Simulating a high pressure situation over France using WRF and MesoNH

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Numerical simulations have been carried out with the weather prediction models MesoNH and the Weather Research and Forecasting model (WRF) for the field campaign Boundary-Layer Late Afternoon and Sunset Turbulence), to be performed during summer 2011 at Lannemezan, at the northern foothills of the Pyrenees. The chosen case study, 30 June -01 July, 2010, was dominated by a high pressure situation with weak pressure gradients thought to be climatologically typical for the period of the year and which fits with the focus of the BLLAST campaign. Under such conditions, thermally driven flow dominates in the form of upslope flows in a weakly stratified boundary layer during daytime and katabatic flows during a stably stratified boundary layer during nighttime. In the latter case, turbulence is typically very weak and the models' forecast skills close to the ground level rely heavily on surface parameterization schemes, which typically differ from model to model.

The aim of this study is twofold. On one hand we seek to establish knowledge on typical flow patterns for the area of Lannemezan and the greater plain in the north under the described weather conditions. Preliminary results show interesting flow patterns in night time, set up by the two dominating mountainous structures in the area, the Pyrenees and Massif Central. Recommendations based on these results are also made for positioning of ground-based and airborne instrumentation in and near Lannemezan during BLLAST.

Secondly, we compare the two models' ability to accurately resolve observed temperature and humidity fields and the associated flow patterns against surface observations and satellite data.