

Interactive comment on “Diurnal, weekly, seasonal and spatial variabilities in carbon dioxide flux in different urban landscapes in Sakai, Japan” by Masahito Ueyama and Tomoya Ando

Anonymous Referee #2

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Title: Diurnal, weekly, seasonal and spatial variabilities in carbon dioxide flux in different urban landscapes in Sakai, Japan By Masahito Ueyama, Tomoya Ando

General comment: This study presents flux of CO₂ measured at three different types of locations (urban suburb and rural) in Sakai, Osaka. The fluxes have been calculated using the eddy covariance method. In summary, the paper presents important result about the variations of flux in different time scales. The data looks reliable and worth reporting. However, I am not fully satisfied with the discussion which is largely qualitative and very brief. Therefore, there is a significant scope to improve the draft considering following aspects.

(1) The experimental uncertainties in the measurements of eddy parameters (CO₂, C1

winds, etc.) have not been reported. In the “Observations” section, the errors and calibration procedure should be presented in details. The variations of meteorological parameters (wind parameters, RH, temp) should be presented (Figures, wind rose) for each season.

(2) The authors should work to make proper statistical representations of results (using mean, median, percentiles, standard deviation, etc.). None of the representations (figures) used in the paper show the variance of CO₂ flux on daily, weekly and monthly scales. Accordingly, the discussion is “overall” but not the “detailed”.

(3) About the results and discussion, sometimes I am confused to see overlaps between the interpretations of data for different sites. Hence, the important governing processes at each site. This is because the discussion is not structured and very brief. For example, the results of “3.1 Diurnal variations” “3.3 Weekly variations” at all sites have been summarized just in few lines. Therefore, it is difficult to follow and appreciate the discussion.

(4) Additional analysis: It would be interesting to see how the diurnal flux changes with weather conditions in each season. For this, I suggest to separate the data, at least for rainy, cloudy and clear-sky days in each season. Please provide the diurnal flux figures measured under distinct weather conditions (rainy, cloudy and clear sky)

(5) English should be improved, sometimes choice of word and phrase are not appropriate.

(6) Overall, the paper looks a kind of well written report. However, a scientific paper requires more detailed representations of both results and discussion.

Some specific comments are given here:

Page 1 Line 14-16: Following sentence is ambiguous and needs to be re-written. "In contrast, the dense and moderately urban areas exhibited higher emissions in winter and summer months, when emissions significantly increased as air temperature

increased in summer and air temperature decreased in winter."

Page 1 Line 25: In this sentence, I do not find the logic to use "Consequently, ..."

Page 1 Line 27: " Global CO2 emissions have often been estimated using inventories ..." I do not understand this, what do you mean by "inventories" here ?

Page 2 Line 15: "because vegetation fraction can be correlated with anthropogenic activities. " How?, an explanation is required.

Page 3 line 1: " according to the apanese Meteorological " Spelling issue, please correct

Page 4 line 19: Following sentence needs correction "using" has come twice

Turbulent fluxes were calculated using the eddy covariance method using the Flux Calculator program

Page 6 " 3.1 Diurnal variations" The discussion in this section is very qualitative. It is needed to be more quantitative in terms of site to site variations represented by suitable diurnal statistical analysis?

Page 6 3.2 Seasonal variations Again, the discussion in this section is very qualitative. It is needed to be more quantitative in terms of site to site variations represented by suitable seasonal statistical analysis?

Page 6 Line 22-23, Previous studiesour city. This sentence is not clear, what authors wish to convey?

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