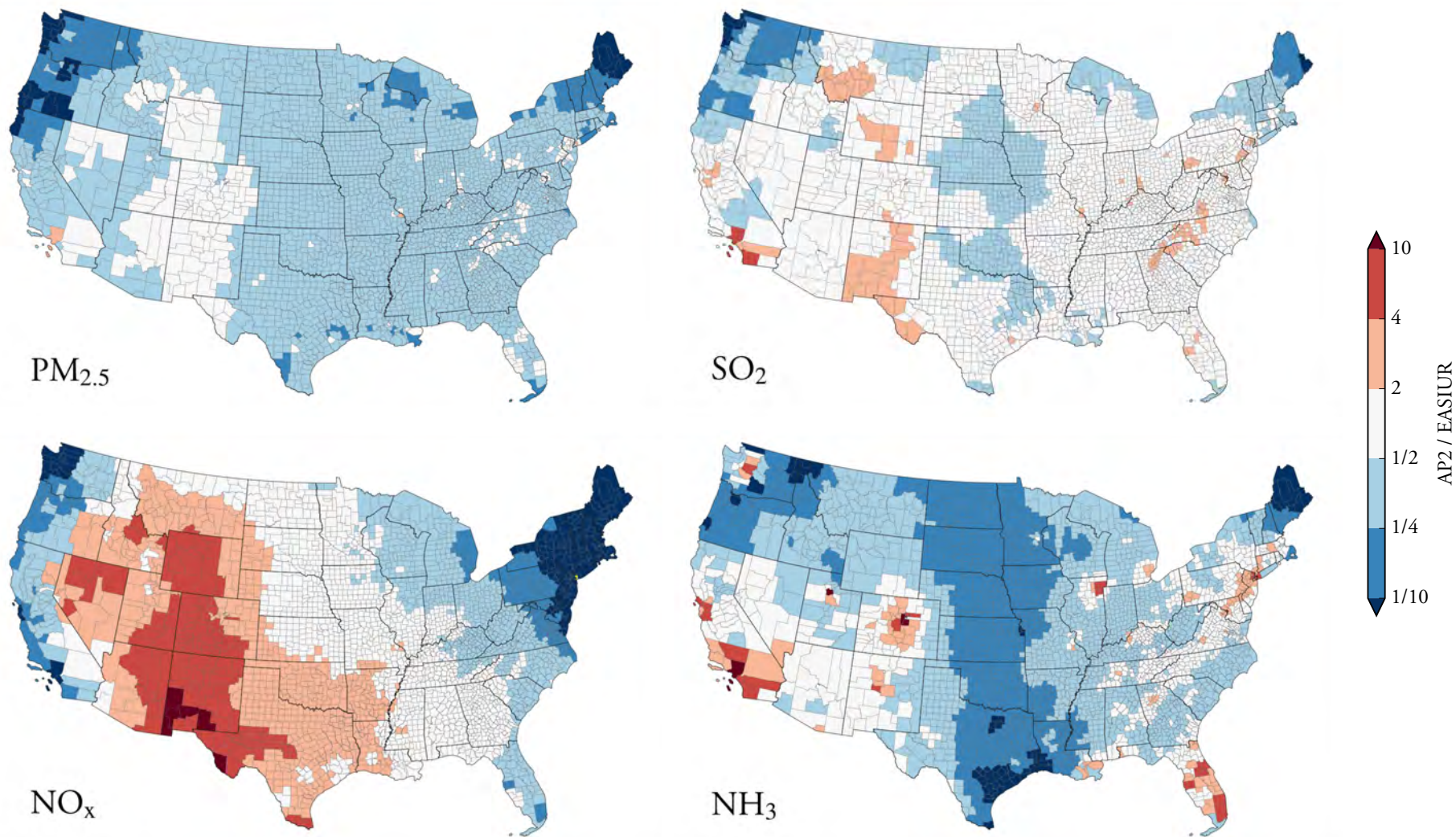
Figure 3: EASIUR 300 m v.s. AP2 Medium (Muller, 2014). EASIUR 300 m indicates a 300 m physical stack height while AP2 Medium is modeled for effective stack heights ranging 250 m to 500 m.
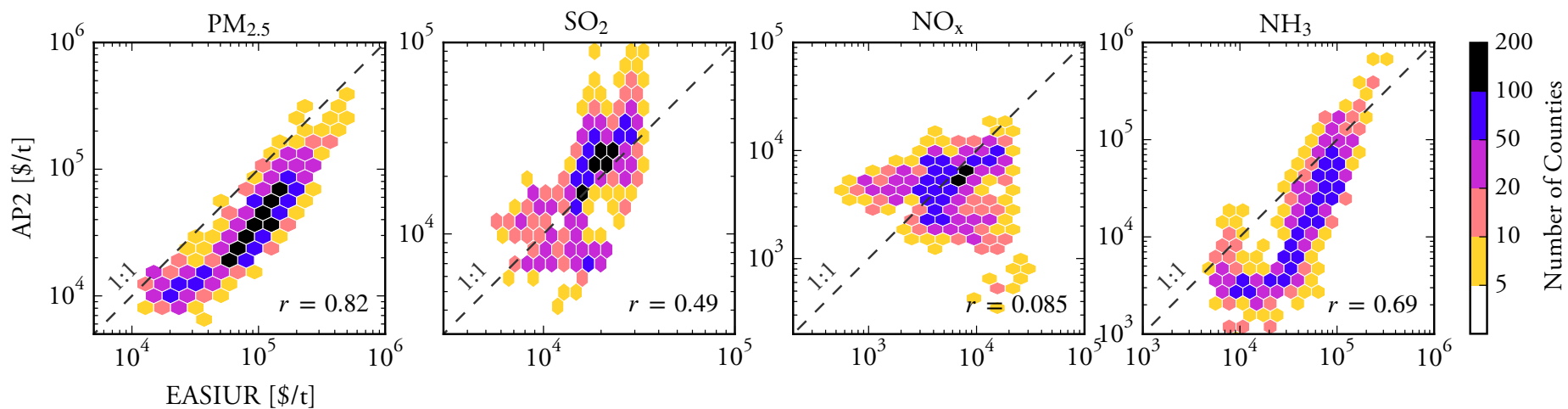
Figure 4: Comparison of EASIUR to AP2 (Muller, 2014) for ground-level emissions. EASIUR and AP2 are compared for each county. Pearson correlation coefficients (r) between EASIUR and AP2 are presented on the bottom right.