Author reply to the comments by Anonymous Referee #2 of the manuscript

gmd-2016-318

"eddy4R: A community-extensible processing, analysis and modeling framework for eddy-covariance data based on R, Git, Docker and HDF5"

by S. Metzger et al.

We thank Anonymous Referee #2 for the valuable feedback on this manuscript. With regard to one reviewer comment, we would like to provide additional clarification to our earlier response from 2017-04-13. The comments by the reviewer are recited in italics, followed by our reply from 2017-04-13 in upright font, and additional clarification in blue font.

We would value further feedback and specification, and are happy to incorporate additional suggestions.

Reviewer comments

General issues:

*1) One fundamental issue in this paper intended for GMDD is that the work is not even connected to any model or modeling framework. The journal scope does not overlap with what paper is about or at least the connection is not made clear. Because there is no model, there is no model version – a requirement of the journal. There are only two words "model" in the whole paper, one of which is included in the last sentence of conclusions but probably in a different meaning: "We hope this framework can serve as a *model* for implementing community-sourced, distributed-development scientific code while combatting the deficiencies of current computational frameworks that limit accessibility, reproducibility, and extensibility."*

Author intentions for revision (2017-04-13)

The authors considered several journals before deciding where to submit our manuscript, and we came to this decision through taking into account the manuscript types requested on the Geoscientific Model Development (GMD) webpage. Specifically, we felt that our paper provides "…utility tools … such as coupling frameworks … with a geoscientific application".

We intend to clarify in the manuscript: The framework provides modular processing for surface-atmosphere exchange data with quality assurance and quality control as foundation for modelling exercises such as the application example in Sect. 3.2. This includes footprint modeling (GMD: Kljun et al., 2015), evaluation of large eddy simulations (GMD: Maronga et al., 2015), machine learning etc. The result is an end-to-end framework for model building,

parameterization and assessment considering the large amounts of theoretical assumptions in eddy-covariance technique that require corrections to the data. The combination of these tools to address the concern of reproducibility was a major consideration when submitting to GMD.

Per suggestion of referee #2 as well as the executive editor, in addition to Sect. 5 Code and data availability we will include the eddy4R-Docker framework version (0.1.0) also in the manuscript title.

References:

Kljun, N., Calanca, P., Rotach, M. W., and Schmid, H. P.: A simple two-dimensional parameterisation for Flux Footprint Prediction (FFP), Geosci. Model Dev., 8, 3695-3713, doi:10.5194/gmd-8-3695-2015, 2015.

Maronga, B., Gryschka, M., Heinze, R., Hoffmann, F., Kanani-Sühring, F., Keck, M., Ketelsen, K., Letzel, M. O., Sühring, M., and Raasch, S.: The Parallelized Large-Eddy Simulation Model (PALM) version 4.0 for atmospheric and oceanic flows: model formulation, recent developments, and future perspectives, Geosci. Model Dev., 8, 2515-2551, doi:10.5194/gmd-8-2515-2015, 2015.

Additional clarification by the authors (2017-04-20)

We further intend to clarify in the revised manuscript that eddy-covariance data processing consists of employing a sequence of models. These often originate from scientific sub-fields with corresponding publications, and eddy4R-Docker provides an integrative, yet modular and extensible framework for their concerted application and continued development. In its current form eddy4R-Docker v1.0.0 encompasses the following models: plausibility tests (Taylor and Loescher, 2013), de-spiking (Brock, 1986), lag correction, data aggregation, and QA/QC budgeting (Smith et al., 2014).

Additional models are in preparation for future extension of the eddy4R-Docker framework presented here: coordinate rotation (Wilczak et al., 2001), spectral correction (Nordbo and Katul, 2012), turbulent mixing and stationarity (Foken and Wichura, 1996), detection limit (Billesbach, 2011), turbulent sampling error (Lenschow et al., 1994), footprint analysis (Kljun et al., 2015), storage flux term, and uncertainty budgeting.

Please note that e.g. Kljun et al. (2015) is itself published in GMD.

References:

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Nordbo, A., and Katul, G.: A wavelet-based correction method for eddy-covariance high-frequency losses in scalar concentration measurements, Boundary Layer Meteorol., 146, 81-102, doi:10.1007/s10546-012-9759-9, 2012.

Smith, D. E., Metzger, S., and Taylor, J. R.: A transparent and transferable framework for tracking quality information in large datasets, PLoS One, 9, e112249, doi:10.1371/journal.pone.0112249, 2014.

Taylor, J. R., and Loescher, H. L.: Automated quality control methods for sensor data: A novel observatory approach, Biogeosciences, 10, 4957-4971, doi:10.5194/bg-10-4957-2013, 2013.

Wilczak, J. M., Oncley, S. P., and Stage, S. A.: Sonic anemometer tilt correction algorithms, Boundary Layer Meteorol., 99, 127-150, doi:10.1023/A:1018966204465, 2001.