**Biogeosciences
Discussions**

Interactive comment on "Spatial resolution and regionalization of airborne flux measurements using environmental response functions" *by* S. Metzger et al.

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General Comments:

This publication presents a technique to combine aircraft-based fluxes of sensible and latent heat with satellite-based data of surface temperature and EVI to obtain flux estimates of sensible and latent heat at a regional scale. The authors accomplish this goal using a sophisticated data analysis procedure, incorporating (in addition to standard EC data processing) wavelet cross-scalogram analysis, footprint modelling, and a boosted regression tree procedure to derive an environmental response function. This is an interesting methodological paper which demonstrates a data mining technique

which has the potential to be applied to existing aircraft-based flux measurement data sets. Given the apparent success that the authors have had with this approach, there is little doubt that it will be emulated by other researchers. The main concern that I have with the paper is the use of estimates of surface temperature every 8 days to obtain regional flux values of sensible and latent heat. I can see that EVI could be interpolated over time, but it is not reasonable to interpolate LST because of the variations of surface temperature with radiation conditions and presence and absence of precipitation. It might have been more reasonable to adjust the satellite-based surface temperature data using the aircraft-based surface temperature measurements. Most of my other comments are minor and intended to make the paper more easily understood.

Minor Comments:

1. You probably should change the title to: 'Regionalization of airborne flux measurements using environmental response functions'. This seems more appropriate.

2. P 15939, L 12 do you mean +/- 18%? Is this the 90% confidence level?

3. P 15945, L6: It is not clear how you have gone from either 1km resolution (LST) or 250m resolution (EVI) to the 90m resolution used in the flux mapping. What point on a grid is represented by 1km2 pixel used for the interpolation?

4. P15945, L14: Why does LST increase for irrigated agriculture? This would seem counter-intuitive.

5. P15957, L13-14: This makes sense but the random uncertainties in the measured fluxes do not seem to be reflected in your results. You probably need an explanation when discussing the results in Figure 9. P15957, L20: 'inherent in the above' rather than 'inherent to above'

6. P15958, L17-18: Not clear what is meant by the meteorological variables measured by the aircraft are not continuous in space.

7. P15961, L3-4: It would have been useful to estimate Rn and compare it to H + LE.

8. P15962, L6: How can you be sure that you are not underestimating fluxes along such a short flight track? Did you compare the flux for five 12 km flights and the mean for the 60 km flights? It would be interesting to compare the flux contribution when you include and exclude the cone of influence.

9. P15965. High intermittent solar radiation should cause large changes in LST which are not accounted for, yet the environmental response function seems to work wonderfully. Can you explain the excellent agreement in Figure 9?

10. P15993: In Figure 2R, the colour palette makes it difficult to distinguish differences in EVI. What does 1 represent? In the scale bar, Km should be km.

11. What is the significance of the different size of the data points in Figures 9, 11 and 12?