

General comments:

This manuscript integrated MethaneAIR aircraft and Tropomi satellite observations in the Integrated Methane Inversion to optimize methane emissions in Permian and Uinta oil/gas production basin. This work can improve methane emission estimates from top-down approach and validate bottom-up emission inventories. This topic is interesting and meaningful to readers.

Special comments:

- 1 Figure 4. Why were posterior methane concentrations from TROPOMI not compared in this study, while methane emissions were compared with TROPOMI in Figure 3? Also, the same question for the following figures.
- 2 Section 3.1. The author posted two figures first in this section, but only a few words about the concentrations shown in Figure 4. I suggest adding more discussion of concentrations, as the spatial distributions driven by posterior and prior emissions were still different.
- 3 Section 3.2, Any differences in the prior emissions between GHGI and Omara et al., 2024 in the region of Uinta?
- 4 Line 328, The data shown here was not consistent with the values in Figure 8.
- 5 Is the framework developed in this study also suitable for other point-source methane observation satellites, such as PRISMA or GHGSAT, rather than MethaneSAT?
- 6 Some small errors. Lines 101, change “10 and 12 local time” to 10:00 and 12:00 local time”, similar to that in line 104. Line 208, change “Total” to “total”.