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# The atmospheric boundary layer evening transitions: an observational and numerical study from two different datasets

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In this work we study the temporal evolution of the Atmospheric Boundary Layer (ABL) along the transition period from a diurnal typical convection to a nocturnal more frequently stable situation. This period is known as late afternoon or evening transition, depending on the specific definitions employed by different authors [1]. In order to obtain a proper characterization, we try to learn whether or not the behaviour of these transitional boundary layers is strongly dependent on local conditions. To do so, two sets of evening transitions are studied from data collected at two different experimental sites. These locations correspond to research facilities named CIBA (Spain) and CRA (France), which are the places where atmospheric field campaigns have been conducted during the last years, such as CIBA2008 and BLLAST 2011, respectively. In order to get comparable situations, we focus especially on transitions with weak synoptic forcing, and consider daily astronomical sunset as a reference time. A statistical analysis on main parameters related to the transition is carried out for both locations, and the average behaviour is shown as well as extreme values according to the timing. A similar pattern in the qualitative evolution of many variables is found. Nevertheless, several relevant differences in the progress of key variables are obtained too. Moisture, both from the soil and the air, is thought to have great relevance in explaining many of the differences found between the two sites. Some case studies are explored, focusing on the role played by the atmospheric turbulence. Complementary, numerical experiments are also performed using the Weather Research and Forecast (WRF) mesoscale model, in order to test the role of humidity, by artificially varying it in some of the simulations.

[1] Lothon, M. and coauthors (2014): The BLLAST field experiment: Boundary-Layer Late Afternoon and Sunset Turbulence. Atmos. Chem. Phys., 14, 10931-10960.