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# Evaluation of the effect of the sub-kilometric scale terrain heterogeneities in the surface energy budget through observations and numerical modelling

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The point measurements of environmental variables, including the meteorological weather stations for operational or research purposes, are very rarely located in homogeneous terrain. However the assumption of homogeneity is customarily made. Structured local terrain variations may induce circulations which are not random (as is assumed for the turbulence eddies), and their effects might be treated as advection contributions in the equations of the variables of interest.
In this work we explore if the imbalances of the surface energy equation can be correlated with the well-documented variations on the soil and vegetation characteristics for the site-1 of the Boundary Layer Late Afternoon and Sunset Turbulence (BLLAST) campaign, held in summer 2011 on the northern foothills of the Pyrenees. Observational evaluation of surface heterogeneities and the corresponding air variablility was made through direct measurement and remote sensing. For air and surface temperature heterogeneities, horizontal transsects and vertical profiles were made by a remotely-controlled multicopter below 50 m and with a small UAV above.
On the other hand a simulation with a horizontal resolution of 80 m has been made for an area of 16 km x 16 km centered around site-1 over the Lannemezan plateau. The sub-kilometric circulations as seen by the model are explored and the statistics compared to those of a lower resolution simulation and to the ones computed experimentally for the site.