

I really appreciate the reading of this paper which is well written. The application of eddy covariance to wild animals is innovative and interesting. The method is well described and the obtained results are very clear. However, I have the following major remarks:

- I do not see the point of using the Tikhonov Regularization method. If cattle location were biased, their location could more or less aggregated than observed. Moreover, cattle could be present in a pixel different than the one expected. I do not understand why the spatial uncertainty should be estimated by smoothing cattle distribution. In my opinion, a better way to estimate spatial uncertainty would be to consider that some part of the herd might not be in the expected cell but in an adjacent cell, even if it results in a more aggregated cattle distribution (e.g. 10% of the herd is considered as mislocated in a specific direction, one iteration could be done for each cardinal direction). As this element represent an important part of the manuscript I suggest either to better explain why the proposed option is the good one (which I am not convinced) or to propose another spatial uncertainty estimation method.
- There is a problem with Equation 6 which should be written as:

$$\langle f_x \rangle = \frac{F_x}{\sum_{i=1}^8 \sum_{j=1}^{12} n_{ij} \phi_{ij}}$$

f_x corresponds to mol animal⁻¹ s⁻¹

F_x corresponds to mol m⁻² s⁻¹

n_{ij} corresponds to an amount of animals

ϕ_{ij} corresponds to m⁻²

The equation proposed in the manuscript is not homogeneous. I hope that the equation which was applied in the calculations was the one described here above and not the one described in the manuscript.

I also have the following minor remarks:

-line 27 to 28: wording: "Our observations point to the need for direct comparisons of methane emissions from conventional and alternate grazing systems using eddy covariance": I do not see the link between observations and grazing management.

-line 43: wording: "also need not migrat

-line 44: The fact that bison do not follow the "green wave" and that they tend to stimulate plant growth does not suggest that they select for forage quality rather than quantity.

-line 86 / Table S3: the average mass of a bail should be specified.

-Equation 2 /3: is it an "α" (Equation 2) or a "a" (Equation 3).

-line 159: I would say: "are solely due to"

-line 216: Giving the mean and median wind direction is of limited interest (e.i. if there are 2 main wind directions, the mean wind direction will be in-between, in a direction from which the wind might never be coming from). Main wind directions are far more relevant.

-line 243: Wording: I would say 'At least one bison was located within...'

-line 244: which

-line 244 to 245: wording: "an average of 8 models which increased to both footprint models"?

-line 265-278: In my opinion, the discussion would be more interesting if emission comparisons would consider animal body weight => e.g. comparisons in $kg_{CH_4}kg_{bw}^{-1}day^{-1}$

-line 301: Gourlez de la Motte

-line 303: Results from Dengel indicate that CH₄ fluxes are more important during summer but the main reason is a higher stocking density on the pasture. Manure impact on this result is expected to be weak / negligible as manure is not placed in anaerobic conditions. I do not think that the publication from Dengel support the associated sentence.

-line 311: Gourlez de la Motte

-line 345 : wording : « algorithms for are »

-line 351: remove “and”

-Figure 11: the second “Figure 11” should be named “Figure 12”.