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Some aspects of the energy balance closure problem

T. Foken, F. Wimmer, M. Mauder, C. Thomas, and C. Liebenthal
Department of Micrometeorology, University of Bayreuth, 95440 Bayreuth, Germany

Abstract. After briefly discussing several reasons for the energy balance closure problem in the surface layer, the paper focuses on the influence of the low frequency part of the turbulence spectrum on the residual. Changes in the turbulent fluxes in this part of the turbulence spectrum were found to have a significant influence on the changes of the residual. Using the ogive method, it was found that the eddy-covariance method underestimates turbulent fluxes in the case of ogives converging for measuring times longer than the typical averaging interval of 30 min. Additionally, the eddy-covariance method underestimates turbulent fluxes for maximal ogive functions within the averaging interval, both mainly due to advection and non-steady state conditions. This has a considerable influence on the use of the eddy-covariance method.

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