

Interactive comment on “A case study of a low level jet during OPALE” by H. Gallée et al.

Anonymous Referee #2

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The paper describes, with the model MAR, the acceleration of the wind (Low Level jet) in the PBL due to the cut-off of the turbulence. The subject is very interesting especially the connection between in the inertial oscillation and turbulence. Nevertheless, the lector would like probably to have more diagnostics and analysis.

In Fig2: the wind speed increases from 5m/s to 7m/s at 25m and above in the observations, it is less in MAR. Some comments ? Could you also explain when the model start the simulation at 00Utc 16th December or at 12UTC ? forecast length ? The initial condition ? A mean (30mn or 1h) vertical profile with the observed value along the mast and the model for theta, U and V at 16LT and 24LT would be interesting.

In general concerning the wind and the geostrophic wind above the mast, is it possible to have some information about the “reality” with sounding data or analysis from ECMWF or NCEP ?

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Line 85: The underestimation of the downward LW probably generates too cold surface temperature and then an overestimation of the vertical stability. This case was selected (line 67) because the surface energy balance was much better so the surface temperature is well simulated ? It is possible to prescribe the surface temperature in MAR ?

I am interesting to see the vertical profile of the wind budget (up to 100m) of the three contributions at 16LT and 24LT, in particular the advection and the PGF contribution.

In your plot PGFu is only $-\text{dphi}/\text{dx}$? so it is not really the term used in the budget equation ? It is the same legend for 5a and 5b ? 5a it is PFGu and 5b PGF ? Line 200 Figure 5a ?

I don't really understand line 195-198

Fig6: Could you add the tendency of the wind speed ? Could you also comment the change in the advection between 19LT and 23LT ? Is it local ? Is it the same above at 25m ?

Line 270: The IO disappears at 1h30 in the model, and as you said the turbulence is one possibility, advection also ? The turbulence starts with the SW , in the model and in the reality , but may be too active in the beginning or it is not the reason of disappearance of the IO in the model. Do you see also the IO in the observation below 14m and above at 25m ? The wind vector in the model is significantly different to the observed one around 4LT.

Cuxart et al (2006) with the GABLS1 case explain clearly the problem of the overestimation of the turbulence and the LLJ.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 31091, 2014.

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