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Interactions among gravity waves, shallow drainage flows and turbulence in the stable boundary layer

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The interactions among turbulence and non-turbulent motions have been analysed for a single night using data from the Boundary Layer Late Afternoon and Sunset Turbulence (BLLAST) field campaign. The peculiarity of this night falls on the observation of several and different stable-boundary-layer (SBL) processes, including local shallow drainage flows, gravity waves and deeper katabatic winds during the SBL formation stage and early night. The local character of the shallow drainage flows (less than ten meters depth) has been analysed using wind and temperature time series at several locations. On the other hand, gravity waves features have been studied using high-frequency and precise data from an array of microbarometers. Finally, the interactions among these submeso motions and turbulence have been studied using data from several sonic anemometers deployed at different heights and locations. Multiscale techniques as wavelet analysis and Multi Resolution Flux Decomposition (MRFD) have been employed to carry out the study and have been demonstrated as very useful for this type of analyses.