Geophysical Research Abstracts,
Vol. 11, EGU2009-4291-1, 2009
EGU General Assembly 2009

Quality assessment framework to utilize turbulent flux data for mesoscale models

W. Babel and T. Foken
Department of Micrometeorology, University of Bayreuth, Germany

Spatial heterogeneity has a strong influence on the reliability of meteorologically measured fluxes which transfer energy and matter between a given type of land surface and the atmosphere. Some QA/QC techniques and respective tools already exist to evaluate the quality of such fluxes from heterogeneous landscapes. In contrast, the aim of this work is to upscale measured fluxes with a certain footprint climatology to a coarser grid size of a mesoscale model. In this context a decision supporting scheme is developed whether measurements sufficiently represent fluxes from a certain target area for different grid sizes or additional modeling is needed to operate the desired flux conversion. This decision is not trivial as often (typically during nighttime) high deviations between the source area and the target area come along with low fluxes diminishing its relevance for some purposes.
Therefore deviances of a measured flux from the target area flux are discussed in principle. Further on model experiments are carried out with observed flux data and simple artificial landscapes, containing only two types of land-use. The source weight functions required to estimate the contribution of a certain land-use type are calculated from a forward lagrangian stochastic model. The investigated datasets stem from the LITFASS experiment 2003 in Lindenberg, Germany, covering a period of one month during the growing season from maize fields and rye fields, respectively. Additionally the performance of SVAT model runs (SEWAB) are evaluated serving as a reference for the calculated flux deviance. To strengthen the representativeness of the results, an analogue procedure is conducted under the very different conditions of the Tibetan Plateau using a half year long data set derived over bare soil and alpine meadow.
The resulting scheme distinguishes between various temporal scales hinting at different intentions of data utilization ranging from the usage of mean values for balances to the description of process dynamics. For future purposes this scheme should be included in a processing routine of measurement data to be upscaled for grid sizes of 1 up to 3 km.