

As no one but Kevin Gurney can ever fully appreciate, the paper on Vulcan 3.0 represents a massive effort of collecting and processing huge amounts of varied data. To dig out the focused, fine-scale data relevant to CO₂ emissions at 1 km by hourly resolution is a heroic effort. Yes, it requires approximations, surrogates, linear extrapolations, etc., but the Vulcan product is the gold-standard for spatial and temporal resolution at the scale of a large country.

As a reviewer I can point out a few queries such as the fact that the meaning of the quotation marks in Table 2 needs clear explanation

These were symbols to represent a repeat of a value. However, this was not the best choice, so we have been explicit in the repetition of values in the table.

Figure 7 does not appear to be cited in the text

This has now been referenced on page 27, line 18 at the end of the sentence as “..... in the months of July and August.”

the number in line 13 on page 29 does not match what appears to be the same value in Table 6 (and the abstract)

They are not intended to be the same. On page 29, line 13 the value is the result of using a mask for ODIAC. This is slightly different from the raw Vulcan result (which is presented in Table 6). We have added text to clarify this as follows:

“The same mask applied to Vulcan results in FFCO₂ emissions of 1553.8 TgC/yr (distinct from the unmasked Vulcan total of 1589.9 TgC/yr) or a difference of 100.3 MtC/yr (7.6%).”

but my substantive suggestions for the paper relate to the discussions of uncertainty. Most notable, the values for uncertainty throughout the text do not generally have reference to the relevant spatial and temporal scale and do not lead to summary values at the end of the paper (except for Figure 7 which is national/monthly). So Figure 10 is annual, and presumably 1 km – what kind of uncertainty are we talking about?

We have now included the 95% CI boundaries in Table 6 for the totals in each year. All totals in the text now have the 95% CI boundaries included. Uncertainty for Figure 10 is now provided in caption.

And what kind of uncertainty are we looking at by the time we get this down to hourly?

There is no distinct uncertainty applied at the hourly versus annual scales. We have added text to uncertainty sections to make it clear how this uncertainty would be represented at different scales.

It is cool stuff.