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Atmospheric Measurement Techniques Discussions

# *Interactive comment on* "A unified code for conventional and disjunct eddy covariance analysis of trace gas measurements: An urban test case" *by* Marcus Striednig et al.

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This is a short and well written manuscript introducing a procedure for processing turbulent fluxes of trace gases by disjunct eddy covariance over relatively heterogenous surfaces. The disjunct eddy covariance method has the ability of measuring fluxes using instrumentation not capable of collecting data at very high frequency (e.g. 10-20 Hz) as requested by the true eddy covariance method.

Although the method has been previously described and tested over urban surfaces, this manuscript summarizes quite well the steps and corrections needed for its application. After addressing the following comments, the manuscript can be considered for



publication.

Main comments

- 'Unified' may not be an appropriate term for the title. This reviewer agrees in general with the assumptions and corrections included in the proposed methodology, but not all researchers may do it. Some debate exists on how to postprocess turbulent fluxes.

- A flowchart will help to visualize the order of the steps for postprocessing disjunct fluxes.

- The introduction should explain the need for measuring fluxes by eddy covariance over urban surfaces, particularly of speciated VOCs.

- Velasco et al. (2005, doi:10.1029/2005GL023356) deployed by first time a PTR-MS for measuring turbulent fluxes over an urban surface using the disjunct eddy covariance method. Some of the corrections and assumptions discussed here were also discussed by them.

Specific comments Page (lines)

1(8-9) ". . . and disjunct eddy covariance flux data."

1(9) Define acronyms every time they are used by first time. Please check this throughout the whole text. Many acronyms were used without being properly defined.

1(16) What about the met data necessary to compute turbulent fluxes?

1(24) Replace "surface fluxes" by "turbulent fluxes".

2(6) Use italic fonts for referring to variables. Check this throughout the whole text.

2(7) in the horizontal dimension?

2(11-12) fast and highly accurate sensors.

2(12-14) Consider that the atmospheric reactivity of some species limits the application

of the eddy covariance method for measuring turbulent fluxes. Some species react faster than the time taken by the air sample to reach the height of the instrumented tower. This is a particular constraint in polluted urban atmospheres.

3(18) Why is the co-spectral analysis important? What does it show?

3(24-26) The averaging time peirod depends also on the roughness elements' height. For flux measurements over smooth surfaces such as lakes and grasslands, for example, averaging time periods of 10-15 min are used, while for measurements over tall canopies in forested and urban environments, averaging periods of 30 min are common.

3(29-30) Define inertial subrange.

4(23-24) Explain how you reached this figure.

5(27-30) You could save the reader of searching in a second article to learn about the eddy covariance flux system used here as a test case. Provide at least the local climate zone, land cover, measurement height, mean roughness elements height and zero-plane displacement height.

6(13) How many VOC species and of which groups (i.e. olefins, aromatics, etc.)?

6(20) What about data from a low frequency met sensor for flux corrections. The sonic/virtual temperature is not the absolute temperature.

8(19) In most urban environments moisture in the air is inherent.

8(25) But a co-spectra analysis is not feasible for DEC as explained above .....

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