EMS7/ECAM8 Abstracts,
Vol. 4, EMS2007-A-00174, 2007
7th EMS Annual Meeting / 8th ECAM

Analysis of short-term closure of the surface energy balance in different seasons.

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A correct determination of the surface energy balance is an important quality test for measurements of turbulent surface fluxes. The energy balance is often not closed especially in non-homogeneous terrain or in presence of orographic obstacles. Daily energy budget is more easily balanced, because of the contribution of energy residuals of opposite sign; however short-term closure is rarely obtained. What distinguishes this study from previous ones is the effort to close short-term energy budget, and to explore the factors that mainly affect the energy imbalance during the day. To this aim we analysed data sets from southern Italy collected above a semiarid terrain during summer and fall seasons. Our analysis has shown that the global closure rate significantly improves after the correction for the error dependent on the ultrasonic anemometer angle of attack and for the error dependent on the heat storage into the soil. Furthermore a significant reduction of short-term energy residual results by taking into account the contribution to the transport by 'large scale motions'. The obtained results are independent from the net incoming radiation.