

10.1 WRF-LES episode III: the microscale awakens.

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The next generation of global reanalyses has arrived with notable and improved features with respect to the previous ones. ERA-5 offers global hourly outputs with a resolution of 31 km since 1979 to now. Moreover, the new data assimilation system and the optimization of the physics packages reveal this new data-set as an authentic revolution in wind industry.

With the goal of adding new value to WRF, Vortex has been working since 2014 - with the external support of the National Center of Atmospheric Research (NCAR) – in the development of a seamless modeling chain based on WRF-LES for wind resource applications and under operative deadlines.

In previous WRF Users' Workshops (Montornes et al., 2016, 2017), we presented our learning and conclusions after one year of offering WRF-LES simulations to wind industry sector. We described two main challenges: i) a cooling problem observed at the first meters of the atmosphere and ii) the Terra-Incognita issue.

In this third episode of WRF-LES, we propose a discussion about two lines of development. First, we will explain some changes in the subgrid scheme for the lower PBL leading to a lower dissipation and hence, a solution for the cooling problem without increasing the number of vertical levels. Second, we will discuss new modifications in the output module allowing to save the entire domain at 4 Hz and opening new applications.

Montornes, A., Casso, P., Lizcano, G., Kosovic, B.: WRF-LES in the real world: Towards a seamless modeling chain for wind industry applications. 17th Annual WRF Users' Workshop. 2016.

Montornes, A., Casso, P., Lizcano, G., Kosovic, B.: WRF-LES in 250+ real sites: Learnings and Challenges. 18th Annual WRF Users' Workshop. 2017.